FINAL SUBMITTAL

HISTORIC SITE SURVEY
BELTSVILLE AGRICULTURAL RESEARCH CENTER

BELTSVILLE, MARYLAND

PREPARED FOR:

U.S. DEPARTMENT OF AGRICULTURAL
AGRICULTURAL RESEARCH SERVICE
CONTRACT NO. 53-3K15-5-9071
TASK ORDER NUMBER 14

VOLUME I
HISTORIC CONTEXT AND RECOMMENDATIONS

JUNE 1998

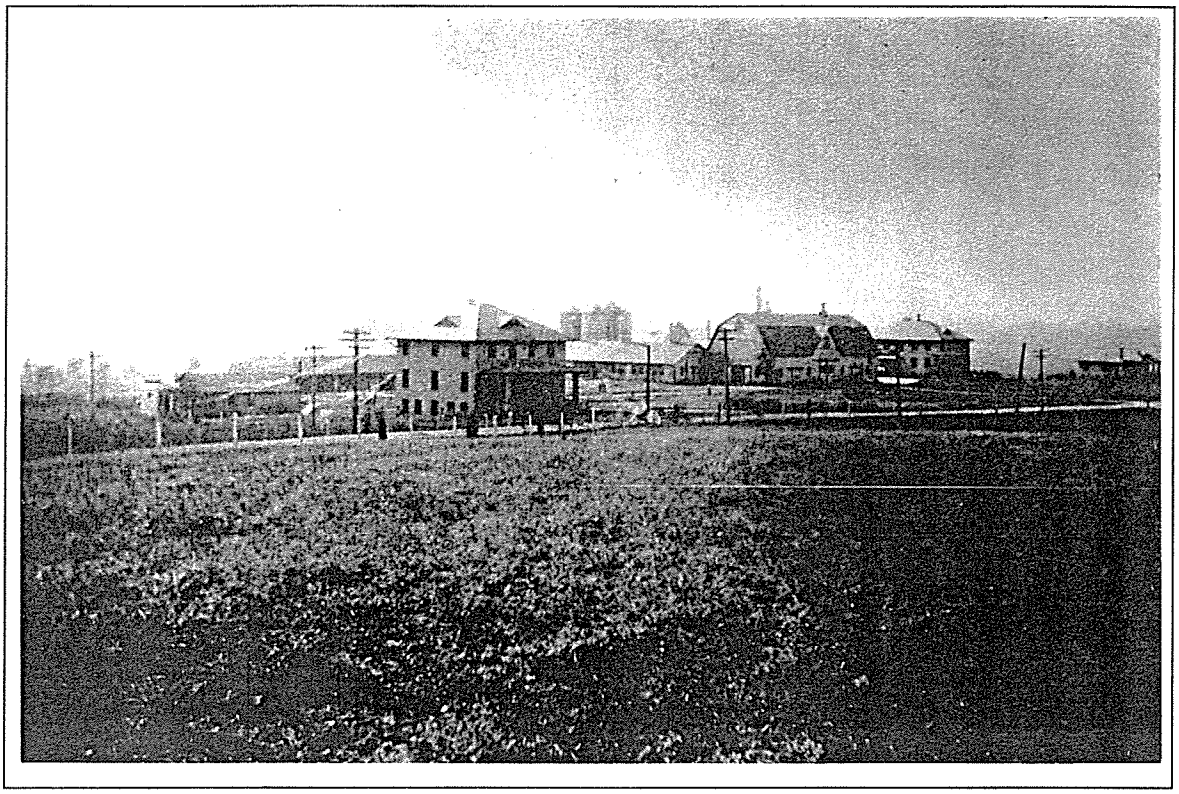
ROBINSON & ASSOCIATES, INC.
RHODESIDE & HARWELL, INC.

BJY J.O. 95314

BERNARD JOHNSON YOUNG INC.
Architecture • Engineering • Planning • Systems

BELTSVILLE AGRICULTURAL RESEARCH CENTER
BELTSVILLE, MARYLAND

HISTORIC CONTEXT AND RECOMMENDATIONS
VOLUME 1



Prepared for:
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

Prepared by:
ROBINSON & ASSOCIATES, INC.
&
RHODESIDE & HARWELL, INC.

In association with:
BERNARD JOHNSON YOUNG, INC.

FINAL SUBMISSION
JUNE 1998

FINAL SUBMISSION
JUNE 1998

BELTSVILLE AGRICULTURAL RESEARCH CENTER
BELTSVILLE, MARYLAND

HISTORIC CONTEXT AND RECOMMENDATIONS
VOLUME 1

Prepared for:
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
6303 Ivy Lane, Room 616A
Greenbelt, MD 20770-1433

Prepared by:
ROBINSON & ASSOCIATES, INC.
1909 Q Street, NW
Washington, DC 20009

&

RHODESIDE & HARWELL, INC.
320 King Street, Suite 202
Alexandria, VA 22314

In association with:
BERNARD JOHNSON YOUNG, INC.
6705 Rockledge, 3rd Floor
Bethesda, MD 20817

Contents

Volume 1

Volume 2 Landscape Forms (North, South, Linkage, Central, and East Farms)
Volume 3 Structure Forms (001-085B)
Volume 4 Structure Forms (156-288)
Volume 5 Structure Forms (300-543A)
Volume 6 Structure Forms (1002-1437)

(Note: The structures surveyed in Volumes 3-6 reflect extant buildings that are fifty years old or older.)

1.0 Executive Summary

In September 1996, Robinson & Associates, Inc., and Rhodeside & Harwell Incorporated, under an indefinite quantity contract administered by Bernard Johnson Young, were retained by the Agricultural Research Service (ARS) to conduct a comprehensive survey of, and preliminary National Register determination of eligibility for the Beltsville Agricultural Research Center (BARC). The project, the first of two planned phases, involved a comprehensive survey of all built and landscape features throughout BARC; contextual research on the bureaus conducting work at BARC; preliminary determinations of eligibility for all resources; and recommendations regarding how to proceed with National Register/Maryland Historical Trust (MHT) documentation. The following document is the result of the project. A planned Phase II of the project will involve the preparation of the appropriate National Register and/or MHT documentation form (see below).

Information collected in this project supplemented preliminary information gathered in three other historical investigations of the site conducted by Robinson & Associates, Inc. The first of these involved determinations of National Register eligibility for a number of buildings on the North Farm, and the research and writing of a preliminary overview of the history of the site. This first project resulted in a determination (approved by the MHT) that an area on the North Farm including Buildings 001-007, and 009-011 constituted a historic district that qualified for listing on the National Register. A second project conducted in 1996 by Robinson & Associates involved a study of the historical significance and National Register eligibility of the potable water system at BARC. This study resulted in a finding that the system by itself did not qualify for listing on the National Register of Historic Places. A third project conducted between 1995 and 1997 involved the investigation of 15 residences at BARC for National Register eligibility. This project resulted in a finding that two buildings qualify for listing on the National Register on an individual basis: Building 023 and Building 216. Other buildings included under this study were identified as warranting additional study (as potentially contributing elements to historic districts) in the current study.[1]

Personnel from Robinson & Associates who have been involved in the project include: Judith Robinson (Principal), Carol Hooper (Senior Associate), Heather Ewing (Associate), Stephanie Foell (Associate), David Bloom (Researcher), and Justin Edgington (Researcher). Project personnel from Rhodeside & Harwell include: Elliot Rhodeside (Principal), Perry Wheelock, Justin Dollard, and Jennifer Smith. Ian Firth and Richard Westmacott from the University of Georgia acted as project advisors, providing expertise on specific issues relating to agricultural history and National Register eligibility, conducting on-

[1]In addition, in December 1997, based on preliminary information derived from the present study, the Maryland Historical Trust concurred with a preliminary assessment that the Dairy Area (the 100-Area buildings) is eligible for the National Register.

site evaluations, and reviewing drafts.

Description of the Site

The Beltsville Agricultural Research Center (BARC) is one of the largest research facilities of the Agricultural Research Service (ARS), the main research agency of the U.S. Department of Agriculture (USDA). For over 60 years it has been the Department of Agriculture's principal experimental area and the leading and most diversified agricultural research complex in the world. The first portion of the site was acquired in 1910 for use by the Bureau of Animal Industry. The site expanded relatively slowly until 1933. At that time it was decided to move other divisions of USDA to Beltsville to make it the nation's "model experiment station for agriculture." Thereafter, with the support of a number of New Deal programs, both the land area and the built resources expanded tremendously. Much of the land acquired during this period was secured by the Resettlement Administration, which purchased land in the area for both the research center and the nearby (and related) Greenbelt project. The area of the site peaked at approximately 12,461 acres in 1938.

The site today consists of 6,582 acres. It is located in Prince George's County, Maryland, ten miles to the northeast of Washington, D.C., and roughly one mile north of Greenbelt, MD. The vast rural area consists mostly of open space and cultivated fields, with approximately 696 buildings and structures scattered throughout the site. Although most of the built resources are farm outbuildings, the site also includes a variety of resource types varying from laboratories to dwellings to office buildings.

Historically, the land that now comprises BARC was organized by groupings of buildings occupied by individual bureaus or divisions of USDA as well as a few unrelated federal agencies. The individual bureaus purchased, were given, or leased specific parcels on the BARC site. Of these, the Bureau of Animal Industry, the Bureau of Dairy Industry and the Bureau of Plant Industry were responsible for the largest building programs and land acquisition. Section 5.0 of this text discusses the physical evolution of these bureaus as well as the research or operations conducted by them.

Today, for organizational purposes, BARC is divided into five largely contiguous parcels or farms (see Figure 5). The 367-acre **South Farm** is the only farm not immediately adjacent to other farms. (It is now separated from it by I-495.) Located at the far southwestern end of BARC, it consists of open cultivated fields and a handful of small farm buildings. The land was purchased by the Bureau of Plant Industry between 1941 and 1943 and has historically been used for plant research. The **North Farm** is located immediately to the northeast of the South Farm and it includes 549 acres roughly bordered by Cherry Hill Road to the west, I-495 to the south, Sellman Road to the north and Route 1 (Baltimore Avenue) to the east. This farm was acquired in 1933 and expanded in 1940 by the Bureau of Plant Industry and consists of cultivated farmland to the west and a densely developed area to the east. The 460-acre **Linkage Farm** is located across Route 1 from the North Farm and across Edmonston Road from the Central Farm. With the exception of the multistory National Agricultural Library and the new USDA Beltsville complex, this 460-acre farm consists mostly of grassy fields and cultivated areas. The Linkage Farm was transferred from the Resettlement Administration to the Department of Agriculture and assigned to the Bureau of Plant Industry in 1938. The 2,980-acre **Central Farm**, the largest of the five farms, adjoins the Linkage

Farm across Edmonston Road to the east. Here, approximately a dozen clusters of farm or research-related buildings are interspersed with large areas of pasture and forested areas. The Central Farm includes the first parcel purchased by the USDA in 1910 for agricultural research and was greatly expanded in the 1930s. Historically, it has been the site of animal research under the aegis of the Bureau of Dairy Industry (BDI) and the Bureau of Animal Industry (BAI) and their successor research units. The 2,225-acre **East Farm,** acquired in the mid- to late-1930s as part of the New Deal expansion of the site, is adjacent to the east side of the Central Farm at the Baltimore Washington Parkway. It was the site of additional work by the BAI as well as other agencies including the Soil Conservation Service. This area is largely forested and has only a few clusters of buildings on it.

Methodology

For architectural and landscape historians, BARC represents a truly unique entity. For this project, factors such as the sheer size of the site, the strength of its interlocking landscape and built resources, and the numerous layers of historical significance and periods of significance created challenges and required innovative methodological solutions.

The first two tasks in the project, which were performed concurrently, were on-site survey and historical research. Prior to starting the on-site survey, reconnaissance-level survey forms for built resources and landscape features were designed and approved by ARS. Because of the complexity of the site, the content of the forms was arrived at after consultations with the National Park Service and MHT, and after thorough examinations of forms used on other contemporary projects with significant landscape components. Relevant National Register bulletins were also consulted. Built-resource and landscape forms were designed to provide individual evaluation of resources and to together function as a comprehensive analysis of the site. After a site test of the form, an on-site survey of all buildings and landscape features at BARC was conducted. Building forms were completed for all pre-1950 buildings and landscape forms were completed for each of the five farms. Although post-1950 buildings were surveyed to determine whether they qualified for the National Register based on their exceptional significance, none appeared to rise to this level.[2] The on-site survey task also involved photography of all pre-1950 buildings and significant landscape features.

Prior to beginning the research phase, a research plan was formulated which incorporated input from individuals at ARS, and others knowledgeable about the site and the field of agricultural history. The goal of the historical research was to provide the information necessary to evaluate the historical significance of both individual resources and the site as a whole. This was accomplished primarily through research on the bureaus within the USDA that conducted research at BARC from 1911 to 1947. These included the Bureau of Animal Industry (and within it the Animal Husbandry Division, the Zoology Division, and the Animal Disease Station), the Bureau of Dairy Industry, the Bureau of Entomology and Plant Quarantine, the Bureau of Agricultural Engineering, the Bureau of Home Economics, and the Soil Conservation

[2]In a few cases, however, it was clear that resources less than 50 years old would be eligible for the National Register when they reached the 50-year mark. Resources in this category have been so noted on the survey form.

Service.[3] Some research was also conducted on the other agencies outside of the USDA that had a presence at BARC. Most of the research was conducted at the National Archives and Records Administration (NARA) facility in College Park, Maryland. This work involved intense, exhaustive searches of approximately 20 Record Groups. The task was particularly time-consuming due to the fact that many of the record groups relied upon are seldom used (reflecting the overall lack of history on USDA subjects). Because the records are so rarely used, archivists know little about their content, and finding aids generally have not been updated or in some case were never prepared. Research was also conducted at the National Agricultural Library, the University of Maryland, and the Commission of Fine Arts. Midway through the research, access was obtained to historical records held by the Facility Engineering Branch at BARC. These records, which are located in Building 427, provided a great deal of new information about a number of areas of the site. Included within these records were a series of circa 1933 to 1938 maps of BARC which provided detailed site information. The large collection of plans and drawings maintained by the Facility Engineering Branch in Building 426 was also a primary source of information for the project. In a few cases, where no information was available from written sources, telephone interviews of current or former BARC employees were conducted. A request for photographs and other types of information was also made through local Beltsville newspapers and through the Friends of the Agricultural Research Beltsville (FARB) newsletter. Photographic resources (both still pictures and motion pictures) were also reviewed and duplicated (in the case of photographs) from NARA, and various local historians.

After completing most of the research and survey tasks, information was compiled into an historical context statement (Sections 2.0 - 4.0 of this report). Historic contexts are an integral feature of the National Register process. Organized by theme, place, and time, they provide a framework for determining the significance of a property and its eligibility for the National Register. This is accomplished in part by providing a vehicle by which to compare it to other similar resources. In the present case, such a comparison presents significant challenges because there are no comparable agricultural research facilities of the same size and scope as BARC. In addition, very little historical research has been done either on the other smaller, more circumscribed, USDA research facilities or on a majority of the state agricultural research facilities. To address this issue experts in agricultural history -- both from within the team and outside it -- were consulted. Their input, along with careful use of secondary sources and oral history sources informed the team's understanding of BARC relative to other research facilities. (See Section 2.0)

Because of the sheer size and complexity of the information uncovered, the context material was divided into three sections: a synopsis of the history of agricultural research in the United States, an overview of the history and development of BARC as a whole, and a section organized by bureau that addresses the work of the different entities that have conducted work at BARC (and the physical development of the individual areas under their charge). The context constituted the underlying basis for our recommendations regarding National Register eligibility. Based on it and our understanding of the physical development of the site and of the research conducted at the site, Robinson & Associates and Rhodeside & Harwell evaluated all resources against National Register criteria to assign preliminary National Register eligibility. This determination was based on National Register Bulletins 16A and 30 as

[3]Extensive research on the work of the Bureau of Plant Industry had already been conducted in a previous project.

well as other key guidelines. Findings are discussed below.

Phase II of this project, would involve the actual preparation of National Register of Historic Places Registration or Maryland Historical Trust Inventory forms. The text of the forms would be based primarily on the draft contextual information completed in this Phase I project. During the subsequent Phase II, certain additional detailed research would be completed to clarify any questions not resolved in the first phase of the project. In addition, this phase of the project would include the majority of the oral history interviews.

Aspects of Significance

The period of significance for the BARC site as a whole is defined as the inclusive 1911 to 1948 dates. This period of significance spans the establishment and New Deal expansion of the site and incorporates the period during which important agricultural research has taken place on the site up to the 50-year period, which according to National Register standards is the amount of time necessary to make objective evaluation possible.[4] The establishment date of the site was chosen as the beginning of the period because it marks both the beginning of a number of important research initiatives that were to continue over time, and because it represents the earliest USDA-related physical development at the site. This physical development provided the nucleus from which the massive New Deal development took place in 1933-1941. The end date for the period of significance represents a date 50 years from the present. This date was chosen because important agricultural research of national importance continues up to the present. (However, according to the National Register Criteria for Evaluation, properties that have achieved significance within the past 50 years can be listed on the National Register only if they display exceptional importance.) Although clear beginning and end points for the period of significance can be determined for the site, it should be emphasized that throughout this 37-year period BARC has produced important contributions to agricultural science. In many ways, rather than specific major discoveries (which it also has) it is this extraordinary continuous body of research that defines the importance of the site.

In order to judge the historical significance of the site, the history of the site and its components during the period of significance were evaluated using the National Register criteria. The relevant criteria, as listed in the *National Register Bulletin 16* (U.S. Department of the Interior, National Park Service, Interagency Resources Division), are as follows:

> The quality of **significance** in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> **A. that are associated with events that have made a significant contribution to the broad patterns of our history; or**

[4]National Register *Bulletin 15*, p. 41.

B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; . . .[5]

As a physically large site with a long period of significance, and as a site that has been the location of the work of dozens of different USDA divisions (as well as a score of other federal agencies), the significance of the BARC site is particularly complex. It has a number of types of historic significance, spanning different periods of time and, in most cases, spanning different areas of the site. However, as a property with a significant concentration of historic resources united historically by physical development, BARC was evaluated as a historic district (see Boundary Determination section).

Initial Determination of Eligibility under Criterion A

Under National Register Criterion A, there are two primary areas of significance for the site. First, the site and individual components within it have been the location of an enormous body of important, innovative, agricultural research of national scope and significance. Second, the site is an exemplary example of New Deal programs, policy, and planning, that had the specific involvement and interest of Franklin Delano Roosevelt and two of his closest associates, Rexford Tugwell and Henry Wallace.

As to the first of these, research-related accomplishments at the site are illustrated by the work of the bureaus which conducted work at the site. Although it is impossible to summarize the remarkable variety of work that has gone on at BARC, a few major accomplishments of the major research groups at BARC during the period of significance are highlighted below.

- The work of the **Bureau of Dairy Industry** at the site dates to the 1910s -- the USDA's earliest presence at Beltsville. Through breeding and feeding research, the Bureau's work at BARC significantly affected small dairy farms, larger commercial dairies, and dairy production and manufacturing industries throughout the country.

- The **Bureau of Animal Industry** constituted the largest entity at the site. Of the three parts of the Bureau with facilities at Beltsville, the **Division of Animal Husbandry** dominated both the development of the site and — simply by its size — the overall research effort. By the mid-1930s, BARC served as the center of the nation's fundamental research into animal husbandry. One of the major components of the Animal Husbandry program was the **Poultry Unit**. It was one of the original areas of study within the Animal Husbandry Division at BARC, as well as one of the areas that remained a critical focus of research that was national in scope. The research undertaken

[5]Criterion D relates to archeological resources. The current study did not include an archeological component.

by this division encompassed breeding, nutrition, physiology, and other fields. One of the more prominent accomplishments of the section was the development of the Beltsville Turkey, a smaller turkey with more white meat designed for smaller, urban families. The **Swine unit** of the Division of Animal Husbandry was also one of the largest and most important research units located at Beltsville. Since the establishment of the farm in 1910, the section conducted important research that significantly affected the swine industry throughout the world. Its work in improving both the size and health of the swine population has been particularly significant. Although not part of the earliest work on the site, the research of the **Zoology Division** of the Bureau of Animal Industry had an important impact on both farmers and a variety of animal industries. One of the most important discoveries to come out of the zoological research at Beltsville (which began in the 1930s) was the development of phenothiazine which had a major impact on the treatment of parasite infestations in various animals. Additionally, the basic discovery that many parasites spend a portion of their life cycles in insect hosts also brought about many innovative new approaches to preventing and treating infestations in livestock. The **Animal Disease Station** was also a component of the Bureau of Animal Industry. During the Station's tenure at BARC which began in the 1930s, many important contributions were realized including the development of an effective vaccine to prevent Bang's disease, the discovery that tubercle bacilli may be present in cream, ice cream, butter, and soft cheese for a considerable period of time following preparation, and the development of an approved method for sterilizing hides contaminated with certain infectious viruses.

- The **Bureau of Entomology and Plant Quarantine** came to BARC in the 1930s. The most significant work conducted at Beltsville by the Bureau was that of the Division of Bee Culture, which had its national headquarters on the site. The single most significant research accomplishment within the Bureau at BARC, however, concerned another division, that of Insecticide Investigations. The development during wartime of the DDT aerosol bomb, and the continued research after the war into aerial spraying to control forest insects, was one of the most important research endeavors at Beltsville.

- The work of the **Bureau of Human Nutrition and Home Economics** at BARC was particularly notable during World War II. Wartime research in the areas of nutrition and textiles yielded practical knowledge that aided both the civilian and military populations. This research contributed greatly to the overall war effort, both at home and abroad.

- Second only to the Bureau of Animal Husbandry in size, the **Bureau of Plant Industry** was one of the largest organizational components at BARC. The work of the Bureau was voluminous and much of it represents important stepping stones for agricultural research. In addition to fundamental research into such areas as photoperiod, much of the Bureau's research at BARC related in some respect to improving growing stock. Many of the varieties of soy beans in commercial use today, modern commercial blueberries, many currently used varieties of potatoes, Easter lilies, and zoysia turf, as well as the important forage crop lespedeza, all had their origin in work conducted by the Bureau of Plant Industry at BARC.

- The work of the **Food and Drug Administration** and successor organizations that conducted research related to insecticides has resulted in important discoveries linked to pesticides. The work has taken place under the aegis of a number of different agencies. Most significantly, research conducted at this facility played an important role in the development of aerosol sprays.

The other major area of significance for the site, also under National Register Criterion A, pertains to the New Deal expansion of the site. The large integrated research unit that is today BARC, is an exceptional example of New Deal planning and policies. In the early 1930s, USDA officials, including Roosevelt's close associates Under Secretary of Agriculture Rexford G. Tugwell and Secretary of Agriculture Henry A. Wallace, set about to create a national model experiment station for agriculture. As enunciated in various public documents, the rationale for the initiative echoed many of the basic themes that defined the New Deal.

Agriculture was a major focus of attention in the New Deal. Aside from the unemployed, no other group received as much attention from Roosevelt's administration than farmers. Tugwell in particular, saw the development at Beltsville as a means to ensure that small farmers, who were in the worst financial straights, had direct benefits from the New Deal. A large consolidated agricultural research center was a way to balance the scales; where other large businesses, such as the steel industry, could afford to operate their own research centers, farmers were too unorganized and too poor to afford such scientific research. The pressing need for a central farm experimental facility took on a greater sense of urgency in 1933 with the extreme drought and windstorms that created the dustbowl conditions in southwestern states.

The tremendous land acquisition and phenomenal building operation that went into creating a national model experiment station was bought and paid for by Franklin Delano Roosevelt's New Deal programs designed to relieve unemployment. Nearly $11 million in Public Works Administration (PWA), Civil Works Administration (CWA), Works Projects/Progress Administration (WPA) and direct appropriations to the Center were made between 1933 and 1941. Perhaps as important as this direct funding, however, was the involvement of the Civilian Conservation Corps (CCC). Much of the infrastructure at BARC (including sewer, water, electrical, roads/bridges, fences, landscaping/land clearing) was completed by the four Civilian Conservation Corps camps that were operating at the site by November 1935.

The influence of the New Deal can be seen today throughout BARC, and, perhaps, its most important representation is the sheer size and scale of the site. The land acquisition program under which most of the land area at BARC was purchased was massive. (The land that is today part of the BARC was acquired along with large areas of land that are now part of the town of Greenbelt and part of the Patuxent Wildlife Research Center) Also massive was the construction program. Today, most of the historic buildings on the site are a product of Depression-era construction.

Initial Determination of Eligibility under Criterion C

As noted earlier in the section addressing eligibility under Criterion A, BARC is significant for its contributions to agricultural scientific research and its relationship to the New Deal era. BARC, as a

setting for research and the physical manifestation of New Deal programs, also possesses significance in American history, agriculture, and architecture under Criterion C. Furthermore, as a significant distinguishable entity whose components may lack individual distinction, BARC meets qualifications under Criterion C necessary for evaluating it as a *district.* NPS Bulletin 15, *How to Apply the National Register Criteria for Evaluation*, notes that "a district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development." The identity of BARC as a district results historically from its research mission, its physical development under the New Deal, the involvement of professional design and planning professionals, and the interrelationship of its resources. These resources convey a common visual sense in terms of spatial organization, circulation, field patterns, woodland buffer zones, cluster arrangements, building types, and details of built elements.

National Register Criterion C states that a district must "possess integrity of location, design, setting, materials, workmanship, feeling , and association." In addition, a district should contain elements "that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction. NPS Bulletin 15 states that "districts typically meet the last portion of Criterion C plus Criterion A, Criterion B, other portions of Criterion C, or Criterion D." BARC in this respect meets both the minimum criteria of significance (the last portion of C plus A) and, in addition, meets the first and second portions of Criterion C: distinctive type of construction and work of a master.

Unique and Distinctive Types of Construction

BARC contains surviving examples of distinctive construction types for nationally significant, agricultural science research. The construction types at BARC derive from a number of agricultural scientific research disciplines.[6] These include concerns of agricultural productivity, economic viability, rural land use, soil conservation, and livestock and plant pathology.

NPS Bulletin 30, *Guidelines for Evaluating and Documenting Rural Historic Landscapes* also notes that significance, under Criterion C, for "rural landscapes, may also include [those] landscapes... laid out according to a professional design plan such as those published in agricultural journals and the State extension service bulletins."

Building clusters at BARC are arranged to form a large demonstration farm consisting of a series of experimental farms and research units organized by bureaus or divisions. At the beginning of the New Deal, USDA officials began the establishment of a national model agricultural experiment station at Beltsville. By 1937, USDA land holdings exceeded 12,000 acres, making it the largest demonstration farm unit in the world. The national stature of BARC influenced designs found in agricultural journals and service bulletins. BARC served as a destination point and resource for both individual farmers and academic agricultural scientists alike. While the research facilities at BARC were not intended to serve as

[6] Construction here refers to building clusters and landscape elements within a district.

direct models for farmers, the application of agricultural science for the planning and design of experimental farms was paramount. The representative farm types included: beef cattle, dairy, poultry, sheep, horses, swine, fruit, vegetable, silage, and forage crops. These experimental farms served as working models of farm layout and operations for individual farmers; the research efforts influenced planting techniques, crop management, and animal husbandry.

BARC represented the largest grouping of scientific experimental farms in the United States. Layout at each farm was directly associated with individual bureau research programs. Each farm contained specific, and sometimes unique, buildings and structures to support ongoing research. Because of the autonomy of each individual bureau, bureau employees generally oversaw the layout of their farms. For example, the Bureau of Dairy Industry employed its own engineers for developing building types and design plans. The dairy farm differed from the poultry area, as did plant industry from animal industry. Differences between farms and research areas are evident in terms of building materials, usually wood in the former and brick in the later, and in basic cluster arrangement. Farm clusters, particularly smaller animal shelters, were oriented functionally as individual sets of buildings with paved or gravel access roads, while the research units tended to be oriented as visible, related groups in campus-like settings that often included lawn panels. The Bureau of Agricultural Engineering, Division of Plans and Services also provided services throughout BARC. Common area-wide elements attributed to this bureau include barns, animal shelters, and research building clusters. These common elements lend a visual similarity between the various Bureau farms and research units.

The landscape at BARC is also representative of a unique and distinctive type of construction. This landscape has differed both functionally and visually from the surrounding vernacular landscape from the period of significance to the present. This difference is especially evident in BARC's spatial organization, land-use patterns and circulation network. Research plots were distinctive between Bureaus and overall to BARC itself. Research occurred across the entire BARC landscape and was not isolated to individual plots. Experimental plots were subject to field rotation. Their location was dependent upon individual research requirements. For example, Bureau of Plant Industry research plots existed at all five farms. A large-scale support infrastructure facilitated research and included silage and forage crops, secondary circulation patterns, woodland zones, and secondary building clusters. This infrastructure, as developed during the period of significance, maintains its physical integrity and accommodates changing research programs and techniques. Woodland zones provide another example of a landscape element not usually associated with vernacular farms. As managed woodlands, these zones physically separated bureau operations and provided distinct visual boundaries between BARC and its neighbors. These buffer zones were simultaneously used for experiments in silviculture, erosion control, and wildlife habitat during the period of significance by the Forest Service, Soil Conservation Service, and Bureau of Biological Survey.

Work of a Master

Albert Davis Taylor, a recognized master landscape architect, contributed to the early planning and design of BARC. (Additional information on Taylor is contained in the Historic Context statement and historic landscape survey forms.) *Sketch Study for Proposed Development of Property,* by A.D. Taylor and architect Delos Smith, dated March 1934, determined the initial physical development of the Central and

East Farms. Intact design and planning work by A.D. Taylor includes portions of the poultry area, the layout of the research facilities and entry drive at quarantine farm, layout of the Livestock and Poultry Institute buildings, and Powder Mill Road. The alignment of Powder Mill Road remains intact. This road was, and remains, the central circulation spine for BARC.

Boundary Determination

Based on archival and field survey data, the proposed historic district boundaries correspond to the current legal boundaries of the Beltsville Agricultural Research Center. BARC, as a scientific agricultural site, is distinct in the scale of its design and planning as the nation's largest demonstration farm unit, exemplifies the monumental scale of projects established or expanded under the New Deal, and is the site of nationally significant agricultural research.

The rural nature of the site remains intact to the current legal boundaries, preserving the original setting and landscape features of the property. As an agricultural research facility with both landscape and built features that reflect this unique use, BARC retains those resources that make it distinct from other traditional agricultural landscapes. Finally, the use of the site has, since 1911, been as an agricultural research facility. Although BARC has continued to evolve as a research farm, the resources that remain from the period of significance (1910-48) retain high degrees of integrity (see below), and new features, such as buildings and roadways, do not detract from the overall site integrity. Similarly, areas that have been subject to flexible uses are still intact. In all, BARC land-use patterns, spatial organizations, circulation networks, and building clusters retain high degrees of integrity, resulting in a determination to include the site to its current legal boundaries as a potential historic district.

One of the most significant aspects of the site is simply its size and scale. This characteristic of the site is a component of both its scientific significance, and its significance as a New Deal site. The bold concept of one vast central agricultural research area epitomizes New Deal policy with its willingness to experiment and its abundant supply of money and workers. As to research, the sheer size of the site permitted a wealth of diverse scientific experiments that could not be matched anywhere else. Its scientific significance is also linked to the fact that it was the largest land area devoted to agricultural research in the United States, and perhaps the world. Distinct changes in visual character outside of BARC also support the use of the current legal boundaries in determining a historic district. From a visual approach, with few exceptions, the rural character of BARC is dissimilar from most of the surrounding area, which primarily includes residential suburban and commercial suburban strip development.

According to National Register *Bulletin 21*, the process of selecting boundaries can be approached in seven different ways; distribution of resources, historic boundaries, natural features, cultural features, cartographic features, arbitrary limits, or current legal boundaries may all be used to determine appropriate boundaries. National Register guidelines also state that the selected boundaries for a historic district should be those that "encompass eligible resources and are consistent with its historical significance." Land should be included to the extent that it was "actively used, managed and controlled by historic land

use or ownership."[7]

One portion of the historic district has been identified as discontiguous. Although originally tenuously linked to the North Farm, today the South Farm is separated from the rest of the site by the large and intrusive Capital Beltway (I-495). According to National Register guidelines, discontiguous districts are most appropriate where: the elements are spatially discrete, the space between the elements is not related to the significance of the district, and visual continuity is not a factor in the significance.[8] In this case, the South Farm has always been largely visually separated from the North Farm (see Figure 5), land has been lost that formed part of the original link, and the intrusion of I-495 is major. Thus, a discontiguous district is appropriate. Although there are other locations within BARC that are separated by roads not owned by BARC (for example, the East Farm is separated from the rest of BARC by the Baltimore Washington Parkway), in general these roads do not present major visual barriers between the separate sections of the site. In the case of the Baltimore Washington Parkway, since at least 1933, when the most significant historic master planning was done for the site, it was contemplated that the Parkway would cross BARC land, although the exact position of the site was not determined until later, when the road was completed. The Parkway is roughly contemporary with BARC and has historical links to the site. In addition, Powder Mill Road, the heart of the New Deal plan for BARC passes, uninterrupted under the Parkway.

Areas that are no longer part of the site and that would not be part of the potential historic district include a number of smaller non-ARS owned parcels which generally do not retain integrity and the large and intact Patuxent Wildlife Research Center, now owned by the Department of Interior.[9] The area contained within the current boundaries of the site, although considerable smaller than the historic site, is large enough to convey exceptionally well the distinct scale of this important New Deal site and its nature as a unique large-scale agriculture research landscape.

More difficult to dismiss was the possibility of nominating a concentration of resources. A number of options relating to this factor were considered, and ultimately rejected, by the team. The potential boundaries that the team considered, fell into two categories: 1) a coextensive subset of the built resources and the land, and 2) the entire site and a subset of the built resources. As to the former, a number of approaches were explored including nominating the area with the highest density of contributing resources (the existing North Farm Survey District plus a central spine running along Powder Mill Road with associated bureau-related clusters off of it), nominating a single cluster of resources that embodied the quintessential characteristics of the site, and nominating resources associated only with certain of the bureaus (if they could be shown to be more significant than the others). As to the latter, the team also explored the possibility of nominating the entire land area and reducing the number of contributing built resources by, for instance, eliminating all but those that were directly involved in significant continuous

---

[7] National Register *Bulletin 30*, p.24.

[8] National Register *Bulletin 15*, p. 6.

[9] The Patuxent Wildlife Refuge was not included in this study, and an evaluation of its eligibility for listing on the National Register has not been made. Because it was part of the BARC site for a relatively short period of time, if a study of the site concluded that it qualified for listing on the National Register, it seems likely that it would most appropriately be listed as a separate historic district.

scientific experimentation (this would, for instance, eliminate service buildings).

These alternatives failed for a number of basic reasons. The first, as stated above, is simply its size and scale--one of its most significant aspects. Creating a historic district smaller than the entire site would diminish this quality.

An additional problem encountered by the team in trying to draw the boundaries around a concentration of resources was the fact that the site exhibits a strong consistency throughout much of its acreage. Particularly with respect to built resources, a majority of the historic resources represent similar levels of significance; few rise above, or fall below, a similar level of significance. For this reason, it is difficult to eliminate certain buildings or areas as "more significant" than others. Although there are a handful of buildings and landscape features that rise above all others in terms of significance, this very small number of resources does not in any way convey the significance of the site as a whole. This problem is in large part attributable to the history of the site and the fact that it is not based on a hierarchal system. Because of the autonomy of the individual bureaus, there are no meaningful "centers" or "headquarters" on the site that can be isolated and preserved as representative of the site.[10]

Given its strong basis in the historical record and the problems associated with other approaches, the team believes that the most defensible National Register boundaries for the site correspond to the current legal boundaries. These boundaries meet National Register requirements in that they include all eligible resources, are consistent with the site's historical significance, and include only land that was actively "used, managed and controlled" by the ARS and its predecessor organizations. The team's determination is also strengthened by a common sense/visual approach to determining the boundaries. With few exceptions (most notably Patuxent), the rural visual character of BARC is absolutely distinct from most of the suburban and suburban-strip development that is directly outside of BARC's legal boundaries.

Major Contributing and Noncontributing Resources

Historic resources at BARC and that were present during the period of significance, relate to the documented significance of the property, and possess historic integrity are considered contributing features to the proposed historic district.[11] For the purpose of the initial determination of contributing and noncontributing features of the proposed historic district at BARC, a high percentage of contributing features have been identified due to the continuous use of the site as a large-scale agricultural research landscape with buildings that support this function.

- The landscape survey forms identify resources by specific categories, including: vegetation, topography/grading, circulation, and small-scale features. The contributing resources that date

[10]Although Building 307 did contain the Office of the Director of the Beltsville Research Center, until the creation of the Agricultural Research Service, this office had no authority relating to scientific research that went on at the site.

[11]National Register *Bulletin 16A*, p.16.

from the period of significance include, but are not limited to, field patterns, circulation networks, and woodland buffers. Because of the continuity in land use at BARC, these resources retain a high degree of integrity, and contribute to the historic integrity of BARC. (For individual determinations of contributing and noncontributing landscape features, see the Beltsville Agricultural Research Center--Survey Forms: Landscape/Volume 2.)

- The building forms identify individual built resources. Contributing resources that date from the period of significance include laboratories, barns, residences, and storage buildings. A majority of buildings are designated as contributing resources. Instead of altering older buildings, the trend at BARC was to either demolish or abandon unwanted buildings, [12] and few remaining buildings have been significantly altered on their exteriors. (For individual determinations of contributing/noncontributing built resources, see the Beltsville Agricultural Research Center--Survey Forms: Structures/Volume 2.)

Integrity

Overall, the team observed a very high level of integrity, both for the site as a whole and for individual site elements. Because of the continuity of ownership and mission for the property, land use and land patterns generally have changed little over the years. Similarly, built resources generally have not been significantly altered on their exteriors --for the most part older buildings have either been demolished or abandoned.

This integrity also carries over to the site as a whole. The rural nature of the site remains intact within the current legal boundaries and overall BARC retains the setting and landscape features that make it distinct from other traditional agricultural landscapes. Although the site has evolved over time, new features for the most part do not detract from the overall integrity of the site. With a few exceptions, the new construction that has occurred on the site is not substantial enough to overwhelm the historic resources. Examples of the few areas where there is a concentration of non-contributing features include the Linkage Farm, where major contemporary buildings and landscape are vastly different from their historic counterparts. Similarly, at the Animal Disease Station, a collection of frame buildings (including Buildings 1200-1203) were demolished and reconstructed on the same site using concrete blocks.

In general, BARC shows an unusual degree of integrity to its period of significance, i.e., 1911-1948. Consistent with its appearance during the period of significance, the site still consists of small-scale developed areas set in cultivated fields and forested areas. Under Criterion A, the clusters of development and landscape forms highlighted above strongly retain elements of integrity. Although all contain certain new, and/or noncontributing elements, these elements do not detract from the overall integrity of the site. Specifically, the site retains a high level of integrity of location, design, setting, workmanship, materials,

[12]Demolition was not significant enough to deplete the buildings stock from the era of significance.

feeling, and association.

Implementation Considerations/Recommendations

Before deciding that the most appropriate vehicle for the National Register designation of the site encompassed the entire property, many other options were considered and rejected by the team. Specifically, the team analyzed the possibility of nominating only a co-extensive subset of the built resources and the land, and the possibility of nominating the entire site and a subset of the built resources. As to the former, a number of approaches were explored including nominating the area with the highest density of contributing built resources (the existing North Farm Survey District plus a central spine running along Powder Mill Road with associated bureau-related clusters off of it), nominating a single cluster of resources that embodied the quintessential characteristics of the site, and nominating resources associated only with certain of the bureaus. The team also explored the possibility of nominating the entire land area and reducing the number of contributing built resources by, for instance, eliminating all but those that were directly involved in significant continuous scientific experimentation (this would, for instance, take out service buildings).

Although it is the team's professional recommendation that the whole site qualifies for listing on the National Register as a historic district for the above stated reasons, given the many unique aspects of the site, the team recognizes that there may be smaller boundaries and/or different solutions that could potentially (although clearly not as well) meet the Secretary of Interior's Guidelines. To explore the possibility of a smaller or different district the team suggests that at the beginning of Phase II of the project a meeting be held with representatives of the Maryland Historical Trust to ensure that they concur with the team's conclusion that no other viable eligibility findings exist.

Assuming that ARS agrees to move forward with National Register designation for the entire site, given the size and complexity of the potential historic district, the team would urge the adoption of a particularly flexible approach to managing historic resources. This approach would emphasize the importance of the current clusters of development and the overall pattern of open land and developed areas. It would encourage new, sympathetic development within the existing clusters, in areas having high concentrations of noncontributing resources, or in new locations that do not diminish the visual continuity of the contributing portions of the site. Given the number of built resources that contribute to the historic district, flexibility should also be encouraged in, for instance, dealing with contiguous resources that are not otherwise significant and that are repetitive in design (e.g., Buildings 1120-22, 1140) or that represent only slightly varied designs (e.g., Buildings 1405-08). At the same time, however, it should encourage, where possible, the reuse, rather than the demolition, of existing buildings that do not currently meet the needs of the ARS but may be adopted to accommodate future needs. Because insuring that ARS can continue its operations on the site is a vital component of the site's integrity, a guiding principle of the approach must be to emphasize the importance of permitting the on-going operation of BARC as a scientific research center.

In order to promote such a flexible approach, there are a number of potential tools which could and should be used to streamline historical review processes (such as the Section 106 process) on the site. These

include:

- A Programmatic Agreement (PA) can simplify the Section 106 process for an entire program. PAs are specifically appropriate when effects are similar and repetitive, or relate to routine management. Thus, for instance, it can clarify what activities constitute "maintenance" and need not be reviewed, or the process that needs to be gone through when similar activities need to be done to similar buildings. (A BARC-specific example would be that a standard replacement material could be specified in the PA for the repair of the prevalent red asbestos roofs.)

- Another important tool is a preservation or management plan. These plans are designed to provide information on the management, maintenance and use of historic resources. Often called for in PAs, preservation plans establish processes for integrating the use of historic resources with the mission of a federal facility. They can be used by the agency in lieu of standard review under the regulations. A key to successful preservation plans lies with having knowledgeable individuals with specific training in the area of historic preservation involved in their implementation. In addition to discussing the process involved in dealing with existing historic resources, the plans often also include design guidelines to inform new development.

The team suggests that concurrently with the development of the National Register and/or MHT form called for in Phase II of the project, other successful MOAs and historic preservation plans should be sought out that could serve as models for BARC. The National Register of Historic Places, the National Conference of State Historic Preservation Officers, and other federal agencies' historic preservation officers would all be appropriate places to begin such a search.

2.0 HISTORY OF AGRICULTURAL RESEARCH IN THE UNITED STATES

Because farmers have been developing new methods of efficiently producing food and raising livestock since the earliest days of farming, it is difficult to put an exact date on the beginnings of agricultural research in the United States. However, the nineteenth century saw a revolution in scientific knowledge due in part to improvements in agricultural industry, as well as the establishment of agricultural education in the United States. This era marks the beginning of formalized agricultural research in the United States, and the involvement of local, state, or federal government in funding this research.

During the mid-19th century, there were numerous calls from both within and outside the American farm community for agricultural research and a practical education directed at those involved in agrarianism. As the amount of arable farmland decreased, farmers began to realize that they needed to produce higher yields per acre. Not only would this increase yields, but it would also increase profits for farmers.

The argument for an agricultural education was also spurred on by the desire to raise the stature of farming as an occupation. A letter to the American Farmer in 1857 addressed this and other points:

> *It [agricultural education] will afford facilities for the instruction of men in the science and practice of farming. It will secure for each State a reservoir of intelligence. It will elevate a vocation which by some, because not understood, has been looked upon as a subterfuge for the indolent, or as a successful mode of securing a living to the industrious.*[13]

Many saw agricultural colleges as a way to increase widespread knowledge and end the isolation that often limited the success of farmers. By establishing colleges in each state, local farmers could benefit directly from the knowledge and resources of these institutions. Due to the level of support for the establishment of agricultural colleges, it was apparent that agriculture was a national concern and "fraught with consequence to our national prosperity."[14]

The first agricultural school was established in 1854, when Pennsylvania chartered the Farmer's High School, which later became Pennsylvania State University. Michigan and Maryland soon followed, and on July 2, 1862, the Morrill Land-Grant Act led to the establishment of 65 other agricultural and mechanical colleges.[15] With an emphasis on agriculture and the mechanic arts, these institutions provided the "laboring" and "industrial" classes with solid instruction in agriculture as well as a scientific and liberal

---

[13]Wayne D. Rasmussen, ed., *Agriculture in the United States: A Documentary History* (New York: Random House, 1975), p. 580.

[14]Rasmussen, *Agriculture in the United States: A Documentary History*, p. 579.

[15]George H. Callcott, *A History of the University of Maryland* (Maryland Historical Society: Baltimore, 1966), pp. 131-132.

education that would ensure success "in the several pursuits and professions of life."[16]

In addition to land grant colleges, agricultural societies played a large role in the spread of scientific knowledge and research to farmers across the country. Though initially forming after the Revolutionary War, agricultural societies grew tremendously in the period between 1827 to 1851. Usually specific to a geographic area's concern or interest, societies represented cotton planters, fruit growers, dairymen, livestock ranchers, and a multitude of others. These societies and organizations enabled farmers to get together "to learn from each other, each to see what others are doing and how they do it, and to have their wits sharpened by the rubbing of mind against mind."[17] New farm tools and machinery could be introduced on a wider and more universal scale. Another benefit of agricultural societies was their promotion of "book farming," which referred to the scientific analysis of agriculture as opposed to the hands-on field work of farming. Prior to agricultural societies, book farming was viewed by farmers as theoretical, useless, and largely separated from the practice of actual farming. With the publishing of pamphlets and agricultural newspapers, book farming further enabled farmers to use science and experimentation to better their profession.

Due to the widespread effectiveness of agricultural societies and the success of agricultural colleges, the call for establishing research and experiment stations became a priority. Early agricultural experiment stations at Yale and Harvard in the 1860s and 70s proved successful and added to the consensus that these stations would prove beneficial. By the late 1880s, agricultural leaders were exerting pressure upon Congress to create experiment stations that would be closely affiliated with the agricultural colleges. On March 2, 1887, President Cleveland signed the Hatch Act, which provided federal grants to states for agricultural experiment stations. The purpose of these stations according to the Hatch Act was:

> *to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.*[18]

---

[16]Rasmussen, *Agriculture in the United States: A Documentary History*, 632.

[17]Ibid., 1222.

[18]Ibid., 1232.

It was the experiment stations that laid the foundation for substantive agricultural research in later years and by 1889 there were 46 state agricultural stations operating in 39 states. The federal government provided a majority of the support for most of these stations under the Hatch Act.[19] The Hatch Act was followed soon after by the Second Morrill Act of 1890, which appropriated additional money to each state "for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established."[20] The act further solidified the government's commitment to agricultural research and knowledge.

Meanwhile, research was also going on at the federal level. Some early plant research, for instance , dates to the first half of the 19th century, and in 1856, the Commissioner of Patents employed the first federal botanist in the Patent Offices' Agricultural Division. The Department of Agriculture was established in 1862 and research continued along a number of separate lines. Research became more formalized with the establishment of national bureaus under the Department of Agriculture to perform research and scientific experiments. In 1884, the Bureau of Animal Industry was created, with the following stated purpose:

> *to investigate and report upon the condition of the domestic animals of the United States, their protection and use, and also inquire into and report the causes of contagious, infectious, and communicable diseases among them, and the means for the prevention and cure of the same, and to collect such information on these subjects as shall be valuable to the agricultural and commercial interests of the country.*[21]

The Bureau of Animal Industry was followed in 1901 by the Bureau of Plant Industry, which was created to conduct experiments on plant diseases and improve plant stock. Establishing these national bureaus forwarded the beneficial partnership between regional experiment stations and national research efforts. It was this partnership that was responsible for much of the gains in scientific agricultural knowledge that occurred in later years.

At the beginning of the 20th century, in an effort to bring scientific knowledge to the rural farms that existed outside the influence of agricultural colleges, extension and demonstration work was created. Rather than pass scientific information to farmers by decree or formal academic lessons, demonstration work relied on special agricultural agents to visit rural farmers and demonstrate scientific and more efficient agricultural methods. Often, a "demonstration farm" was used as a site to teach new farming techniques, which resulted in farmers learning quickly through a "hands on" approach.[22] In later years, extension and demonstration work developed into rural field schools and agricultural boys' clubs. These

---

[19]Ibid., pp. 1238-39.

[20]Ibid., p. 1258.

[21]Ibid., p. 1228.

[22]Ibid., p. 1372.

developments further increased the impact of extension and demonstration work upon rural farming.[23]

Increased pressure to fund basic agricultural research on a broad basis resulted in Congress passing the Bankhead-Jones Act of June 29, 1935. The Bankhead-Jones Act represented a major shift in agricultural research. The Secretary of Agriculture was authorized to conduct scientific, economic, technical, and other types of research through the USDA, experiment stations, and land-grant colleges. This research was to address principles that would reveal answers to broad, underlying agricultural problems. Research was to focus on improving the quality of agricultural commodities, and to develop new and improved methods for production and distribution of products. Also marked for importance was the discovery of new uses for farm products and by-products, the study of conservation, development, and the use of land and water resources for agricultural purposes. New funds were allocated for further developing the cooperative extension service. The idea behind this major change in research was stated best by the Secretary of Agriculture in his annual report of 1936:

> *The principal function of this Department is scientific research. All its other activities, such as weather and crop reporting, the eradication or control of plant and animal diseases and pests, the administration of regulatory laws, highway construction, and economic guidance, are the practical expression of research results. Research is the primary thing, the keystone of the entire structure of the Department's functions and services.*[24]

Even though the Bankhead-Jones Act focused on establishing agricultural research on basic principles, certain areas of research became more specialized and reflected the issues of the times. During the Depression era, research focused on contributing to relief measures and emergency action programs. The Soil Conservation Service was a direct result of drought and soil erosion in the Dust Bowl states. Better farming procedures and marketing of goods was of primary importance during this time.

Similarly, during the years of World War II, agricultural research centered on assisting the war effort both at home and abroad. The individual bureaus focused on finding uses for as many animal by-products as possible. The Bureau of Human Nutrition and Home Economics developed a method of sterilizing wool, thus enabling the armed forces to treat blankets and uniforms to decrease the risk of bacterial infections. The home economists also developed recipes that contained nutritional supplements that might otherwise have been lacking due to war rationing.

Another important aspect of agricultural research in the twentieth century was the atmosphere of cooperation between state and federal researchers. While state researchers were located at local stations, the largest grouping of federal researchers was located BARC. An assemblage of USDA research departments, including the Bureau of Animal Industry and the Bureau of Plant Industry, BARC

---

[23]An early example of extension work was the Farmers' Cooperative Demonstration Work, which was created by the Department of Agriculture. One aspect of the Farmers' Cooperative Demonstration Work was an intensive effort to interest young boys in farming. Individual boys were given small acreage which enabled them to compete against other boys in organized competition. Thus, the Farmers' Cooperative Demonstration Work served as both an extension of agricultural education into rural areas, as well as a mentor service for potential young farmers.

[24]Rasmussen, *Agriculture in the United States: A Documentary History*, p. 2538.

represented a national commitment to agricultural research for the country. This network of BARC and state experiment stations was responsible for much of the important gains made in agricultural research in the 20th century. The interrelationship between state and federal research centers was organized in large part by the Office of Experiment Stations. Established in 1888 during the Hatch Act, the OES changed names during the years, but was responsible for authorizing cooperative federal and state agricultural research programs. As a result, although state experiment stations and BARC operated independently, there was sharing of research and personnel. Very rarely were the results of experiments a surprise to other researchers. Information was shared at state, regional, and national levels to benefit from other scientists knowledge. Most of them knew what their colleagues' findings involved as the research progressed. Additionally, this approach decreased the chance of repetitious work being conducted at separate locations.[25]

Specializations were more likely to occur at regional stations. For example, Texas experiment stations focused on raising beef cattle, while others specialized in areas that involved climate, soil or specific regional crops, such as cotton. Some research, such as experiments in soil and climate, were regional in nature and could only be performed in particular geographic areas. Local scientists were pressured to apply statistics to their experimental work in a way that could prove an actual economic benefits to local farmers. For example, statistics proving how much more milk a cow might produce on a certain diet were more important than a scientific contribution that did not have a provable economic benefit. Regional labs usually took the lead on research for any problems that affected only a portion of the country.

Research that would have a large pool of beneficiaries was usually conducted at BARC, while areas with only regional significance were conducted at state or regional levels.[26] When catastrophic events, such as a disease of epidemic proportions or a plant blight, occurred, BARC generally took the lead in research, particularly if the epidemic had far-reaching economic consequences. Scientists at BARC did have a great deal of autonomy in terms of choosing their research topics, but usually had to focus on areas that would provide information in demand. Therefore, the research needed to yield not only scientific data but also applied science. In addition, BARC researchers had to sell the ideas to the Secretary of Agriculture, who then asked Congress for funding. Generally, Congressional representatives wanted to know how the research would help their constituents. Ultimately, farmers needed to be able to use the information that resulted from BARC research.

Overall, BARC focused primarily on broad scientific research as opposed to the specialized state experiment stations. This focus on basic research enabled the state stations to create solutions to regional agricultural problems. The importance of BARC was best stated in a Department of Agriculture publication,

> *Every state in the Union has an agricultural experiment station. These stations, however, deal primarily with local problems. For broad, basic information, vital for the solution of these local problems, they must look to a well-financed, well-staffed, and well-equipped organization that*

---

[25]Telephone interview with Wayne D. Rasmussen (longtime employee and expert on the history of the USDA), by Stephanie Foell, May 1, 1997.

[26]Ibid.

can approach each problem in a completely objective manner and study it from every angle for as long as necessary, with no need for a consideration of the purely local application of results. Such is the type of organization at Beltsville.[27]

[27]NARA, RG 16, Entry 32, Box 1.

3.0 OVERVIEW OF THE DEVELOPMENT OF THE BELTSVILLE AGRICULTURAL RESEARCH CENTER 1911-1950

3.1 PRE-USDA HISTORY OF THE SITE (PRE-1911)

The Beltsville site was part of a colonial grant to the Snowden family.[28] The area around Beltsville began to develop after 1742 when the town of Bladensburg was established on the Anacostia River. Bladensburg was to become one of the busiest Maryland ports in the second half of the 18th century. In the 18th century, it was the center of a large tobacco farming area. By the early part of the 19th century, however, things began to change in the area as tobacco farming largely ended due to the depletion of the soil. It was replaced with smaller-scale grain and vegetable crops. Another major change was the opening of the Baltimore-Washington Turnpike (Route 1) in the early 19th century and the opening of the Baltimore and Ohio Railroad in 1835. A new town developed at one of the railroad stops and it (Beltsville)[29] soon replaced Bladensburg as the local market town. The roads that evolved thereafter communicated to and from the railroad line. Population in the area increased in the decades after the Civil War, as an increasing number of residents commuted into Washington, or, for those who were in the building trades, commuted into the closer-in suburbs (such as Hyattsville and Berwyn Heights) that were under construction. Early in the 20th century, two trolley lines came into the area: the City & Suburban Railway line (which followed what is now Rhode Island Avenue extended from downtown Washington to Laurel) and the Washington, Spa Spring, & Gretta Railroad (which followed what is today Bladensburg Road and Edmonston Road from Washington to Berwyn Heights).

The oldest structure on the BARC site is Building 209 (Walnut Grange), a Federal-style brick plantation house with a distinctive "butterfly" plan (Figure 1). Although the building was much altered over time, the original sections of it apparently date to around 1805. The building was once the centerpiece of the large estate known as Black Walnut Levels, owned by Mary Snowden Herbert, a daughter of Major Thomas Snowden one of the principal early landholders in the area. It was constructed at the time of her marriage to John Carlyle Herbert, a U.S. Congressman. After a major fire, the house was rebuilt in 1857. The house and surrounding hundred-acre parcel was purchased by Richard D. Hall from the Executors of Mary Herbert in 1859. At that time the property was described as containing approximately 700 acres, a large orchard of choice fruit, an excellent garden, and a variety of outbuildings including a Switzer barn, a stable, a carriage house, a smoke house, an ice house, a dairy, a kitchen, servants' quarters. The 375-acres purchased by the Halls remained in their family until the site acquired by the USDA in 1910. At the time the property was transferred to the government, a large brick bank barn, the smokehouse, and several slave quarters were still standing and in good condition.[30]

---

[28] Susan Pearl, "Walnut Grange," Maryland Historical Trust State Historic Sites Inventory Form.

[29] The name "Beltsville" came from the Belt family, early settlers in the area.

[30] Susie Beall, "Birmingham Manor - The Snowden Grant," undated and unpublished manuscript.

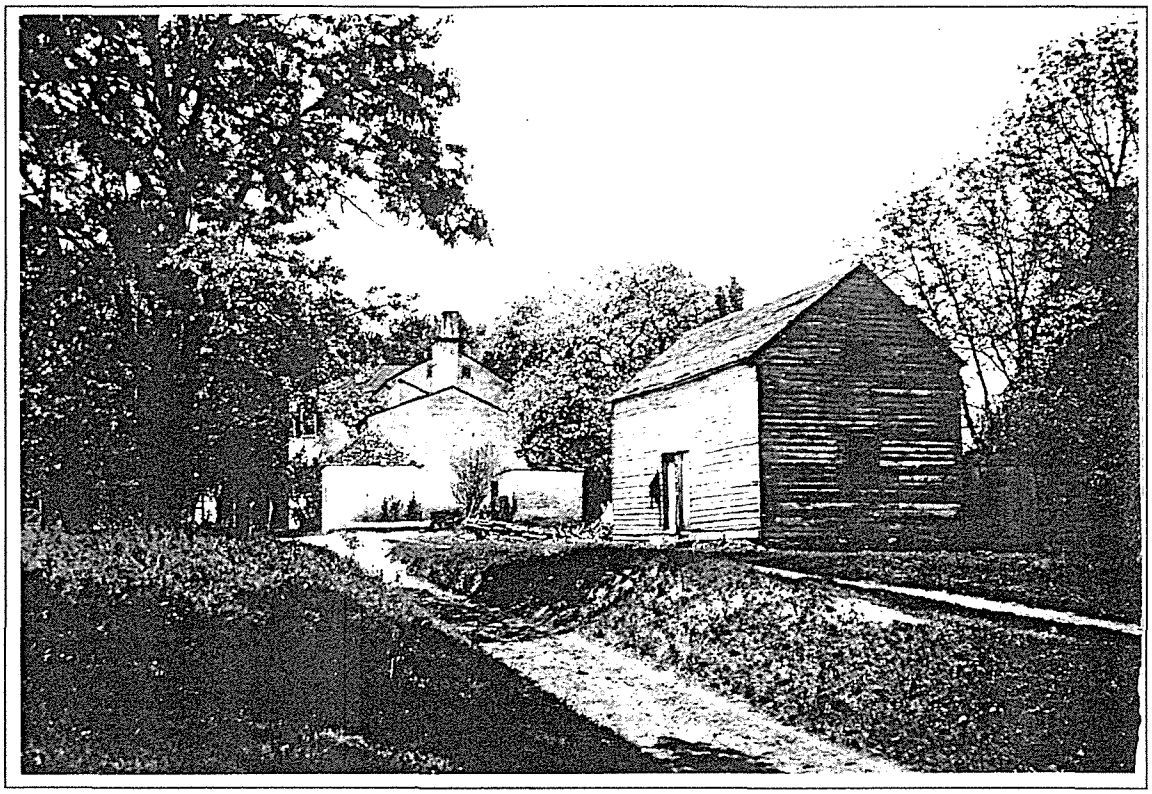


Figure 1 - Walnut Grange outbuildings at U.S. Experimental Farm, no date

Approximately a half dozen other structures predate Department of Agriculture occupancy of the site. In general, these include residences and small, related outbuildings. The earliest of these is Building 216 (the William Shea House) which dates to around 1850 and also was part of the Herbert family ownership in the area. Most, however, are simple wood farmhouses dating from the early to mid-20th centuries. Illustrative buildings in this category are Building 023 (the Sellman House) (1905), and Building 522 (Hayden Farm) (1912). Many of these structures are included in the Prince George's County Historic Resources Inventory.

3.2 EARLY USDA USE OF THE SITE (1911-1933)

Department of Agriculture facilities first came to the Beltsville area in 1910. By that time, land on which to conduct experiments at the 110-acre USDA Bureau of Animal Industry site in Bethesda, Maryland, was becoming scarce. Unable to afford expansion in Bethesda, the Bureau purchased 475 acres of farm land (now part of the Central Farm) at a cost of $25,000. The land was purchased under the authority of the Act of March 4, 1909. The Farm Dairy and Animal Husbandry Divisions (the latter a new division in the USDA) moved to the new site.[31] Extant on the site were buildings valued at $5,000, one of which was

[31] Some facilities of these divisions remained in Bethesda until after the mid-1930s, when $265,000 was allocated to move the remaining facilities to Beltsville.

Walnut Grange.

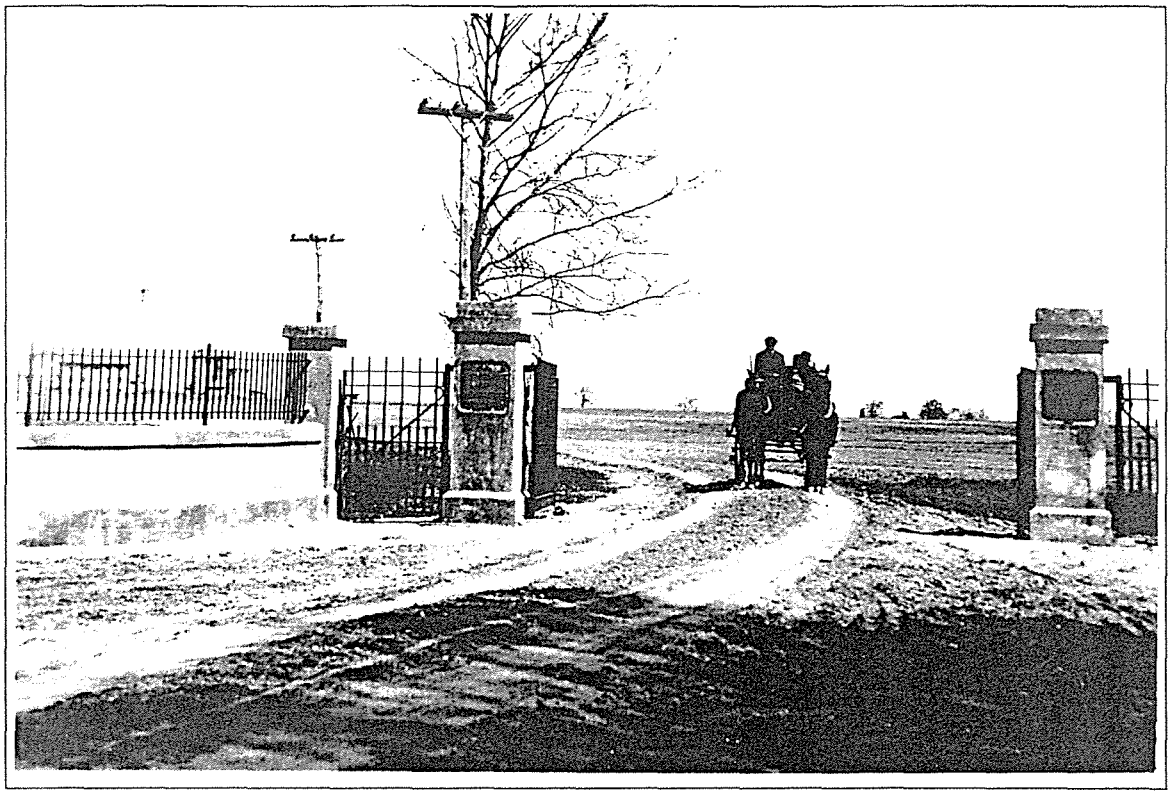


Figure 2 - Original entrance to U.S. Experimental Farm, 1910-1924

The site was fenced and became operational within the first year (Figure 2). By 1912, the "experimental farm" had new buildings and site improvements valued at $16,996 and annual salaries for workers at the site amounted to $12,904.[32] In 1924, when the Dairy Division became a separate bureau of the Department of Agriculture, the land was divided up between the two bureaus, with the Bureau of Dairy Industry receiving 190 acres, and the Bureau of Animal Industry receiving 285 acres.[33] The former continued experiments with dairy cattle breeding, and research on forage crops, silage, and milk research. The latter continued work on poultry and swine research and started research with Barbados and Karakul sheep and, later, intensive farm production of sheep. Additional land was purchased with regular bureau or general USDA appropriations in 1925, 1930, and 1932 (Dairy Industry) and in 1926 by Animal

[32]"Experimental Farm, Beltsville," NARA, RG17, Entry 3, Box 54.

[33]Information about acreage acquired varies greatly between sources. For instance, one document from the Bureau of Animal Industry indicates that they acquired 306.5 acres in the initial 1910 purchase. Memorandum to Mr. Barnett, BAI File Room from Victor H. Sehorn Administrative Assistant, February 2, 1931, NARA, RG 17, Entry 3, Box 54.

Industry[34] (Figure 3). By 1929, improvements on the Animal Husbandry land alone were valued at $224,465. Their land included 50 permanent buildings, including offices, laboratories, residences, barns, storage houses, a garage, a mill and shops, along with approximately 160 small animal and poultry houses. After 1932, large expansions in both land and physical improvements were funded largely by Public Works Administration monies and were part of the major New Deal expansion of the site discussed below.

[34]This was authorized by the Act of May 11, 1926, through the Office of the Secretary of Agriculture "for the purchase of additional land for experimental purposes adjoining the experimental farm of the Department of Agriculture near Beltsville, Maryland."

DATE	SIZE-ACRES	PURCHASER
1910	475	Bureau of Animal Industry
1925	129	Bureau of Dairy Industry
1926[35]	1,058	Bureau of Animal Industry
1930	80	Bureau of Dairy Industry
1932	114	Bureau of Dairy Industry
1933	1,811	Bureau of Animal Industry
1933	424	Bureau of Plant Industry
1934	854	Bureau of Animal Industry
1934	19	Bureau of Dairy Industry
1935	131	Bureau of Animal Industry
1937	7,164	Transferred From Farm Security Agency
1938	402	Transferred From Farm Security Agency
1938	10	Agricultural Research Center
1940	-2,238	Transferred to Patuxent Wildlife Refuge
1940	28	Bureau of Plant Industry
1941	551	Bureau of Plant Industry
1941	819	Transferred From Farm Security Agency
1941	108	Transferred From Farm Security Agency
1942	27	Bureau of Plant Industry
1947	128	FFMC

Figure 3 - BARC - Major Land Purchases/Sales 1910-1950[36]

[35]This land was purchased in two parcels in 1926. A confirmatory deed in 1927 changed the acreage to the above (Figure 4).

[36]Source: C.A. Logan, *Brief History of the Agricultural Research Center*, September 1962 (Unpublished). It should be noted, however, that other acquisitions may not be included in this list.and the acreage given may be approximations. Other sources provide different figures relative to both dates of acquisition and acreage. See, e.g., United States Department of Agriculture, *National Agricultural Research Center*, 1939, p. 1.

3.3 NEW DEAL BOOM AT BELTSVILLE (1930s-1940s)

3.3.1 Creation of the Beltsville Research Center

> *Such a scientific clearing house had long been needed, but it did not become indispensable until 1933. In that year droughts and dust storms brought disaster to thousands of farm families,—many of them already suffering a chronic poverty. These calamity showed, with inescapable emphasis, the penalties for a century of reckless husbandry. They made America recognize, for the first time, the need for a planned agriculture—for more efficient methods, better crops, wiser use of land resources.*
>
> *An unprecedented responsibility at once fell on the Department of Agriculture. Washington became the planning center for both emergency aid and long-term corrective measures. Faced with a flood of questions from local authorities, government officials found themselves wiring and telephoning all over the country for technical information. Worse still they could not watch their policies tried out without traveling hundreds of miles. Every day the forces for a central unit to co-ordinate research became more pressing.*
>
> *The nucleus for such a unit already existed near Beltsville, Maryland about eight miles from the Capital . . . Then, in early in 1933, department executive decided to develop this station into a large-scale testing ground.*
>
> *The result is the National Agricultural Research Center, largest farm demonstration unit in the world. Its area has been expanded to 15,345 acres through the purchase of 11,230 acres of neighboring land—much of it sub-marginal—by the resettlement administration.*[37]

Beginning in the early 1930s, USDA officials began discussing the possibility of transferring more research facilities to Beltsville.[38] The idea was to establish a national model experiment station for agriculture. The rationale for what was to become a greatly expanded facility had some practical aspects (such as the economy associated with grouping facilities in one geographic spot) but was also linked closely to some of the overall themes of the New Deal.

Agriculture and farmers were a primary subject of concern in the New Deal. Conditions on American farms had reached crisis conditions by 1932. Farm prices, which had generally declined since World War I, tumbled to half of what they had been in 1927, and farm income dropped to its lowest level in twenty-six years.[39] Crop prices did not cover production expenses and millions of farmers were foreclosed upon. Dustbowl conditions worsened the already dire straights of western farmers. Given these problems a host of programs aimed at the farm community were initiated under Roosevelt's administration. New Deal

---

[37]"National Agricultural Research Center, Beltsville, MD" (1937), U.S. Resettlement Administration. The actual acreage under the control of the USDA never reached 15,345 acres.

[38]C.A. Logan, *Brief History of the Agricultural Research Center*, n.d.

[39]Ronald L. Heinemann, *Depression and New Deal in Virginia*, Charlottesville: UVA Press, 1983, p.105.

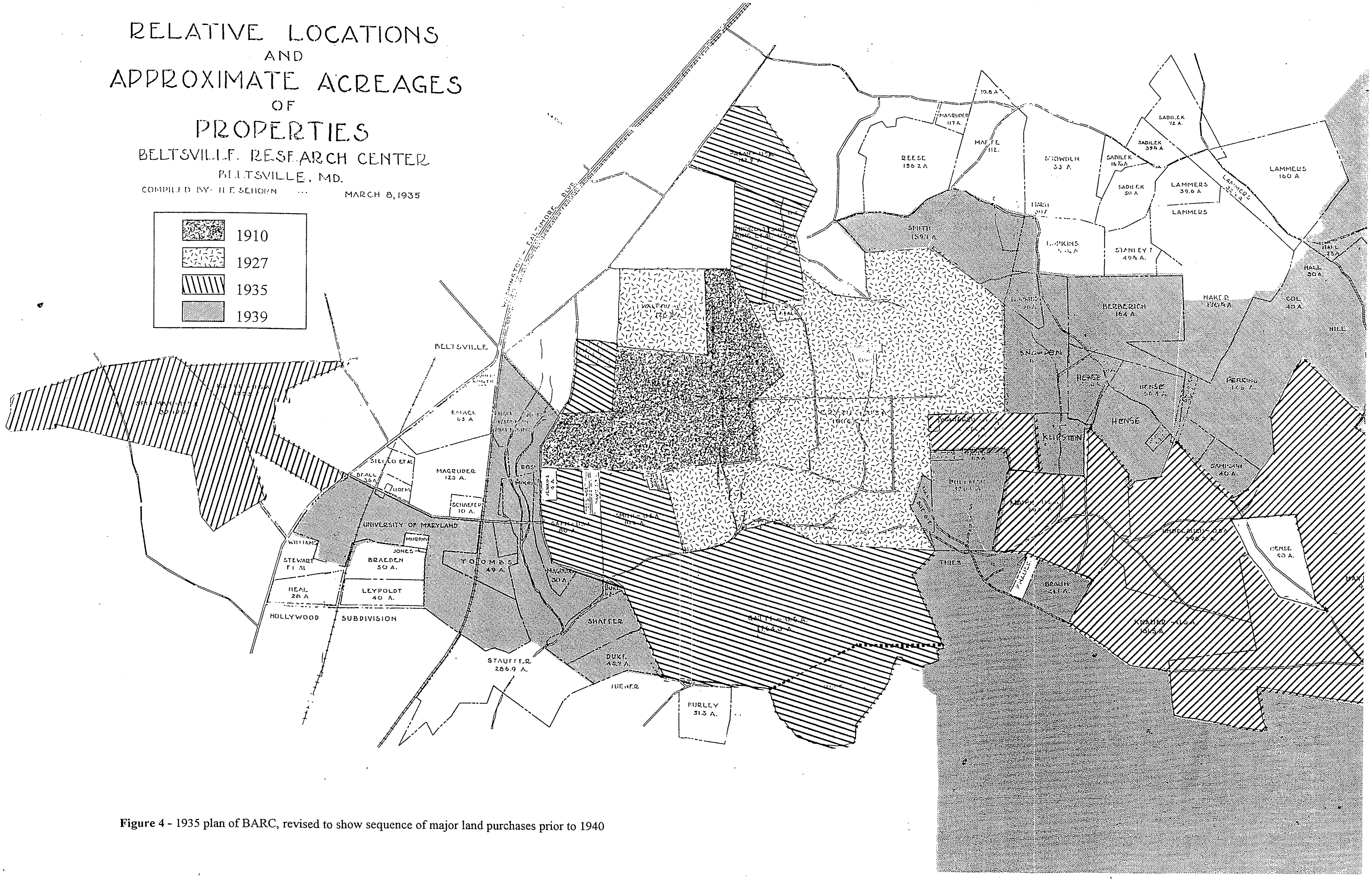


Figure 4 - 1935 plan of BARC, revised to show sequence of major land purchases prior to 1940

farm programs addressed farm prices, farm living conditions and poor soils

There was a concern in the administration that small farmers were in the worst financial straights and weren't benefitting from other New Deal programs.[40] It was suggested that "other big American industries—steel companies, for example—operate research centers for the benefit of all their members," but that farmers were unorganized and could not afford food or clothing let alone scientific research.[41] This was also seen as a watershed period in terms of the necessity of scientific research. According to Secretary of Agriculture, Henry Wallace:

> *As we move towards economic and social co-operation, we need more science . . . In our pioneer period, and for long afterward, the trial and error process worked. It produced mistakes, but the mistakes did not drag down whole communities. Now things are different. With public agencies making decisions in farm production, land settlement, and land use, blind experimentation more and more must give place to knowledge. Though science cannot eliminate the risks, it can lessen them.*[42]

Although each state had an agricultural experiment station and there were a plethora of USDA field stations, these stations dealt primarily with local problems. Prior to 1933, however, there was no central farm experimental facility charged with coordinating the work of the states and conducting basic research with possible application to the entire country. These basic issues took on a greater sense of urgency in 1933 with the extreme drought and windstorms that created the dustbowl conditions in southwestern states.

---

[40]Rexford Tugwell in particular believed that programs like the AAA benefitted large farmers and lobbyists but did little for poor farmers on poor lands. He also took a dim view of the Extension Service. Bernard Sternsher, *Rexford Tugwell and the New Deal* (New Brunswick: Rutgers University Press, 1964), 262.

[41]"National Agricultural Research Center at Beltsville," circa 1936-41. NARA, RG 16, Entry 32, Box 1.

[42]"National Agricultural Research Center, Beltsville, MD" (1937), U.S. Resettlement Administration.

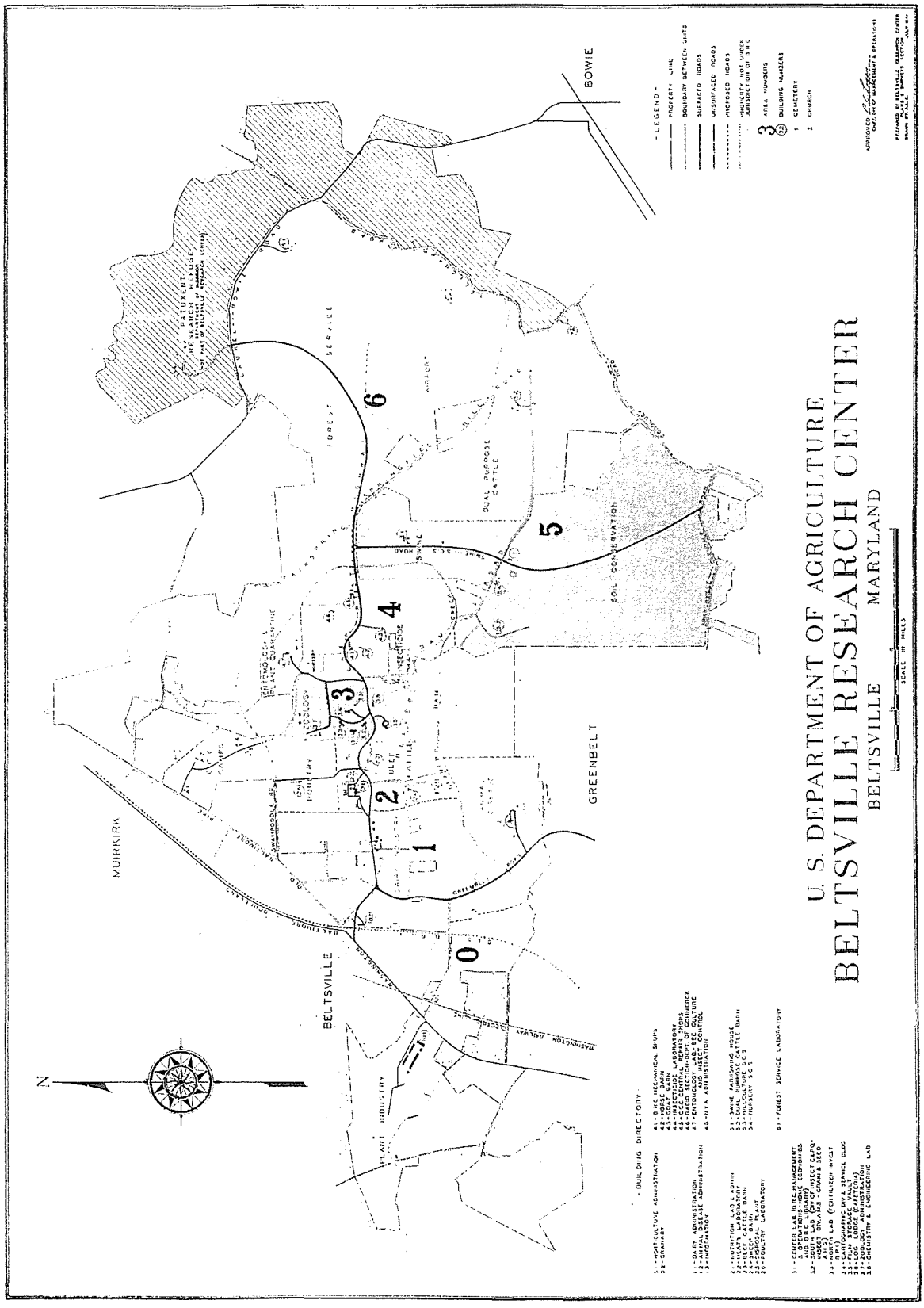


Figure 5 - Location of individual bureaus at BARC, 1941

According to one source, the idea of creating the Beltsville Research Center (BRC) came out of a meeting took place in July 1933 with Assistant Secretary of Agriculture Rexford Tugwell, Earl Sheetz, Chief of the Division of Animal Husbandry and William A. Jump, Department of Agriculture Budget Director. At the meeting, it was decided to concentrate Department of Agriculture activities at Beltsville, and to create a large, unified, federal agricultural research center. Such a facility would consolidate research and researchers from Washington and Bethesda and other smaller research centers (such as Somerset, Maryland, and Takoma Park, Maryland). Agencies and bureaus were to move their operations as their facilities became available. Part of the Pathology and Zoological Divisions of the Bureau of Animal Industry came to the site in 1933. The Food and Drug Administration was established at the site in 1934, the Animal Disease Experiment Station of the Bureau of Animal Industry and the Bureau of Entomology and Plant Quarantine came to the station in 1935, and active operations by the Bureau of Biological Survey, the Forest Service, and the Soil Conservation Service at Beltsville began in 1936[43] (Figure 5). The Bureau of Agricultural and Industrial Chemistry, the Bureau of Human Nutrition and Home Economics, the Bureau of Agricultural Engineering, and the Production and Marketing Administration came to the site in the late 1930s or early 1940s. Working initially on rented land, the Bureau of Plant Industry came to the Beltsville area in 1932. The land on which they were located, to the west of the Dairy and Animal Industry areas, was purchased the next year using PWA funds. Although from the establishment of the Beltsville Research Center, the Plant Industry Station (as it was known) was considered part of the Center, because it was not originally contiguous to the rest of the site, was not used for animal research, and was not part of the same set of land purchases, it was considered a separate unit in terms of a number of factors, such as the early master planning of the site.

Thus in August 1934, in order "to provide for the most beneficial use, in the interest of agriculture as a whole, of the land, buildings and other facilities of the Department in the Beltsville area,"[44] all of the work at Beltsville as well as research going on at the USDA Plant Introduction Station at Glenn Dale, Maryland, was grouped together as part of the Beltsville Research Center.[45] It was to be "the major proving ground for the development of the idea of centralized control for department field stations." Despite the quite strong impetus for centralization, the overarching BRC central organization related only to the physical plant and never extended to the research being conducted. Given the historic independence of the various Bureaus operating at Beltsville, the central organizing scheme was resisted by the Bureaus, which continued to operate relatively independently throughout the 1930s and 40s.[46]

---

[43]The use of part of the BARC site for airplane landings also began around this time. What was referred to as "Emergency Landing Field Site Number 57B came under the jurisdiction of the Department of Commerce's Bureau of Air Commerce. See Section 4.9.2.

[44]Memorandum No. 648 - Beltsville Research Center, August 28, 1934, Memorandum issued by Secretary of Agriculture H.A. Wallace, NARA, RG 54, Entry 2, Box 1032.

[45] In 1919, the Bureau of Plant Industry acquired land in Glenn Dale, Maryland, for a plant introduction station. It was often referred to as the Bell Station. The Center's title was changed to the National Agricultural Research Center in 1935.

[46]Even after the individual Bureaus were abolished in 1953, their research continued to be organized in more or less the same way until 1972. It has been suggested that the historic resilience of individual parts of the USDA to change was a function of their ability to win earmarked appropriations from the Congress.

3.3.2 The Role of Rexford Tugwell and Henry Wallace

The tremendous growth that took place at the Center would have been impossible without Franklin Delano Roosevelt's programs designed to relieve unemployment and without the personal intervention of two USDA officials, Secretary of Agriculture Henry A. Wallace and Under-Secretary Rexford G. Tugwell. Both Wallace and Tugwell had particularly close ties to FDR, Tugwell was part of his "Brain Trust" and Wallace was to become his running mate in the 1940 election. Both were quite liberal members of his administration and Tugwell in particular was one of the more controversial and outspoken members of Roosevelt's inner circle. Both men took a direct interest in the Center, pushing ahead construction that would otherwise have taken years to get approved. According to one source, "Their visions for the place . . . contemplated a growth and an improvement that would in one year outdistance all that had been achieved before."[47]

In his *Addendum to the Diary for the Hundred Days*[48] Tugwell described his role in the Beltsville expansion:

> *Another activity in which I was engaged at this time was the preliminary planning for what became the National Agricultural Research Center at Beltsville, Md., just outside of Washington.*
>
> *The possibilities in such an institution were called to my attention by various Bureau Chiefs; but I think I can claim to be responsible for the subsequent embodiment of our combined thinking in a going institution.*
>
> *What occurred during the next few years would not have been possible in ordinary circumstances. Only because emergency funds were available to be processed outside the usual budget procedures were we able to purchase the large tracts of land, improve them, and build the many necessary facilities. If these sums had been submitted in a budget to the Congress they would have met the determined opposition of the extremely powerful land-grant-College lobby and Congressmen, always anxious for funds to be spent in their own localities . . .*
>
> *That, of course was why I—and others in the Department—were so glad to seize this unusual opportunity. It would not be long before emergency funds would no longer be available . . . Practically everything at the modern Beltsville dates from the years 1933-36.*[49]

---

[47]"Manna From New Deal Again Falls Richly On Green Pastures of Beltsville Test Farm," *The Washington Post*, October 20, 1934, p.1.

[48]Roosevelt took office in 1933, and this constituted Tugwell's recounting of the first hundred days of the Roosevelt administration.

[49]Michael Namorato, ed., *The Diary of Rexford G. Tugwell* (New York: Greenwood Press, 1992), 365. Tugwell's perception that he was responsible for pushing ahead the Beltsville expansion is supported by Secretary of Agriculture Wallace who stated, "Rex also had vision in pushing for the acquirement of an enlarged area of land for the Beltsville Experiment Station . . . Rex was as far ahead of me in sensing certain things as I later turned out to be ahead of the American People." Quoted in Raymond Moley, *The First New Deal*, New York: Harcourt, Brace & World, Inc., 1966, p. 261.

Tugwell apparently lured Franklin Roosevelt to Beltsville in March 1935 to show him how things were progressing. According to Tugwell's *Diary*:

> *Yesterday he [FDR] and I drove to Beltsville and went over the whole property. He was much surprised at its scale and took a great interest in everything. One of his saving qualities is an enormous interest in physical construction and growth . . . One thing I wanted him to see at Beltsville was the hill to the south of the farm where I would like to build a city for the Resettlement job. He liked it and approved the scheme. He asked me why we didn't find a better name than Beltsville. I had thought before of naming it the Theobald Smith Research Center. I must attend to this.*[50]

As early as 1933, Tugwell had also invited Eleanor Roosevelt to visit Beltsville and the potential subsistence homestead project.[51]

3.3.3 Greenbelt and the Subsistence Homestead Project

Early in his tenure at Agriculture which began in March 1933, Tugwell was persuaded of the wisdom of greatly expanding the federal land area at Beltsville. He was also a strong supporter of, if not an initiator of, the idea of establishing a Subsistence Homestead settlement to the south of the Agricultural Research Center. The Subsistence Homestead program, initially part of the Department of the Interior, was related to the back-to-the-land movement but was specifically aimed at the relocation of urban families to rural self-sufficient communities.

The initial goals of the Beltsville Subsistence Project were to "demonstrate the value of small farms for full-time and part-time workers . . . [and] to insure a dependable supply of reliable men for carrying on the work of the Federal and State experiment stations in the vicinity of Beltsville." Other goals were to protect the station from "commercial exploitation" and to "control and protect" the Beaver Dam Creek watershed. The plan for the project called for establishing 200 homes in approximately three or four groupings with acreage for each house varying from two to ten acres. In addition, common areas for pasturage and wood were planned. According to the slightly latter master plan (see below) the site planned for the community was located directly east of the Animal Disease area. This parcel of land, the 764-acre Gatti tract, was purchased by the Bureau of Animal Industry in December 1933. During the same month a $226,540 allotment from the Civil Works Administration (CWA) was set aside to do "planning and development of land, drainage, roads, fencing, sewage and seeding approximately 1500

---

[50] Tugwell, *Diary*, pp. 226-227.

[51] "Letter From Assistant Secretary of Agriculture Tugwell to Mrs. Franklin D. Roosevelt," November 7, 1933. Records of the Secretary of Agriculture. NARA, RG 16, Entry 17, Box 1834. So far, research has not revealed whether Mrs. Roosevelt took up Tugwell's offer, although there is extensive anecdotal evidence that she did make an early visit to Beltsville during the course of which she pointed out an area.that she thought would be a good location for what was to become Greenbelt. It is clear that she visited Greenbelt later when it was under construction.

acres of a 3000-acre tract for community development work in subsistence homesteads project."[52] This initial money was allocated to the Bureau of Animal Industry's Animal Husbandry Division as Federal Project # 13. According to a progress report, the project faced difficulties because plans for the project had not progressed sufficiently. It appears that much of the federal allotment was used for surveying and for the preliminary clearing of some land. Work was begun in December 1933 and ended in April 1934. In that time, 1500 acres site was surveyed, and 400 acres were cleared, and had stumps removed and undergrowth grubbed out. Plans for illustrative homesteads were prepared by Washington architect Delos Smith and landscape architect A.D. Taylor for the Bureau of Animal Industry likely through this appropriation (Figure 6).

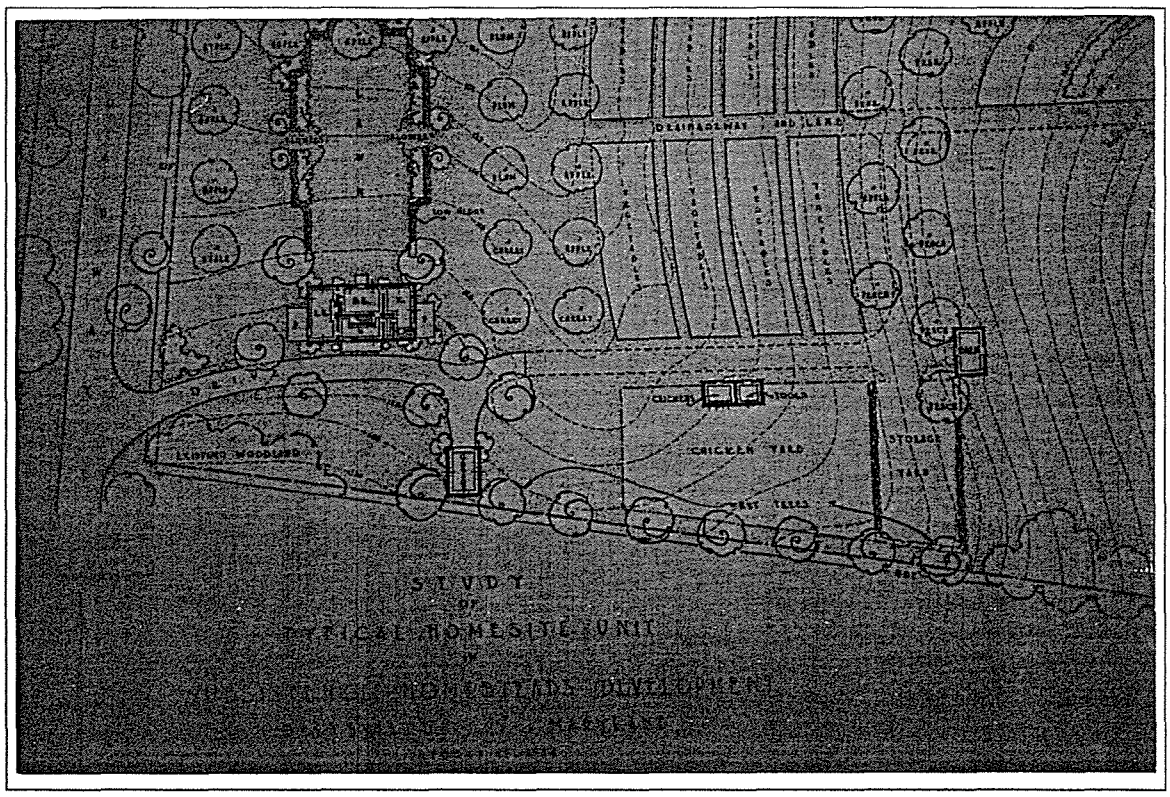


Figure 6 - Typical homesite unit for subsistence homesteads, Delos Smith and A.D. Taylor, 1934

Despite Tugwell's strong support for the idea, little other money or effort was expended on the project by the Subsistence Homestead Division. Some of this difficulty apparently was tied to the fact that the

[52]The other land which was worked on under this appropriation likely was the Hayden farm which was also acquired at around this time.

project did not meet the program criteria.[53] This, however, proved to be a temporary problem. In April 1935, Rexford Tugwell was appointed to head up a new agency, the Resettlement Administration which combined in one organization programs relating to "poor land and poor farmers." Soon thereafter, the Subsistence Homestead project at Beltsville was converted into one of the greenbelt cities funded under the Division of Suburban Resettlement of the Resettlement Administration. (The Subsistence Homestead Division also was transferred into the Resettlement Administration.) Land acquisition for the greenbelt project, as opposed to the subsistence homestead project, apparently was begun in the spring of 1935 and all told 11,138.67 acres were purchased.[54] This land was located to the south of the BRC boundaries (this included most of the Greenbelt land) and to its west. After the boundaries of the town of Greenbelt were established, the land was divided up between the town and the BRC, with USDA increasing their acreage at Beltsville by approximately 7,354 acres by 1938.

It is clear that Tugwell was behind the complicated land acquisition; however, it is not clear which goal was foremost to him—acquisition of land for the experimental settlement or for an expanded USDA experimentation center. The two goals tended to reinforce one another, however. By locating the new town of Greenbelt (or earlier, the subsistence homestead settlement) adjacent to the Beltsville facility, a certain amount of green space protected from urban sprawl was guaranteed for both locations. In addition, when certain of the land was originally transferred to USDA it was with the proviso that if it was warranted by growth of the Town of Greenbelt, the land would be returned to it from Beltsville. The early goal of providing homes for workers at Beltsville was not totally lost. In 1940, employees were surveyed concerning their interest in moving to "a low cost housing project" at Greenbelt. It is not clear how many of the early occupants of Greenbelt were employed at Beltsville.).

3.3.4 Master Planning in the 1930s

Independent activity by bureau, rather than overall centralized planning activity characterized master planning at BARC during the period of significance. Three plans appear to have influenced the allocation and use of land at BARC. The first, by the planning team of A.D. Taylor and Delos Smith, covered Bureau of Plant Industry areas (the Central and East Farms) and was partially carried out in 1934. A second plan dating to 1936, by National Park Service employee Malcolm Kirkpatrick, was initiated by the Bureau of Plant Industry, and related only to a section of what today is the North Farm. The third, plan a Soil Conservation Service (SCS) conservation plan, covered the entire site and was implemented area-wide in 1943. Between these plans, the efforts of the Bureau of Agricultural Engineering's Division of Plans and Services, the Civilian Conservation Corps (CCC), and the Public Building Commission

---

[53] Reasons included the fact that resettlement sites were supposed to be used for a "re-distribution of the overbalance of population in industrial areas" and that under the program guidelines, USDA workers could not be given preference in occupying the town.

[54] A memo dated February 4, 1935 from Tugwell's assistant Grace Falke states that "The work of securing options for the purchase of land for the . . . proposed rehabilitation project at Beltsville Maryland" is ongoing. (NARA, RG 16, Entry 17, 1935, Box 2174). The official date of the first options for the land date to June 13, 1935. "Greenbelt Project - Project Land and Acquisition Cost for Tracts Accepted Classified According to Counties and Purchases." Facilities Engineering Archives. See also, J.S.D. Lansill, Final Report on the Greenbelt Project of the Greenbelt Town Program, Volume 1, Section VIII, NARA RG 196, Entry 48, Box 2. Quoted in National Historic Landmark Nomination, Greenbelt Maryland, Historic District.

landscape architects, helped define BARC's common built and landscape elements. Additional oversight came from the Commission of Fine Arts headed at this time by architect Charles Moore.

In December 1933, a meeting was held with representatives of the various bureaus that either were operating at Beltsville or that soon would be there.[55] At the meeting the common problems of land acquisition, utilities, location and planning of buildings, and location and construction of roads was discussed. Given these common problems, in November 1933, the team of landscape architect A.D. Taylor and architect Delos Smith were retained to, among other things, provide master planning for the site.

One of the plan's designers was preeminent landscape designer Albert David Taylor (1883-1951). Taylor received degrees from Massachusetts Agricultural University, Boston College, and Cornell University. He taught for a few years at Cornell and then joined the office of Warren H. Manning. After leaving Manning's office he established his own firm in Cleveland, Ohio, in 1914. Among the many significant projects completed by the firm were the Eastern States Agricultural and Industrial Exposition (Springfield, MA), a campus plan for Boys Town (Nebraska), and a site plan for the Pentagon (Washington, D.C.). Taylor also was a consultant for the U.S. Forest Service. His report, *Problems of Landscape Architecture in the National Forests* (1937) became a major reference work in the field. Taylor also wrote extensively and was a fellow of (and later President) of the American Society of Landscape Architects (see Section 4.3.4 for information on Delos Smith).

In 1934, Taylor, who was also the managing editor of *Landscape Architecture* magazine, noted that "social currents" were carrying the landscape profession "through an uncharted sea under most abnormal conditions." At the height of the New Deal era, nearly the total membership of the American Society of Landscape Architects had shifted away from work in the private sector to find employment with the Federal government (Figure 7). Taylor himself brought his earlier experience on agricultural expositions, country estates, and large-scale subdivisions to the Beltsville project.

The Department's contract with Taylor called for the landscape architect to provide plans, estimates, and specifications for the development of the Beltsville site. In addition, the Department expected Taylor to work in conjunction with Delos Smith and to give general instructions regarding "all work being done by the CCC labor" on a variety of landscape projects. Throughout 1934, Taylor and Smith prepared preliminary plans for the general development of the Beltsville Research Center, as well as specific plans for the construction of new facilities for the Animal Husbandry Division. However, as Taylor outlined to the Commission of Fine Arts:

---

[55]Present at the meeting were: J.R. Moher (Bureau of Animal Industry), H.G. Knight (Bureau of Chemistry and Soils), Lee Strong (Bureau of Entomology), W.G. Campbell (Food and Drug Administration), S.H. McCrory (Bureau of Agricultural Engineering), K.A. Ryerson (Bureau of Plant Industry), W.A. Taylor (Bureau of Plant Industry), O.E. Reed (Bureau of Dairy Industry). Memorandum dated December 20, 1933 from E.W. Sheets Chief, Animal Husbandry Division, to participants. NARA, RG 17, Entry 5, Box 54.

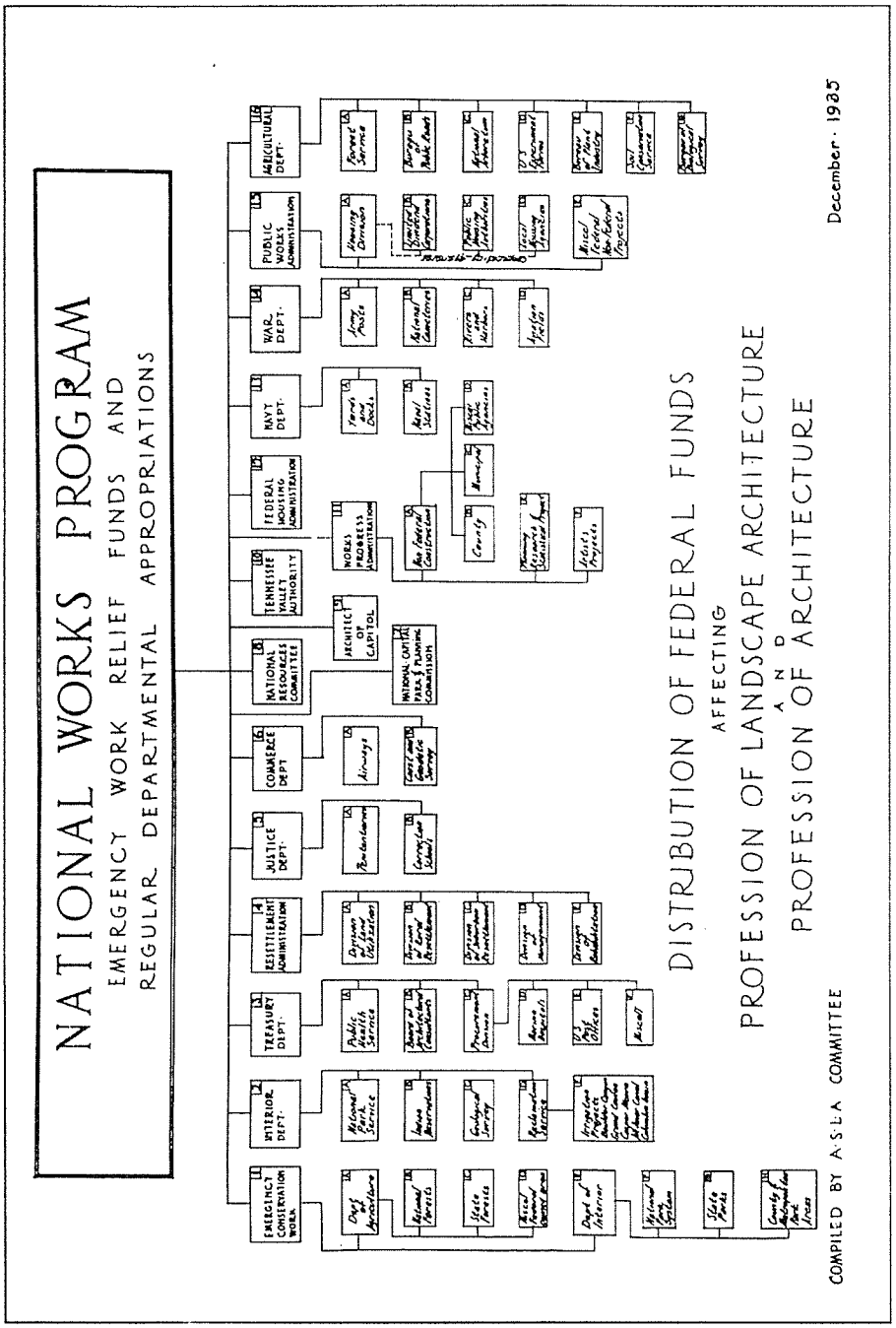


Figure 7 - Federal funds affecting landscape architects, 1935

> *A large number of detail plans have been completed for specific projects and there is much additional study which should be devoted to the completion of the general plan on the basis of which this entire landscape development will continue toward completion, and there are many detailed studies and much field supervision necessary in order to assure the kind of results desired by your Commission and by those in charge of this project for the Department of Agriculture.*[56]

Taylor was unable to realize these studies as his contract was not extended at the end of 1934. The plans he did conceive, many with Delos Smith, belong to the newly-defined process of master planning carried out by landscape architects. By 1930, master plans for large-scale areas had been developed and refined by Thomas Vint, chief landscape architect of the NPS. Master plans were comprehensive designs for parks that outlined land use, circulation systems, current and proposed development, and eventually included construction drawings. Many of these plans were realized throughout the New Deal as public works projects funded by the Public Works Administration and other agencies. They were built with labor from the CCC and were supervised by landscape architects from the NPS, just as Taylor had specified in 1934.[57]

Taylor's major work was a master plan for the central and east farms entitled "Sketch Study for Proposed Development of Property," developed in March 1934[58] (Figure 8). In general, the plan illustrates a heavily forested area with a number of intersecting curvilinear roads separating different sections. It also illustrates the proposed Baltimore Washington Parkway which at that time was anticipated to run in an east-west direction through the property following Beaver Dam Creek. (By the time it was constructed in 1952, the road's orientation, as well as its "scenic" small-scale nature had changed dramatically.) Although a number of the plan's suggestions appear never to have been taken up, the basic divisions of the land and the location of a number of key buildings were.[59] The plan's most basic effect on the site was the designing of the pleasantly curving road known today as Powder Mill Road.[60]

---

[56]A.D. Taylor to Charles Moore, Commission of Fine Arts, October 19, 1934, NARA, RG 66, Entry 17, Box 22.

[57]See Phoebe Cutler, *The Public Landscape of the New Deal*, (New Haven: Yale University Press, 1985).

[58]The two also designed plans for the proposed subsistence homestead project that was to be located to the south of the station. The master plan was presented to the Commission of Fine Arts on January 18, 1934.

[59]For instance, the site plan sets aside the area in which the Entomology Division was to be located, places the Dual Purpose Cattle area at its current site and locates the shops area and the Building 200 cluster at its current site.

[60]This road, which was given a hard surface in 1936, replaced a perfectly straight road that ran roughly from Walnut Grange to the turn-off to the radio section. It was first referred to as East-West Highway.

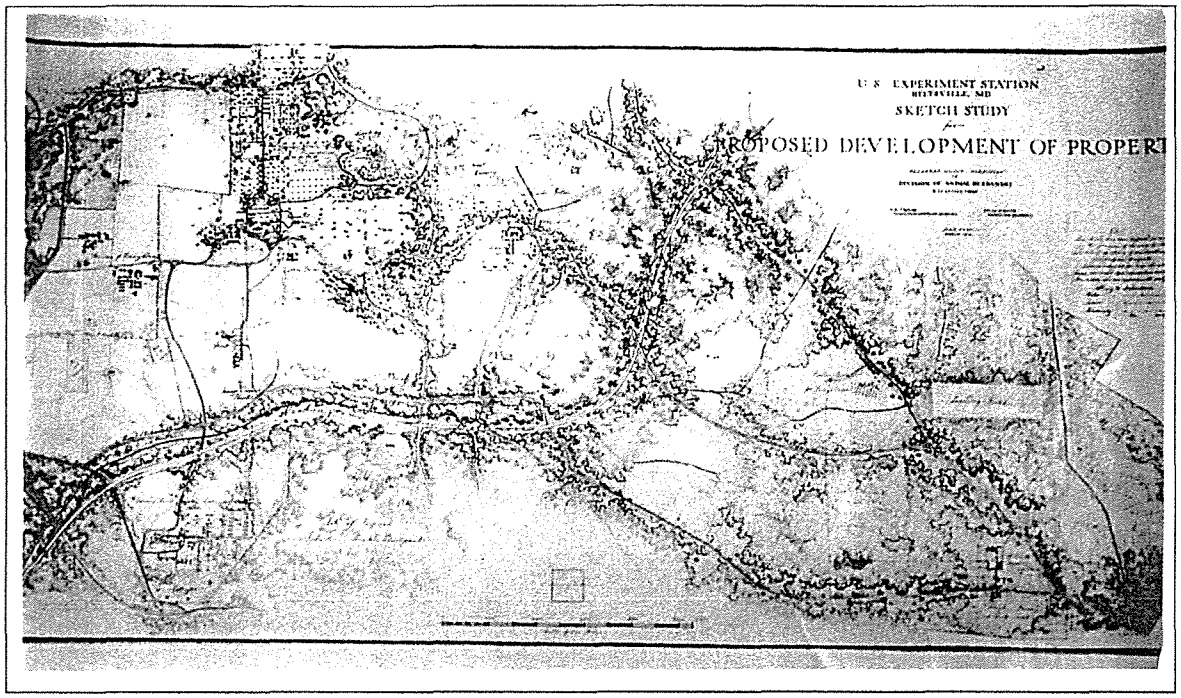


Figure 8 - Master plan of Central and East Farms, A.D. Taylor and Delos Smith, 1934

The second major master planning effort took place in 1936, when the Bureau of Plant Industry, taking advantage of National Park Service expertise, was "loaned" landscape architect Malcolm Kirkpatrick. Kirkpatrick designed a layout and general plan for the new location of Bureau of Plant Industry (North Farm) (Figure 9). Kirkpatrick focused on the immediate development of the buildings and approach roads as well as proposed additions to the site.[61] His work reiterated the process begun two years earlier by Taylor and Smith for the Animal Husbandry Division, as well as demonstrated the new master planning standards used by the National Park Service.

[61]Nolen to Delano, September 17, 1936, I,4APA, RG 328, Entry 7, Box 91.

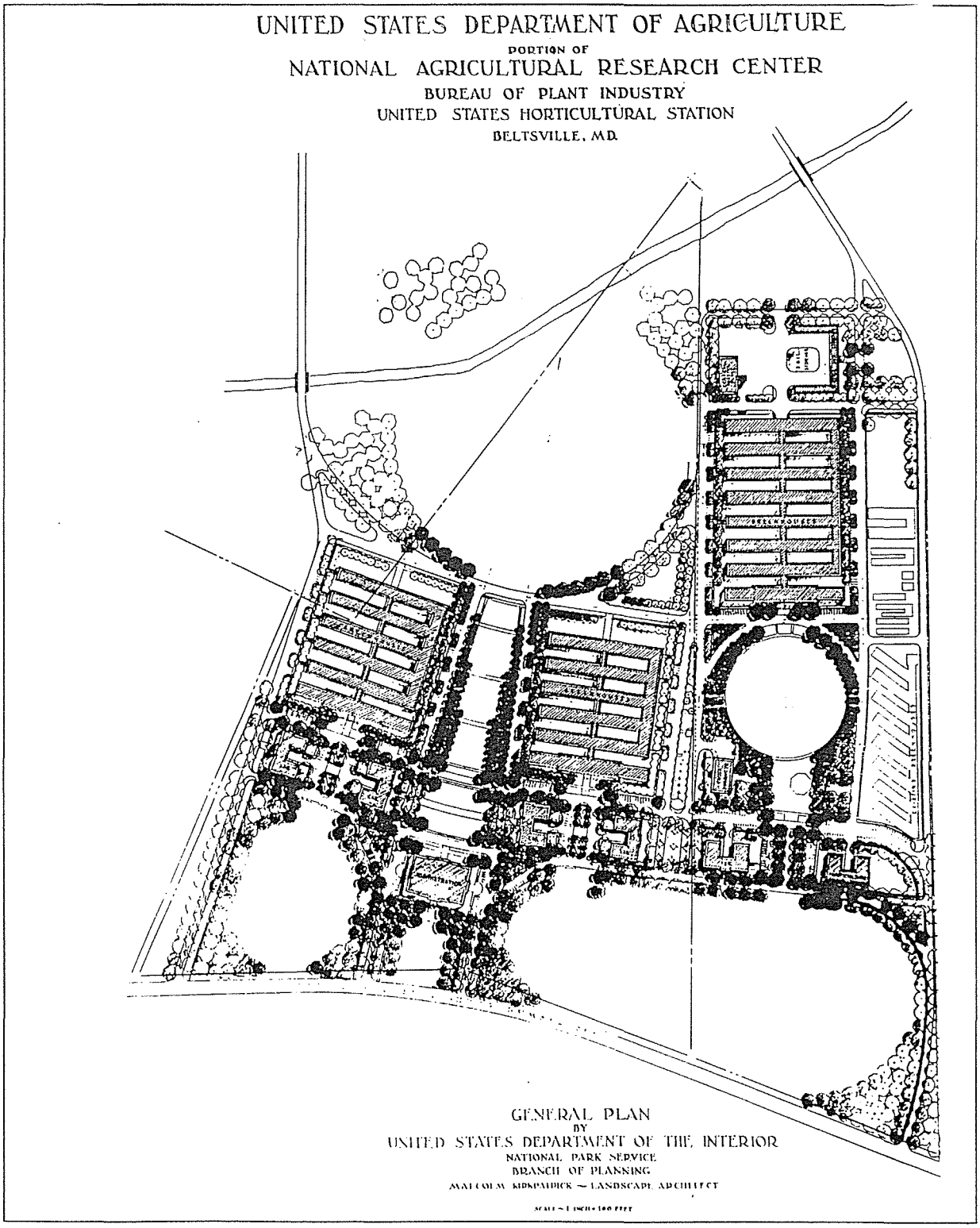


Figure 9 - Development plan for a portion of North Farm, Malcolm Kirkpatrick, 1938

The other major master planning effort at Beltsville came out of an inspection of BARC in June, 1941, by then-Under Secretary of Agriculture, Paul H. Appleby. He noted serious erosion damage at BARC. Given that the farming methods at BARC were intended to demonstrate and promote those recommended on a national level by the USDA for private agricultural land, Appleby requested that Hugh H. Bennet, Chief of the Soil Conservation Service, chair a committee to study the problems and develop a conservation plan for BARC to reflect this mission. The involvement of Bennet, as a national figure in the area of resource conservation, reinforced the stature of BARC. Under Bennett's oversight, the *Beltsville Research Center Conservation Plan* was implemented at BARC beginning November, 1943.

The SCS conservation plan served as the first *comprehensive* master plan for BARC with an area-wide mandate. The plan made general recommendations in the areas of the following: pasture management, woodland management (forest buffers), surface drainage, croplands, orchards, and wildlife habitat. Specific field and section recommendations determined erosion planting, feed crop production and location, and pasture or woodland assignments for areas not in use. BARC's circulation network was studied in terms of road grades and surface runoff related to soil erosion. Using aerial photograph mosaics, the SCS conservation plan organized BARC area-wide by section numbers and associated bureaus or departments. The SCS then overlaid land use suitability classifications based on soil conditions. Under the SCS, plan BARC became a national model for experimental farming strongly guided by conservation planning. This overriding concern for land and soil conservation guided individual bureau plans. With the exception of some woodland overgrowth, the general land use patterns established during this time continue today.

3.3.5 Funding and implementation of BARC Expansion—1930s and 1940s

To accommodate the major expansion at Beltsville, huge financial commitments were necessary. Fortunately, the funding mechanism to accomplish this was available through the expansive New Deal public works programs. Franklin Delano Roosevelt was elected in November 1932[62] with what he saw as a charge to save the United States from a downward spiral of economic depression through an aggressive program of public works and back-to-work efforts. The number and type of programs created to fuel the economy varied over the administration as different approaches were tried, changed, or rejected.

The "First New Deal" created a number of programs, most under the aegis of the National Industrial Recovery Act of 1933 (NRA). This broad legislation authorized $3.3 billion to be spent for economic recovery and permitted Roosevelt great flexibility in how to expend it. One of the programs funded under NRA was the Public Works Administration (PWA) which was organized to finance public works for both federal and non-federal government agencies. Under the direction of Secretary of the Interior Harold Ickes, it operated between 1933 and 1939. The Civil Works Administration (CWA) was created in November 1933 as a "work relief" program (i.e., a program aimed mostly at putting people to work). It provided jobs for approximately four million men, generally in unskilled work such as road work and parks. Its functions were assumed by the Federal Emergency Relief Administration (FERA) the following year. It too was eventually funded through the NRA.

[62] At this time Presidential terms began in the March after the election, rather than in the January after the election.

After the Congressional elections of 1934, the Presidential landslide reelection of 1936, and the overruling, by the Supreme Court of some of the major New Deal legislation, many New Deal programs were tinkered with or overhauled. The changes following these elections were referred to as the Second New Deal. In April 1935, the Emergency Relief Appropriation Act (ERA) was passed which provided five billion dollars, most of it aimed at work relief rather than direct relief. Under it, the FERA became the Works Progress Administration (WPA) (changed to Works Projects Administration in 1939). By October 1935, the WPA was employing 2.5 million manual laborers on construction projects. In addition, it provided work for skilled labor. When it ended in 1943 it had spend approximately $11 billion and given jobs to 8.5 million people (working on 1.5 million projects).

The vast sums of money necessary for the New Deal building campaign at Beltsville came largely from Public Works Administration and Works Progress/Projects Administrations funds. In addition, large numbers of Civil Works Administration and, after October 1933, Civilian Conservation Corps (CCC) workers completed the land preparation—building bridges, roads, parking areas, and sidewalks, laying utility lines, clearing and fencing land, and planting agricultural specimens. (See CCC section below.)

The first wave of development took place using 1933/34 funds; these amounted to $3,000,825 from the PWA, and $376,540 in CWA appropriations. In addition to extensive improvement to the infrastructure at the site, construction during this period included the following major structures: Building 200 (Nutrition Lab), Building 265 (Biologic Poultry Lab), Building 263 (Fundamental Research Poultry Lab), Building 302 (Assembly Building/Log Lodge), Building 426/429 (Shop/Storage Facility), Building 004 (Horticulture), Building 006 (Fruit Products Laboratory), as well as the Sheep, Horse, Goat, and Dual Purpose Cattle barns (Buildings 215, 432, 434, and 527 respectively).

The fact that there were such large quantities of money appropriated so rapidly and that plans could hardly be prepared before construction needed to be started did create problems. For instance, the Commission of Fine Arts minutes for 1934 discuss A.D. Taylor's push for quick approval of the master plan because "there are 1,400 CWA workers and others under the Public Works Program who are now available for use and certain things had to be settled quickly . . ."[63] Other problems were created by the fact that much of this construction was done with the federal government acting not only as architect, but also as general contractor. This technique—referred to as force account or day labor construction—came under criticism from local contractors and, in October 1934, irregularities in the construction of buildings constructed by force account by the Division of Animal Husbandry caused a minor scandal (see Section 4.2.1). At this time PWA monies allocated to the Division of Animal Husbandry had been exhausted although many of the funded buildings were uncompleted. As a result, Public Works Administrator Harold Ickes ordered that all construction on animal husbandry buildings be halted pending an investigation. This resulted in slowdown in the construction of many buildings. In addition, no doubt reacting to these problems, in submitting requests under the Public Works Administration Appropriation Act of 1938, the USDA requested that the funds be allocated directly to the Beltsville Research Center rather than to the individual bureaus. Money continued to be earmarked for specific projects for the individual bureaus however. A personnel structure was set up to closely supervise the construction projects. PWA appropriations amounted to $3,538,573 in 1938. WPA appropriations in 1938 amounted to $1,303,365. An additional direct appropriation for the center of $2,721,500 was made in 1941.

[63]Commission of Fine Arts Minutes for January 18th to 19th, 1934.

Not only did the Department of Agriculture act as contractor for much of the construction at Beltsville, USDA architects also were responsible for the design of most of the buildings. Most plans for BARC buildings from this era were signed by the Department of Agriculture's Bureau of Agricultural Engineering, Division of Plans and Service. The Division of Plans and Services, in addition to preparing plans for all buildings, also prepared specifications and cost estimates. The Coordinator of the BRC Construction Program (see Section 3.3.7) acted as an intermediary between the Division of Plans and Services and the program offices. Designated individuals from each of the Bureaus determined program and budget for each of the new buildings (see Section 4.8). The exception was the Bureau of Dairy Industry where, prior to 1940, plans were drawn up by designers in the department. Individuals from other bureaus also occasionally were responsible for the design of smaller, utilitarian buildings. These designs were reviewed by the Bureau of Agricultural Engineering.

A small amount of work was done by other design professionals. These include Louis de Laourantaye who was architect of the Log Lodge and W. Ellis Grobius, who was a consulting architect on Buildings 445 and 446. Information has not been located on either of these architects. Delos Smith, who worked on both a master plan for the Central Farm, and on plans for subsistence homesteads planned for Beltsville, apparently also designed Building 200. Commission of Fine Arts minutes indicate that he presented to the commission designs for a number of other buildings including Building 426. Although the minutes would suggest that he was the architect of these buildings, his name does not appear on any drawings located for buildings at Beltsville. Smith (1884-1963) was a Washington architect known for his ecclesiastical, residential, and laboratory work. He attended George Washington University (B.S. Arch., 1906; M.S. Arch., 1916) and received his practical training in the Office of the Supervising Architect of the Department of Treasury, and with the well-known Washington firms of Hornblower and Marshall, Hill and Kendall, and J.H. de Sibour. He was in the service during both World War I and World War II. He was the architect of the prayer room in the U.S. Capitol, Christ Lutheran Church and St. Patricks Episcopal Church. Non-ecclesiastical projects include the Montgomery County Courthouse and low-rent housing in Alexandria, VA. He had a particular interest in colonial churches and he both published articles and collected information on the subject. At around the same time as his work at Beltsville, he was involved in the regional administration of the Historic American Building Survey. He was a member of the local chapter of the American Institute of Architects and served as its president from 1923 to 1924

3.3.6 Emergency Conservation Work /Civilian Conservation Corps Work at Beltsville

After his election as president in November 1932, and prior to taking office, Franklin Delano Roosevelt asked his staff to come up with plans for a national program to employ unemployed men in projects in federally owned forests. By March 1933, he had signed into law a bill establishing the Emergency Conservation Work (ECW) program (later changed to the Civilian Conservation Corps) and by April 1933, the first camps were operational. Roosevelt emphasized the program's effect of conserving natural resources, and the "moral and spiritual value" of the work. By placing the "vast army of these unemployed out into healthful surroundings. We can eliminate to some extent at least the threat that enforced idleness brings to spiritual and moral stability."[64] When the ECW was re-authorized under the Emergency Relief Appropriation Act of 1935 (April 8, 1935), Roosevelt issued a directive calling for the

[64]U.S. House, Committee on Labor, Message from the President of the United States on Unemployment Relief, Doc. 6, 73rd Cong., 1st sess., March 21, 1933, p. 2.

doubling of the program to 600,000 workers. At the same time, however, he was beginning to plan for reducing the size of the program and making it permanent. He instructed the director of the ECW to begin reducing the program to 300,000 by June 1, 1936. On June 28, 1937, Congress passed legislation establishing what would now be called the Civilian Conservation Corps (CCC). Although it was not made a permanent agency (it was to end three years later) Roosevelt signed the bill. In 1939, under legislation aimed at consolidating federal relief programs, the CCC came under the Federal Security Agency.

Figure 10 - Unidentified CCC Camp at BARC, 1936

The first Beltsville CCC camp (Camp A-1 Agriculture) was established in late October 1933. Permanent wood structures were built for the enrollees soon after the camp was established. Just five months later, in March 1934, Assistant Secretary Tugwell sent out an urgent plea for more camps, in particular to complete development and drainage work around the newly acquired land adjacent to the Beaver Dam Creek. The need for CCC labor at Beltsville became even more urgent in July 1935 when funds for center-wide "general developments" (such as roads, utilities, etc.) had run out. In November 1935, two additional camps were opened, bringing the total to four camps operating at the site (Figure 10).

Although statistics are not available for the total period of their operation, as of October 1941, CCC enrollees (Figures 11 and 12) working at BARC constructed 79 miles of roads, trails, and bridges, erected 80,000 rods of fences, laid some 666,000 feet of water, sewage, and drainage pipes, landscaped 500 acres, and moved and planted 78,000 trees and shrubs. In addition, they cleared more than 2,700 acres of burned and cutover land for agricultural use, seeded and sodded 454 acres of land, and improved two

hundred acres of timber stand. Other tasks included construction and operation of a nursery, the erection of dikes and levies, stocking ponds with fish, eradicating weeds, pest and rodent control, fighting fires and conducting engineering surveys.[65] CCC workers also completed a number of buildings on the site. The most notable of these was the Log Lodge (which was used as a recreation building by the camps and later became a cafeteria facility). According to one source, the CCC constructed 42 "minor buildings and shelters" at Beltsville. So far, most of these minor buildings have not been identified.[66]

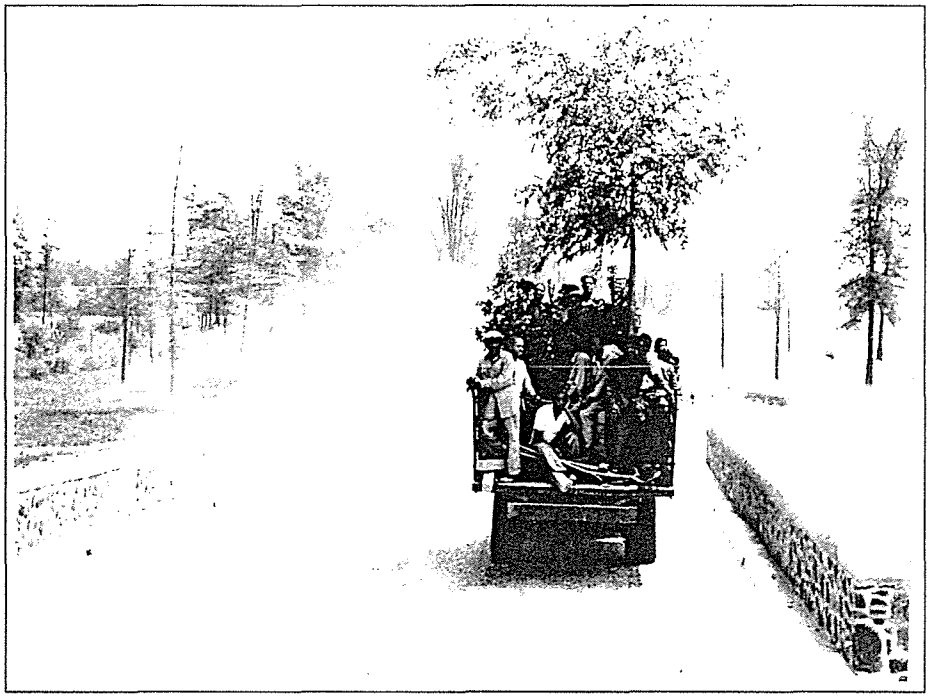


Figure 11 - CCC enrollees at BARC, no date

The CCC camps also operated a sawmill and nursery on the site and apparently also helped to conduct experiments relating to breeding and livestock diseases.[67] They were heavily involved in the development of the Patuxent Wildlife Refuge (then part of the Department of Agriculture site) and constructed a large impounding dam and several small ponds on the site. The CCC also operated a Central Repair Shop that repaired CCC vehicles from throughout Maryland. Some of the CCC camps located at Beltsville also did a significant amount of work at Camp Meade.

---

[65]Annual Report of the Director of the Beltsville Research Center for the Fiscal Year 1936, NARA, RG 16, Entry 17, Box 2278.

[66]Buildings 445 and 446, the CCC Central Repair Shop buildings, were constructed for use by the CCC in 1939 and likely were constructed with CCC labor. The adjacent buildings may have been CCC camp buildings moved to the site.

[67]"Beltsville Agricultural Research Center Does Well a Multitude of Duties," *The Washington Post*, February 20, 1938.

Figure 12 - CCC enrollee at BARC, no date

Without question, the general physical appearance of BARC today, and the infrastructure which has made its continued development possible must be credited to the CCC. The director of the Center in his 1936 annual report acknowledged the importance of the work accomplished by the CCC: "If the development of the Beltsville Agricultural Research Center is ever accomplished on a scale commensurate with the dignity of the government and the importance of the work conducted by the department, no agency will properly receive any greater share of the credit."[68]

The saga of the decline of the ECW was a long one. By the late 1930s, it was becoming progressively more difficult to get adequate recruits to meet the needs of the CCC. Increasingly, men were either taking jobs in better paying defense-related jobs or were joining the military. The work of the CCC programs

[68]Annual Report of the Director of the Beltsville Research Center for the Fiscal Year 1936, NARA, RG 16, Entry 17, Box 2278.

became largely linked to the military, with some camps located at military bases, and certain defense-related training taking place at the camps. As of the bombing of Pearl Harbor (December 7, 1941) all CCC projects that did not directly relate to the war effort were ended. The program ended completely on June 30, 1943.

By 1936, as defense work increased, the number of camps at Beltsville was reduced to three. In 1937, three companies of black CCC enrollees replaced the white enrollees stationed at Beltsville. In 1941 there were three companies at the site, two performing work at Beltsville. The last camp was disbanded in 1942. The CCC facilities were officially transferred to the War Department in 1942.

3.3.7 Office of the Director of the Beltsville Research Center

A fundamental component of the idea of a national agricultural research center was the concept that there should be a central organizational structure charged with operating the land and common facilities. In the same August 1934 memorandum that officially established the Beltsville Research Center (BRC),[69] the Secretary of Agriculture also established the Office of Director of the Beltsville Research Center to accommodate these duties and to ensure "the continued development and coordination of the Research Center on a comprehensive and orderly plan."[70] As of August 30, 1934, maintenance and construction of buildings and roads, custodial services, utilities (power, light, water, sewer, telephone, etc.), fire protection, library services, supplies, mechanical shop services, farm labor, and land and building assignments as well as the supervision of activities under "emergency funds" (PWA, CCC, FERA, etc.) were all concentrated in the Office of the Director of the Beltsville Research Center.

However, by early 1935 the director of the Center had not yet assumed many of his duties—in large part because no funds were available for the establishment of his organization. To alleviate the problem, a permanent organization for the management of the BRC was brought into being on July 1, 1935, when 27 new employees were hired and 72 employees were transferred from individual bureaus to the BRC.[71]

The Office of the Director of the BRC was organized into the Office of the Director,[72] the Division of Operation, and the Division of Office Management. Specifically, the Division of Operation was responsible for the Farm Unit (i.e., performing farm labor, plowing fields, etc.), the Mechanical Shop Unit

---

[69]The BRC was renamed the National Agricultural Research Center in 1935. In 1935, its name was again changed to Beltsville Research Center. It was changed to the Agricultural Research Center in 1945.

[70]Memorandum No. 648 - Beltsville Research Center, August 28, 1934, Secretary of Agriculture, NARA, RG 16, Entry 32, Box 1.

[71]This problem was to continue, and as late as 1956, an audit of the Office of Operations (as it was then known) reported that it was not fully exercising its function of custody and maintenance of some buildings at Beltsville.

[72] Dr. E.W. Sheets (former Chief of the Animal Husbandry Division) was the first coordinator of activities at the center. Dr. E.N. Bressman, the first formal (albeit temporary) director of the facility, was so named in August 1934. E.C. Butterfield became Director a few months later, and one year later Harry A. Nelson assumed the post. Earl Sanford became the director in 1937. He was succeeded by C.A. Logan in 1940.

(including machinery repair, blacksmith, carpenter, electrical, paint, plumbing and sheet metal shops) guard, janitorial, fire protection, engineer, and messenger service, and operation of the sewage disposal facility. The Office of the Director was responsible for the supervision of public works activities, the work of the CCC, and miscellaneous engineering work (such as preparation of an atlas of the site, plans for minor buildings, layouts and lines and grades for other buildings, etc.). The Division of Office Management was responsible for payroll, timekeeping, accounting, personnel issues, and switchboard operations.

As mentioned above, in submitting requests under the Public Works Administration Appropriation Act of 1938, the USDA requested that funds be allocated directly to the Beltsville Research Center. A personnel structure within the Director's Office was set up to closely supervise the construction projects. During the late 1930s and early 1940s this constituted a major part of the work of the Director's Office.

Over time, there became greater centralization in the administration at Beltsville although individual Bureaus always retained significant independence, in particular in matters relating to research. In 1939, the BRC came under the supervision of the USDA's Office of Plant and Operations. In 1940, the title of Director of the BRC was abolished and its duties were transferred to the Division of Management and Operations. At that time, the Division was given the power to transfer surplus products, materials equipment and other property from one Bureau to another at Beltsville. Finally in 1941, the Beltsville Research Center along with the other Bureaus doing work at Beltsville were incorporated into the Agricultural Research Administration.

Throughout its history the Office of the Director of the BRC was responsible for a significant number of services, and the related buildings, which provided support for the different Bureaus and Departments working at Beltsville. In this category were the automobile repair shop, the other shop facilities, the sewage treatment buildings, the cafeteria/Log Lodge, the granary buildings, the Departmental Laboratory buildings and related buildings, many smaller storage buildings, and a number of residences. After they were vacated, the Director's office also became responsible for the buildings constructed by the National Youth Administration and the Civilian Conservation Corps. These separate components are discussed below.

3.3.7.1 Departmental Laboratory Grouping

The Office of the Director of the Beltsville Research Center was responsible for the construction of a central grouping of laboratory, office, and support buildings which also included administrative offices for the BRC. The departmental laboratories (Buildings 306-308) were seen both as a means of gathering together USDA activities previously scattered around the Washington area, and a way of providing improved facilities for the bureaus. Because of their size and the fact that they housed the headquarters of the Center, these new facilities were to provide a new geographical focus to the site, and in particular to the Central Farm.

The planned occupants of the departmental laboratories, as well as their planned location, varied significantly from the planning stage to the final occupancy. Early on, the departmental labs were planned for the far southern reaches of the BRC site adjacent to Greenbelt and to the Animal Disease Station. This site was seen as having the advantage of being in the approximate center of "the entire tract" (that is, the entire USDA - Greenbelt site.) It also had good access, was "an elevated and favorable position in the

landscape," its land was not suited for cultivation or for experimental purposes, and it was close to Greenbelt and therefore, "those of the scientific staff residing in the new village will have a short and pleasant walk to their homes." At this point (1936), an Administration and Exhibition Building, a Pharmacological Laboratory for the FDA, and various Bureau of Chemistry buildings were envisioned for the site. It was thought most appropriate that the positioning of the buildings be "orderly and systematic but not unduly monumental."[73]

Sometime prior to mid-1938 the final (and different) location of the Departmental Labs (also known as the Research Laboratory Group, or the Central Laboratory Group) was selected. The site chosen was the location of part of the Swine Unit which had to be moved to accommodate the new buildings.

In June 1939, all of the Departmental labs were combined into a single project so that they could be bid out as a single contract. The contract was won by the Harwood-Nebel Construction Company of Washington. Only thereafter, sometime in the summer or early fall of 1940, when the buildings were completed, was the final selection of the occupants of the buildings made. The central building (Building 307) housed the BRC office, library, and other administrative offices on the ground floor (occupied before September 1940), with the two top floors occupied by the Home Economics Division. The North Building (Building 308) was occupied by the Fertilizer Investigation Division of the Bureau of Plant Industry. The South Building (Building 306) was occupied by the Bureau of Entomology and Plant Quarantine, the Soil Conservation Service and the Agricultural Marketing Service.

In addition to the Departmental Laboratories, a number of other buildings were constructed in the vicinity which provided support for the individuals and work being conducted in the Departmental Laboratories, and in some cases, for the entire BARC campus. Building 309, the Central Heating and Power Plant, supplied power for the Departmental labs and the surrounding buildings. Constructed in 1940, the rear of the building has always had office or laboratory space. It initially housed the cartographic work of the Soil Conservation Service. The Solvent Storage Vault, located to the north of the Departmental Laboratories also apparently provided facilities for a number of bureaus. It was funded under the 1938 Act with PWA monies and completed August 16, 1940.

Another building in this category was the Film Storage Vaults (Building 312), constructed in 1940 just to the east of the Departmental labs. Building 312, specifically its fireproof design, and its air conditioning, sprinkler, and ventilation systems, was designed specifically to avoid the hazards associated with storing nitrate films. Nitrate film, the use of which was discontinued in the 1950s, is highly flammable, burning rapidly at a relatively low temperature. It is also relatively unstable—it begins to decompose as soon as it is produced. As the film deteriorates, it gives off extremely flammable gases, making explosions and fires more likely. In addition to its other specialized design features, the building was designed so that its roof could be covered with water during the summer months and drained daily whenever the temperature reached 85 degrees. The building was the repository for the aerial negatives of the Agricultural Adjustment Administration. During the war years, these negatives were "in constant use in producing reproductions of the War and Navy Departments and other war agencies." Because of the value of the negatives and their strategic value, there was continuing concern about security at the vaults. During the

[73] "Comprehensive Plan - National Agricultural Research Center," included in "National Agricultural Research Center Summary Report," May, 1936. NARA, RG 16, Entry 32, Box 1.

war years, fences, flood lights, and an armed guard were added for protection of the collection.[74]

3.3.7.2 Other Beltsville Research Center Services/Buildings

Other services and accompanying buildings under the control of the Office of the Director of the Beltsville Research Center were spread throughout the Central and Linkage farms. They include the granary grouping, the sewage treatment group, the CCC automotive shops, the central shop grouping, the former National Youth Administration Buildings, and the Log Lodge.

The Office of the Director of the BRC was responsible a variety of construction and maintenance activities for buildings and equipment at Beltsville. To meet this need a grouping of shop buildings were constructed on the south side of Powder Mill Road. The buildings were constructed to house various types of shops (including the electrical, sheet metal, and carpentry shops among others) and storage facilities for large equipment. Building 426, the first building constructed in this cluster was funded under the National Industrial Recovery Act of 1933. Under the 1938 Act, the complex was added onto significantly and the complex more or less as it currently exists (Buildings 426, 427, 429, 430, 431) was completed by spring 1943.

Sewage treatment, as a service necessary for all of the departments operating at Beltsville, was another responsibility that fell on the Office of the Director of the BRC. With the tremendous growth in facilities at Beltsville, it became clear in the early 1930s that a sewage treatment facility would have to be constructed to dispose of the waste from existing and planned laboratories, slaughterhouses, and offices located at Beltsville. Because the facilities would be used by a variety of USDA departments, the $147,000 funds came through the appropriation for the Secretary of Agriculture's office. The sewage disposal buildings were funded under the National Industrial Recovery Act of 1933 and completed in the spring of 1935. The plant was designed by the Bureau of Agricultural Engineering in conjunction with the Public Health Service. After a test period, the plant was fully operational by August 1935 (Figure 13). As completed, the Sewage Disposal plant consisted of a number of component parts including the greenhouse-like sludge beds (Building 218A), the chlorination chamber, the service building (Building 218), the mixing/settling/tanks and siphon chamber (to the south of the service building), the trickling filters (the large round lawn sprinkler-like structures), the mounded sludge digestion tanks, the pump house (218B), and the final tanks (to the south of the pump house). The system was initially designed to handle as much sewage as would flow from a village of 2,350 people. It included a number of, for the time, novel features. The system separated solid and liquid wastes. The former, after going through a treatment process eventually were used for fertilizer. The liquid wastes were treated and then put into Beaver Dam Creek. Methane gas generated by the fermentation process was used for heating the buildings.

[74]"Research for Better Farming and Farm Living," August 1945, NARA, RG 310, Entry 1001, Box 2.

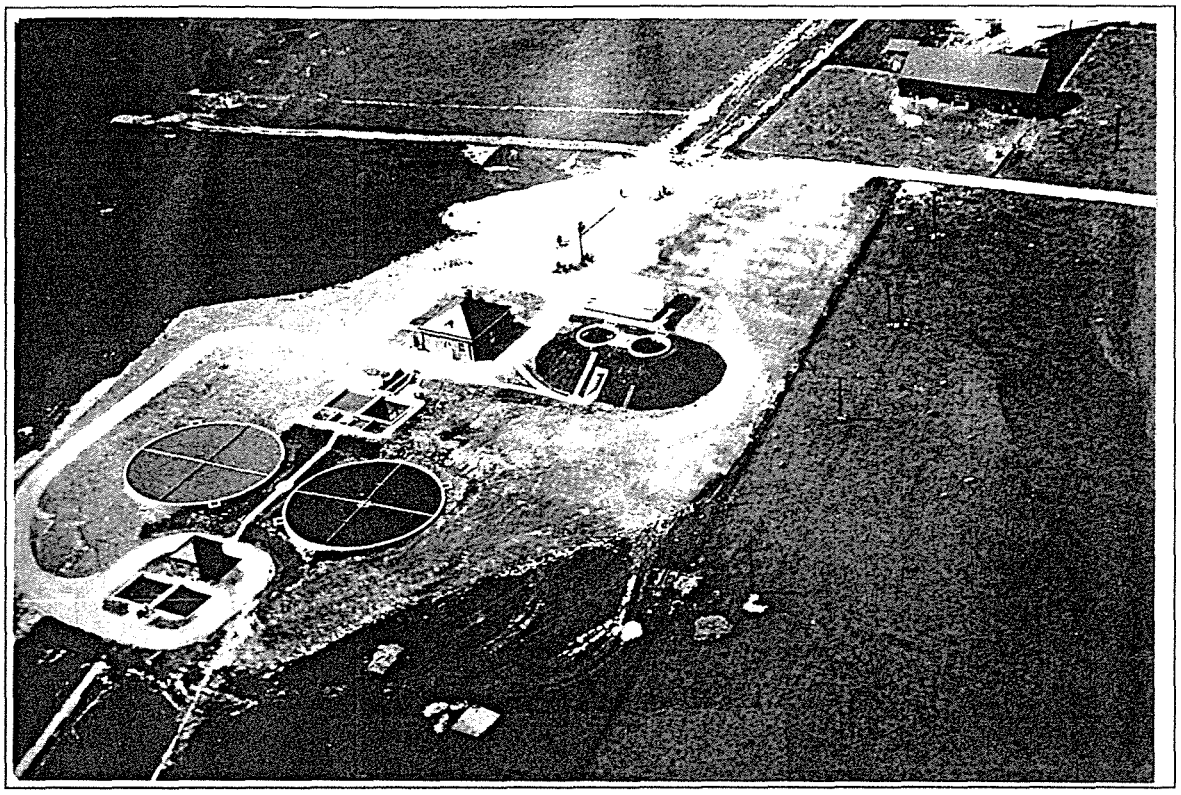


Figure 13 - Sewage treatment area, aerial view, 1936

A number of buildings were constructed for other agencies but were eventually to become the responsibility of the Office of the Director of the BRC. In this category is the Log Lodge (Building 302), one of the more picturesque buildings on the BARC campus. One of the buildings funded under the first wave of New Deal construction (under the National Industrial Recovery Act of 1933), it was funded through the Animal Husbandry Division. The plans for the building were drawn up for the Division in February 1934 by Louis de Laourantaye (Figure 14). The vernacular log building is representative of recreational buildings constructed during the New Deal period in parks throughout the country. Work on the building apparently began in 1934. However, construction of the building, like many of the other Animal Husbandry buildings of this era, was slowed up due to the controversy surrounding irregularities in the handling of PWA funds. Work appears to have stopped on the project in October 1934. When construction resumed, it was with the use of CCC labor. The building was completed in 1937 and initially used as a recreational facility for the CCC. When the CCC program ended, the BRC took over the building and it was used as a cafeteria and meeting space.

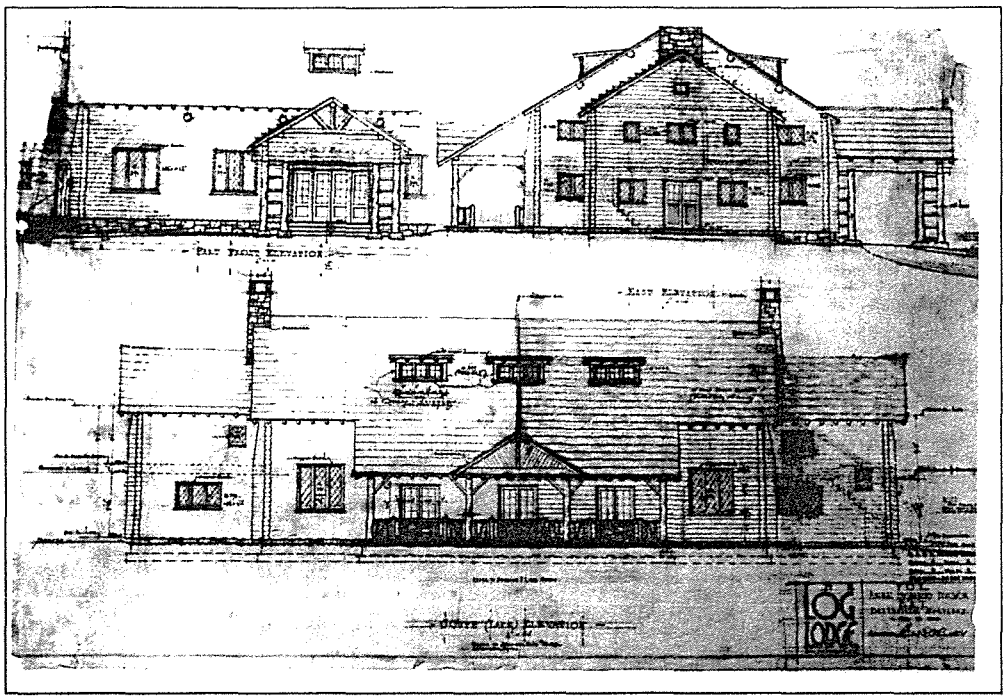


Figure 14 - Log Lodge (Building 302), drawing, 1934

The BRC was responsible for maintaining many vehicles for farm operations, and in the late 1930s it recognized a need for a facility to house this work. Conveniently, at the same time the CCC also had a need for such a facility. The CCC Central Repair Shop buildings were constructed between 1939 and 1943 by the CCC and/or the Army as repair facilities for, first, CCC vehicles and, later, for military vehicles (Figure 15). Buildings 445 and 446, the first buildings in this grouping, were constructed in 1939.[75] The other—mostly wood—buildings in the cluster, apparently were constructed by the CCC or the military between 1939 and 1943.[76] Apparently, early on, the BRC Office of Operation was closely involved with the use of the facility and employees of the office initially performed the maintenance on the CCC vehicles. Later, however, the USDA had little relationship to the facility although the department clearly assumed that it would inherit the buildings when they were no longer being used by the CCC. In September 1940, what had been an informal arrangement was formalized when a revocable permit from the Department of Agriculture for the use of the 3.7-acre site was granted the Federal Security Agency (the umbrella agency created in 1939 with oversight responsibility for the CCC and other agencies). Within a short period of time thereafter, with the increase in wartime activities and the conversion of many of the

[75]Facility Engineering Branch Archives. (Photographs of buildings 445 and 446.) The USDA apparently cooperated in the planning of Buildings 445 and 446 which were designed by W. Ellis Grobius. A 1939 site plan shows that initially a grouping of seven buildings was planned for the site. Most buildings were to be located in a court to the north of Buildings 445/446 and were identified as being "type B" sheds.

[76] One of the buildings, Building 448, appears similar to certain CCC standard prefabricated designs and could have either been built on the site or moved from one of the CCC camps.

CCC facilities into military facilities, the 1307th Service Unit, 3rd Service Command, United States Army, took over the facility. This Army unit was responsible for repairing old vehicles and, in 1942, assembling a large number of new vehicles originally intended for China which were diverted to Fort Meade when the Burma Road was closed.[77] In November 1943, the Army returned the central repair parcel to the Department of Agriculture, and the Office of the Director of the BRC assumed control of the facility.

Figure 15 - Building 446 (Repair Shop), 1939

Buildings 424, 425, and 419 were also eventually to become the responsibility of the BRC. The buildings were constructed by the National Youth Administration (NYA)—an agency created to provide part-time work for high school, college, and out-of-school youth. An agreement to establish a program at BARC was signed by USDA in October 1940, and buildings for the program were mostly completed a year later when the facility opened. The buildings constructed for the NYA organization, which originally consisted of Buildings 413-425, included dormitories, a hospital building, an administration building, a dining hall, a storage building, and residences. The facility closed on November 30, 1942, and the facilities reverted back to BARC about a month later. The buildings were remodeled in the 1950s. The buildings were used for a variety of purposes thereafter, including an "aerosol" lab for the Bureau of Entomology and Plant Quarantine, a technical office and cartographic facility for the Soil Conservation Service, a mineral

[77]Letter from C.A. Logan, Chief, Division of Management and Operations to Dr. E.C. Auchter, Administrator of Agricultural Research, November 11, 1942. Facility Engineering Archives.

deposits facility for Geological Survey, and a radio lab for the Forest Service.

The granary was also to come under the jurisdiction of the Office of the Director. This facility, which was constructed for the Bureau of Dairy Industry is discussed in that section.

3.4 RECENT HISTORY AT BARC (1940s to present)

The newly expanded Beltsville facility was to prove its worth quite soon after its major growth period. With the advent of World War II, research in specialized areas related to the war effort came to the fore. One major initiative was to reduce the dependence on imports from Europe and Asia. A successful example of this was the creation of the first American Easter lily bulbs, which had previously been imported from Japan. There was also major efforts to help ease food and other types of shortages. The Bureau of Home Economics, for instance, created and promoted recipes that used substitute ingredients for those that were scarce. It also was responsible for making major nutritional improvements in concentrated foods that were used in relief shipments and in feeding the armed forces. Each of the other bureaus had similar initiatives that were quickly implemented to respond to the wartime crisis. The war, however, also largely spelled the end to the period of rapid growth at Beltsville. The CCC enrollees that had been counted on for so much of the physical improvements on the site were no longer available, and many of their facilities were taken over by the military. The funding sources that had fueled the expansion also were diverted to the war effort.

One of the continuing trends that was to increase over time was the loss of land at BARC to other federal agencies. From around 1940 onward, the East and Central Farms continued to be reduced in size as portions of the farms were transferred to other federal jurisdictions or sold. One of these major transfers was the Patuxent Wildlife Refuge; originally part of the Department of Agriculture's Beltsville land, it was transferred to the Department of Interior in 1939 when the Biological Survey Division was made a part of the Department of Interior. [78] Other major parcels of land were lost in 1951, 1952 (BW Parkway), 1961 (NASA-Goddard), 1962 (HEW-FDA), 1972 (Howard University), 1974 (Treasury Department), 1981 (APHIS, Fish & Wildlife, NASA) and 1982. Between its height in the 1940s and the present, BARC has lost over 6,000 acres. Most of this reduction in land area has been in the Central and East Farms.

By early 1950, there were 2,399 people working at Beltsville, 3,000 experimental farm animals, 10,000 laying and breeding fowls, 600 head of cattle, and 5,500 small animals for use in laboratory tests. In

[78]The idea for the reserve may have come from J. "Ding" Darling. According to Rexford Tugwell on March 26, 1934, "In the afternoon, we went out to Beltsville, taking J. Darling with us. Went all over the property, marking out a possible place for a wildlife experiment Ding wants to make. Got stuck in the mud twice and had to push and dig the car out." (Tugwell, *Diary*, 105) In May 1934, Tugwell approved a memo by Ding Darling proposing a "Wildlife Demonstration Project." "It was Mr. Darling's idea that this type of marginal land which was unsuitable for agricultural purposes could be utilized as a demonstration area. Such an area would be beneficial to wildlife in general but would be used specifically for the purpose of demonstrating to farmers how waste lands could be made to pay in game crops." L. C. Morley, Project Director, Beltsville Demonstration Area of USDA's Bureau of Biological Survey to E.C. Butterfield (Director BRC) 11/17/1934 Facility Engineering Branch Archives. On December 16, 1936, Roosevelt signed an executive order under the authority of the Migratory Birds Conservation Act establishing the roughly 16,000 Acre Patuxent Research Center under the Biologic Survey Division of the Department of Agriculture.

terms of facilities there were 40 laboratory buildings, 31 greenhouses, approximately 100 barns and storage buildings, and roughly 500 small-animal and poultry houses. In addition, there were an assortment of warehouses, heating plants, granaries, etc.[79]

There was further growth at the site in the next ten years. By 1962, there were 4,800 scientists working on the site—a quarter of all ARS scientists. The 3,000 projects carried on by the scientists cost a total of $120 million. On the 10,500 acres under its control at the time, there were 1,160 buildings, including 35 greenhouses that encompassed five acres.

Today, although the area under the USDA's control is somewhat smaller, the site remains in active use for agricultural experimentation. It continues to be the world's most prominent center of agricultural research and the site of important new discoveries in the field. Approximately one-third of the employees of the Agricultural Research Service are today located at Beltsville.

3.5 DESIGN INFLUENCES AT BARC

The main building period at BARC was between 1933 and 1941. Prior to this period there were approximately two dozen structures on the site, many of which were demolished in the 1930s or thereafter. Extant buildings which predate the 1930s are clustered in the Dairy Area and the Poultry Area . Specific buildings that can be reliably dated to before 1933 include Building 281 (House for Poultry Man), part of Building 204 (abattoir), part of Building 161 (Nutrition Lab), Building 162 (Carpenter Shop), Building 165 (Boiler House), part of Building 166 (Nutrition Barn), Building 167 (Main Dairy Barn), part of Building 170 (Open Cow Shed), and part of Building 173 (Mess Hall/Physiology Laboratory). Of these buildings, most appear to date from the 1910s.

Building 167 (Figure 20) has particular architectural significance in that it is both one of the oldest USDA buildings on the site, and it is the earliest extant example of a permanent barn on the site. It is of cement construction, with stuccoed exterior walls, and a Dutch gable roof. It is capped by a central, pitched, cross gable and ventilators. A number of characteristics of the barn, including the ventilators, roof shape, and the use of stucco were picked up in the design of later barns on the site. Although barns on the site in many cases look very similar, their designs are not based on a single stock plan.[80]

Although there are a number of buildings with wood siding, and many more brick buildings at Beltsville, stucco is perhaps the most common siding material. One reason for its use may relate to fire safety. It seems likely that because of concern about fire and in particular its potentially disastrous consequences for livestock/experiments (and given the distance of the area from fire stations) there was, from early on, a predilection for non-wood structures at the site. This preference is carried over into later buildings as well.

---

[79]"The Agricultural Research Center of the United States Department of Agriculture," USDA, Washington, D.C., 1949, p. 3.

[80]The only buildings which appear to have been constructed using stock plans were Buildings 445 and 446 which are identified on site plans (after they were built) as "type B" sheds. In addition, certain buildings at the central repair facility may also have been "type B" sheds.

A large fire which destroyed a sheep barn gave further impetus to this trend[81] (see Section 4.2.1.3.). In 1933, major construction began at the site. One of the first major buildings in this first phase of the Depression-era boom was Building 200 the "Main Laboratory" of the Division of Animal Husbandry [82] The three-story animal-husbandry laboratory was one of the largest single construction projects of the early New Deal period at the station. It was to be the principal structure in the new plan for the center. As the first major laboratory building on the site, it set the stylistic precedent, and all later major laboratories and office facilities on the site followed its example of brick construction and Colonial and/or Georgian Revival detailing. According to Commission of Fine Arts minutes of a meeting at which it was presented: "It was designed in the Georgian style of architecture, thus conforming to the style of the interesting historical brick buildings in this part of the country. Furthermore, it is to establish the style of architecture for the buildings of the farm."[83]

The most significant buildings of the second phase of the Depression-era buildings were two roughly contemporary clusters of buildings, the "Arlington Replacement" buildings at the North Farm (Buildings 001, 003, 005, 007) and the Departmental Laboratories at the Central Farm (Buildings 306, 307, 308). (Figure 16) Both groupings included large laboratory/office buildings representing sizeable financial investments and both were completed with a Georgian Revival vocabulary consistent with the Building 200 grouping. The style was also consistent with many other early 20th-century government/institutional campuses across the country. Buildings constructed with federal money during this period generally followed certain stylistic conventions; in the northeast and mid-Atlantic Colonial/Georgian Revival styles were seen as appropriate, while in the west adobe and Spanish-revival styling was used. A few, mostly smaller and/or utilitarian buildings, show more elements of the "modern." Most fall generally within the "Stripped Classical" style, which combines elements of classical design, Art Deco influence, and modern design. Illustrative of this category are Building 426 and Building 014.

---

[81] According to Commission of Fine Arts minutes discussing the first wave of 1930s construction at Beltsville, "certain buildings are to be demonstration buildings for parts of the United States where there is no brick." Commission of Fine Arts Minute,s 17 November 1933.

[82] See "Beltsville Farm to be Expanded," *The Sunday Star*, October 15, 1933.

[83] Minutes of the Commission of Fine Arts, January 18-19, 1934. Records of the Commission of Fine Arts.

Figure 16 - Building 306, drawing, detail, 1938

In general, buildings at BARC were constructed in discrete clusters with each cluster containing anywhere from three to over one hundred buildings. This arrangement reflects the different areas of research, and earlier, the separate divisions, and bureaus within USDA. Generally, buildings from the 1930s within these groupings share certain specific decorative elements or materials. Examples of this are found within the Building 200 to 203 grouping (lighter colored brick quoining, half-round dormers, brick entrance details), within the Building 306 to 308 grouping (slate roof, wood portico, etc.), and within the North Farm grouping (Buildings 001-011) (stone quoining and keystone, double-hung windows, etc.)(Figure 17). The trend towards a common design theme within the clusters, however, was not absolute. Certain building types such as barns, service buildings, and smaller structures housing animals (coops, etc.) tend to be outside this scheme and were given fairly consistent treatment throughout BARC.[84] In addition, certain of the decorative/material subunits were not confined to one area. For instance, the architectural vocabulary used in the Building 200-203 grouping also extends to Building 470 and 476. (It should be noted that the plans for these buildings tend to date to 1934.) An interesting distinction between the North and Central Farms is that at the North Farm, major laboratories/office buildings have windows employing double-hung sash (usually six-over-six), while the buildings on the Central Farm more frequently employ metal sash, often configured with multiple panes running vertically at the top and horizontally at the

[84]Although in general, standard plans were almost never used at BARC, in many cases only minor changes were made in the design of some service buildings. In addition, where there were large, geographically close groupings of small structures, such as animal pens, one design was used for all buildings.

bottom.

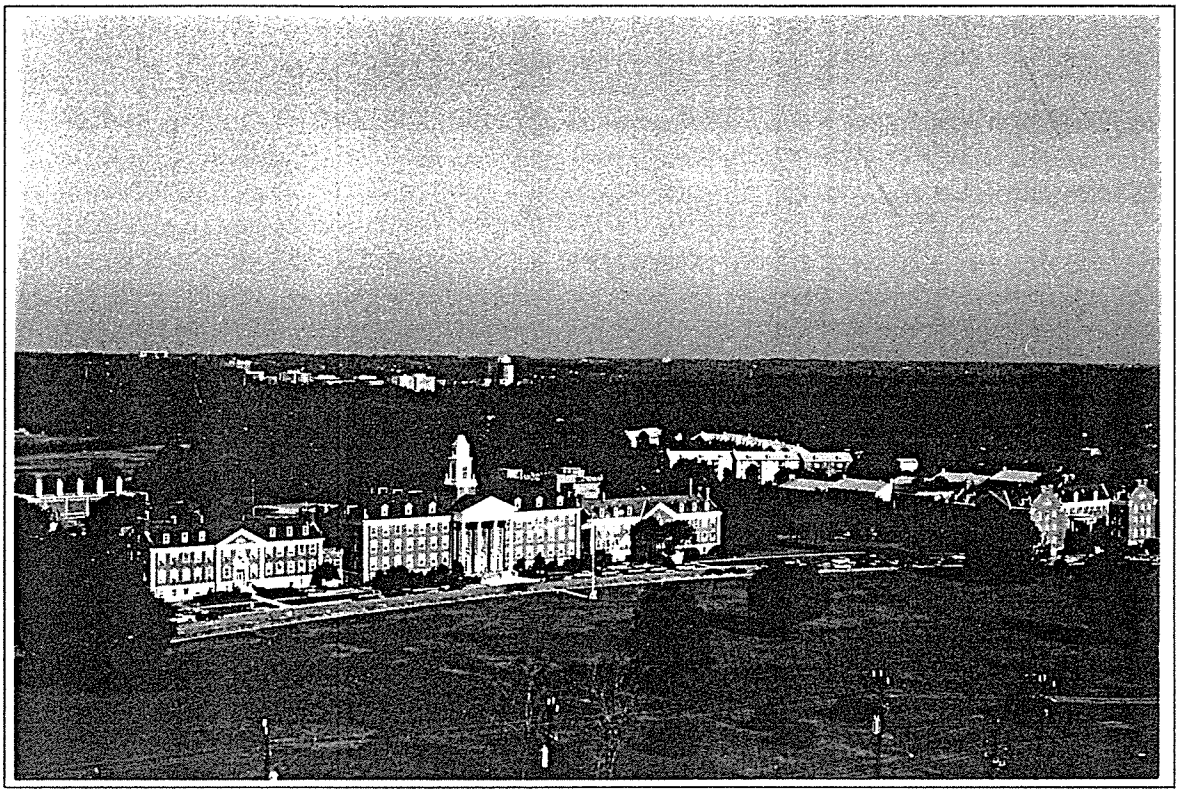


Figure 17 - Bureau of Plant Industry buildings, 1996

4.0 BUREAU RESEARCH AND LAND USE AT BELTSVILLE (1911-1950)

4.1 BUREAU OF DAIRY INDUSTRY

4.1.1 History and Evolution of the Dairy Site

The Dairy Division first came to the Beltsville Research Center site in 1910. As part of the Bureau of Animal Industry, the Dairy Division, along with the Animal Husbandry Division of the same Bureau, shared a 475-acre tract of land located on what is now the Central Farm.[85] On July 1, 1924, an Act of Congress established a Bureau of Dairying as part of the USDA. The work of the Division continued at Beltsville under the new bureau, and personnel and equipment were transferred from the Dairy Division of the Bureau of Animal Industry to the new Bureau of Dairying, which became known as the Bureau of Dairy Industry by 1929.[86]

As part of the Bureau of Animal Industry, the Dairy Division originally occupied 190 acres in 1911, all of which was under cultivation, except for four acres off of the western end of Powder Mill Road, where buildings were located. The soil was originally in a low state of fertility, but was improved by tile drainage and the application of lime and manure. The principal crops grown at this site were corn, oats, crimson clover, and cowpeas, all used as feed for the herd. As a result, the first year at the new site was spent grading the soil and planting crops for use with the experimental herd, which was not purchased until the summer of 1912. Until the soil was further improved, the farm could not support grass for pasture land; the herd was maintained on silage, grain, and hay.[87] By the 1920s, much of work of setting up the farm and establishing the herd was completed, and attention focused on aesthetics and expansion of the farm.

The 1923 Annual Report briefly recounts that:

> *(d)uring the past year special attention has been given to improving the appearances at this station by more attention to the lawns, setting out shrubbery, painting, replacing temporary fences with more permanent ones, and providing a more satisfactory method of manure storage.*[88]

---

[85]As part of the original landholding at BARC, the Dairy Area served as a gateway to the Bureau of Animal Industry farms. An entrance gateway into the farm was designed in 1916 and constructed in 1917. No evidence has been found to indicate that the stone wall ever contained an actual gate across the road, but the entrance marker remains on the site.

[86]Report to the Chief of the Bureau of Dairying, 1925, NARA, RG 152, Entry 5, Box 25.

[87]Annual Report of the Beltsville Experimental Farm: January 1, 1911 to December 30, 1911, NARA, RG 152, Entry 1, Box 29.

[88]Report of the Dairy Station for the Fiscal Year Ending June 30, 1923, by T.E. Woodward, NARA, RG 152, Entry 1, Box 29.

Figure 18 - Dairy buildings along Powder Mill Road, 1925

Additional correspondence reveals that landscaping the grounds of the Dairy Area was a priority. A.D. Melvin, Acting Chief of the Bureau of Animal Industry in 1913, requested the assistance of a landscape gardener in laying out the grounds around the dairy buildings. The request was granted by the Bureau of Plant Industry, which offered the services of F.L. Mulford. Records indicate that Mulford designed a planting plan for the Superintendent's House (Building 186). A planting plan from the mid-1930s exists for the Dairy Products Laboratory (Building 157), indicating that the wish for a pleasant landscape in the Dairy Area extended to later New Deal era buildings as well.[89]

In 1925, the Walker tract of land was acquired, adding an additional 129 acres to the Dairy site (Figure 18). Eighty acres were added in 1930, when the Gatti tract was purchased, and 114 more acres were added in 1932. A small 18-acre parcel, part of the Muller-Fitzgerald tract, was acquired in 1934. These purchases, which brought the total land holdings of the Bureau of Dairy Industry to approximately 532 acres, were used for pasture and crop land to feed the ever-expanding dairy herd.[90]

Acreage was also acquired by transferring land between bureaus. In 1930, the Bureau of Dairy Industry

[89]NARA, RG 152, Entry 1, Box 40.

[90]USDA Property Record, September 19, 1938, Archives, Facility and Engineering Branch, Building 427, BARC.

was given approximately 38 acres of the Bureau of Animal Industry's Bennett tract. In 1934, a new boundary line was established and approximately 13 acres of this same tract was returned to the Bureau of Animal Industry, with 25 acres remaining in the possession of Dairy Industry. Approximately 67 acres of the Hall tract was then allocated to Dairy, making a total of approximately 92 acres given to Dairy by 1934.[91]

By 1943, the Bureau of Dairy Industry tract contained 664 acres. Approximately 148 acres were pasture, 340 acres were devoted to the production of feed crops, and 149 acres were woodland. The remaining 27 acres were occupied by buildings.[92]

By the late 1930s, the Bureau of Dairy Industry's work was spread across the Central Farm area (Figure 19). The original core building cluster was constructed in the 1910s as part of the initial occupation of the site, and enlarged in the 1930s as part of the New Deal construction effort at Beltsville.[93] An area north of the cluster also contained several barns and residences (Buildings 186 and 188, and the 192 series). The barns were used to house cattle and mules (which were used to work in the crop fields of the Bureau) and for hay storage. South of the original Dairy Area, west of the Animal Disease Station, an area, which includes Buildings 1002 through 1008, was designated as a quarantine area for tuberculin infected cattle.[94] Finally, a granary complex (Buildings 085, 085A, and 085B) was constructed on the Linkage Farm to assist in feeding the growing experimental dairy herd.

---

[91]1934 Bureau of Dairy Industry/Bureau of Animal Industry Map, Archives, Facility Engineering Branch, Building 427, BARC.

[92]Beltsville Research Center Conservation Plan, USDA, Soil Conservation Service, November 1943, p. 18.

[93]Much of the original 1910s construction was demolished in the 1930s to make room for new buildings.

[94]This land and its buildings were considered part of Dairy until 1941, when the land became part of the Animal Disease Station. However, Dairy continued to use the land and buildings to quarantine tuberculin-infected cattle. For more information on the Quarantine Area, see Section 4.2.3.

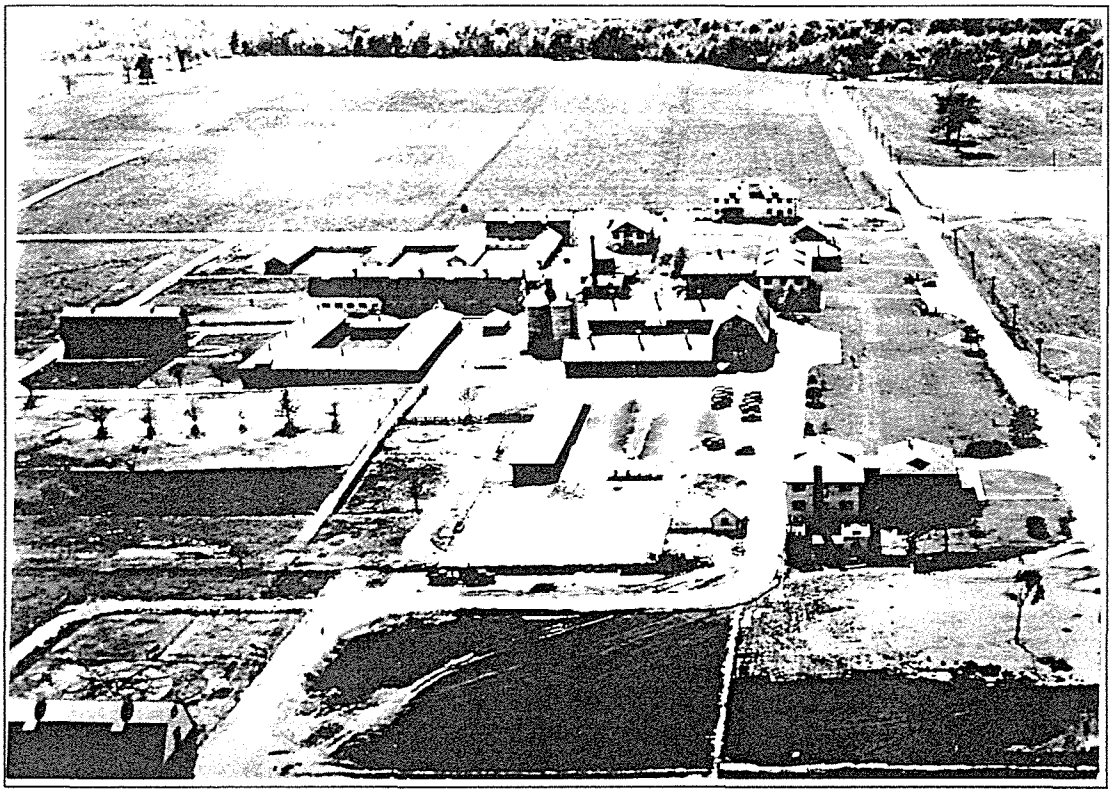


Figure 19 - Dairy area, aerial view, 1936

4.1.1.1 Construction in the Dairy Area

The architecture of the Dairy Area is unique for several reasons. First, along with the Animal Husbandry Area, it is the oldest collection of USDA buildings on the BARC site. Second, the Bureau of Dairy Industry employed dairy engineers who designed the buildings in the area during the key building campaigns of the 1910s and 1930s. At other bureaus at BARC, primary design responsibility fell to the Bureau of Agricultural Engineering, with employees of the individual bureaus occasionally contributing design ideas. However, the dairy engineers planned the layout of buildings in the Dairy Area, designed the dairy buildings, and took on additional research tasks to test new materials for farm buildings. No other bureau at BARC had specific engineers or architects.

The Dairy Area is also unique in that it displays such a broad range of building types, allowing the area to essentially function as a small, self-sustaining work community. While most building clusters at BARC contained barns and laboratories, the Dairy Area also featured residences, silos, a mess hall, an administrative building, an autopsy building, and a products laboratory. Various other buildings, such as pump houses, storage buildings, and animal shelters are also present. Despite the varied uses and different scales of the buildings, the use of similar building materials provides a consistent architectural vocabulary.

Because of the Dairy Division's early occupation of the site, many of the buildings in this area are some of the earliest USDA buildings at BARC. Most notably, Building 167 (Figure 20), the main dairy barn, is the earliest extant barn on the site. Like other buildings in the Dairy Area, it is of poured concrete construction, with a stucco finish, and a gable roof covered with red, asbestos, diamond-shaped tile. The barn was constructed as a central unit with east and west wings used to house the herd. The west wing was enclosed during the initial phase of construction in 1911, while the east wing remained open. This was done to test the open shed method of sheltering dairy cattle, and also with the idea that as the herd grew, the wing would be enclosed to accommodate the growing number of cattle in cold weather conditions. [95]

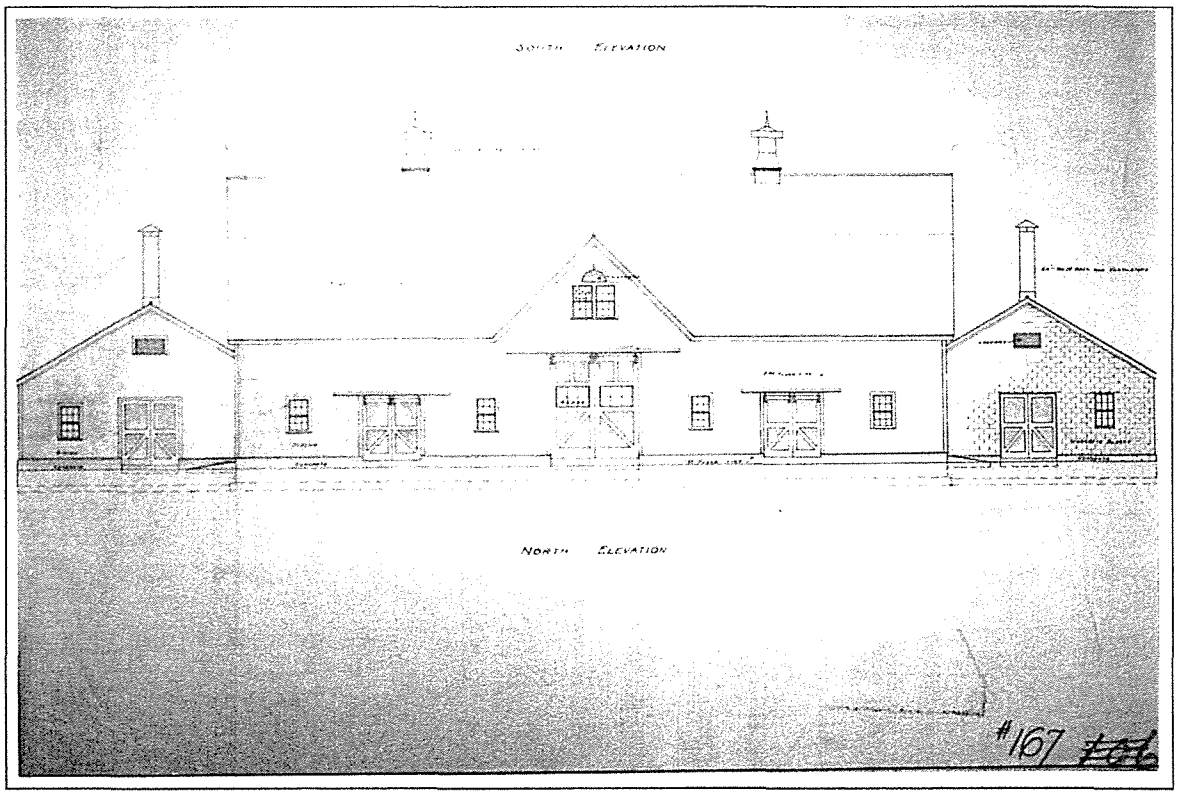


Figure 20 - Building 167, drawing, 1911

A 1915 description of the area says that the buildings are of the "solid-wall concrete type, with asbestos shingles."[96] This architectural vocabulary is still apparent in the Dairy Area today, where all but a few of the buildings are poured concrete with the red, diamond-shaped, asbestos-tile roof shingles. These fireproof features are innovative in their early use at BARC. A 1935 fire hazard survey draws attention to the need to build with fire safety in mind, yet the dairy buildings from the 1910s are well prepared for any

[95] The enclosure of the east wing was completed in 1918. NARA, RG 8, Entry 19, Box 383.

[96] NARA, RG 152, Entry 1, Box 40.

type of potential fire hazard.[97]

The 1930s buildings added to the site were constructed of similar materials, and are of a similar scale, thus respecting the original 1910s construction. Correspondence from 1934 directs the Bureau of Dairy Industry to use stucco in a warm tone on new buildings to match existing buildings. However, many of the buildings from both eras have either been demolished or altered, with much of the demolition of 1910s buildings occurring to clear land for New Deal era construction. While some of the alterations took place early in the history of the site, others are more recent. Over the course of Dairy's tenure at BARC, many temporary buildings were also constructed to meet short-term needs of the bureau. Wood silos, implement sheds, and milk houses once present on the site no longer exist.[98]

However, the core buildings remain. These buildings display similar materials and convey the evolution of the site, as well as the research conducted there, since 1911. As a working dairy farm from the 1910s, the site now shows obvious signs of evolution and progress. New Harvestore silos are present, and many of the barns show improvements, such as metal or concrete stalls, which are easier to clean than wood. Many of these improvements were made as a result of increased knowledge in the areas of animal disease and product sanitation. However, the essential layout and architectural vocabulary present from the 1910s and 1930s is present.

4.1.2 Research of the Bureau of Dairy Industry

The work of the Bureau of Dairy Industry initially involved four distinct lines of investigation: dairy cattle breeding, feeding, and management; dairy cattle nutrition; dairy manufacturing research; and investigations in the production of market milk.[99]

Breeding, feeding, and management investigations included comparisons on the effectiveness of various methods of breeding cattle to produce high-volume milk producers. Investigations included comparisons made on the outward appearance of cow udders to the milk-producing capability of the cow, factors affecting fertility of cattle, the effects of food and nutrition on milk production, and determining the effects of rations on calves as a factor involved in mortality in the early phases of life.

The nutrition work of the Bureau investigated nutritional requirements of dairy cattle for optimal growth, maintenance of normal health and reproduction, and the process of milk secretion. The most practical methods for obtaining nutritional requirements were also studied. While the research was directed toward dairy cattle, small animals were used in early phases of research.

The dairy manufacturing researchers tested the results of laboratory investigations on the manufacture of dairy products and by-products, such as cheese, powdered milk, whey, condensed milk, and skim milk, on a semi-factory scale. The Bureau developed new and improved methods of manufacturing, but before these methods could be transferred to the national dairy industry, they needed to be fully tested at a

---

[97]NARA, RG 152, Entry 5, Box 77.

[98]NARA, RG 152, Entry 1, Box 40.

[99]NARA, RG 16, Entry 32, Box 1.

commercial creamery and cheese factory. This work was originally conducted at such a facility in Grove City, Pennsylvania , but was transferred to Beltsville in the 1920s to bring the operation under closer supervision of technical personnel, thereby increasing efficiency.

The market milk scientists investigated practical and economic methods and equipment for producing and handling milk and cream. They studied the effects of feeds and other factors on flavors and odors of milk, homogenization, viscosity, etc. Improvement in the physical properties of milk increased the quantity consumed, thus extending the market.[100]

By 1936, the Bureau shifted its research focus to include the following four main goals: increased efficiency and economy in the production of milk on the farm; greater efficiency in the transportation, processing, and merchandising of milk and its products; improvement in the general level of quality in all dairy products offered to the consumer; and the development of methods utilizing the constituents wasted in skim milk, whey, and buttermilk, and the development of wider market outlets for existing by-products.[101]

From its inception, the Dairy Division realized the importance of disseminating information regarding its findings. Publications, films, lectures, and representation at hundreds of meetings helped to spread the scientific findings that directly related to the work of dairy farmers, affecting both their production methods and overall profits.[102]

4.1.2.1 Breeding Research

Breeding research at Beltsville was conducted with one goal in mind: higher milk production. Studies conducted at Beltsville beginning in the 1910s indicated that one-third of heifers produce enough milk to turn a profit, while another third breaks even, and the final third actually costs money to keep. The financial burden of raising these unprofitable cows was a drain on the business of dairying, and added materially to the cost of milk production. The work on the Beltsville herd proved that the application of genetic knowledge to breeding practices resulted in a steady rise in the average milk production of the individual cow and a diminishing percentage of low or unprofitable animals. Improving these statistics was one of the most important goals of the Bureau of Dairy Industry. Research indicated that if a heifer produced more milk than her mother, the sire had provided a milk-producing gene. Sires with good results were valued and bred to further increase production in the herd. Other research indicated that by examining the udder of a calf, future milk production could be predicted with a reasonable degree of certainty.[103]

---

[100]NARA, RG 16, Entry 32, Box 1.

[101]NARA, RG 152, Entry 5, Box 11.

[102]NARA, RG 17, Entry 18A, Box 2. Some of the types of meetings attended included small local meetings, large conventions, meetings of livestock and cattle-testing associations, conferences of milk producers, dealers, consumers, and health officials, and meetings of medical societies. Representatives also lectured at dairy schools, fairs, milk exhibits, and on a dairy train, which toured the United States, spreading dairy-related information.

[103]NARA, RG 16, Entry 32, Box 1.

Inbreeding experiments were also conducted. A cow was mated with a bull of proven quality, and female offspring were then mated back to the same bull, as were the resulting female offspring of the third generation. This was done not only to study the effects of inbreeding, but also to determine if an entire herd could be built with only one good bull. This research had varying results. Some offspring showed genetic defects that appeared to be the result of excessive inbreeding, while other offspring proved to be high milk producers.[104]

4.1.2.2 Feeding and Nutrition

The Bureau undertook long-term pasture experiments in the mid-1920s to determine what effects various crops had on the milk production and general health of the herd. Approximately 70 acres were allotted for pasture land, and crops, including sweet clover and timothy grass, were planted.[105] Other pasture experiments studied the effects of grazing rotation and fertilizer on milk production. The Bureau found that grazing the pastures in rotation increased their yield 11 percent, but the heavy application of fertilizers, while increasing the yield of the pasture, was not economical, as the price of the fertilizer outweighed any economic yield of the herd.[106]

Other feeding experiments studied the effects of various foods on the flavor and composition of milk, and additional studies were conducted to determine if food that was normally considered to be waste could be used to supplement other foods in the diets of cattle. Desiccated potatoes, corn stalk extract, and fish meal were all tested with varying degrees of success.[107]

Silage experiments were also conducted to determine which crops produced the best food for cattle, as well as which foods suffered the least amount of loss in the silo. Both small-scale silos and large, full-size silos were used in the experiments. The silage was sometimes tramped and distributed, while at other times, it was simply deposited in the silos. Experiments showed that tramping and distributing had no effect on the spoilage rate of the silage; it kept equally well throughout the winter. Finally, materials used in the construction of silos were studied to determine the relative merits of wood and concrete as building materials, and to further determine the best concrete composition, and to protect the building material from the resulting acidity of silage.[108]

---

[104]NARA, RG 152, Entry 1, Box 40.

[105]NARA, RG 152, Entry 5, Box 154.

[106]1932 Annual Report of the USDA Bureau of Dairy Industry, p. 6. NARA, RG 152, Entry 5, Box 25.

[107]1932 Annual Report of the USDA Bureau of Dairy Industry, p. 5. NARA, RG 152, Entry 5, Box 25.

[108]NARA, RG 152, Entry 1, Box 40.

4.1.2.2 Manufacturing

By 1936, there were more workers involved in manufacturing research than in actual production work at the Bureau of Dairy Industry. Then Chief of the Bureau, Oliver Reed, stated that he believed the manufacturing research yielded a higher economic return to the industry than the work on breeding and actual milk production. Some of the most productive experimental work involved investigations of sources of bacterial contamination, methods of sterilizing equipment, and shipping milk in frozen concentrated conditions. Studies were also conducted on evaporated milk, ice cream, cheese, and butter. These experiments were concerned primarily with preserving the flavor and appearance of products during transportation and storage. Ultimately, more products reached consumers without spoiling, thus decreasing waste and increasing profit for farmers and manufacturers.[109]

4.1.2.3 Milk Production

The Bureau of Dairy Industry strove to improve the economic position of farmers and others in the dairy industry. A 1923 study was conducted to determine if consistently using the same person to milk a cow resulted in a higher yield. During one experimental term, cows were milked by the same person. During the following term, the cows were milked randomly, but never by the same person twice in a row. The results showed that an increase of .6 percent in milk yield occurred when the cows were milked by the same person. Since this result was not significant, large dairies, which milked cows randomly, were able to confidently continue this practice, knowing that no great losses were incurred.[110]

The Bureau of Dairy Industry specifically addressed several milk-production problems in the research it conducted during World War II. Research on the open-shed cattle system, which began at Beltsville in the 1910s, continued into the 1940s. This system of stabling cows proved to be satisfactory, as long as cows were kept dry and out of cold winds. Researchers found that cows kept in open sheds gave as much milk, and stayed as healthy and as clean, as those kept in closed quarters. This information allowed farmers contemplating expansion of their herds or those considering first-time dairy farming to do so without building expensive barns.[111]

Another study with a wartime application, which aided the nation's food supply, determined that the frequency of milking had an effect on the overall quantity of milk produced. When cows were milked three times a day, instead of the usual two times, they gave about 20 percent more milk. Farmers with enough help to perform the additional milking were able to increase milk production without expenses for additional cows or enlarged housing facilities.[112]

---

[109]NARA, RG 152, Entry 5, Box 4.

[110]Report of the Dairy Division: Fiscal Year Ending June 30, 1923. NARA, RG 152, Entry 1, Box 29.

[111]Research for Better Farming and Farm Living, USDA, August 1945, RG 310, Entry 1001, Box 2, p.18.

[112]Ibid.

Another important discovery from research conducted at Beltsville was that decreases in summertime milk production were due to a lack of green, moist pasture for grazing, rather than elevated body temperatures or annoying insects, as previously thought. When moist grass, rather than the typical dry, short grass of midsummer, was abundantly available, there was no significant decrease in milk production.[113]

A long-held belief of dairymen was tested at BARC in 1922. Warming the drinking water of cows was believed to lead to higher consumption rates of water, which in turn led to an increased milk yield. One group of cattle was given cold water, while another group was given warm water. While the cattle given warm water did consume eight percent more water than those cows given cold water, the milk yield of the warm water group was only one-half percent higher.[114] Similarly, exercising cattle, long thought to increase milk yield, proved that regular exercise increased production only .05 percent.[115]

In an effort to determine the effects of flies on milk production in dairy cattle, employees conducted experiments on various fly repellents. While some solutions proved to be more effective in repelling flies, the experiment determined that the presence of flies had no impact on overall milk production.[116]

4.1.2.4 Tuberculosis

Perhaps one of the most devastating occurrences in the history of the Bureau of Dairy Industry was an outbreak of tuberculosis at Beltsville that began in 1937 and continued to perplex researchers into the following decade.[117] Initially, sabotage was suspected and government agents were involved in the investigation. When no signs of foul play were uncovered, dairy researchers began exploring other potential sources of the infection. Not knowing much about the disease, researchers investigated the possibility of infection from birds, humans, insects, and other livestock.

In an attempt to end the epidemic, cattle were quarantined, and when this did not appear to help, they were slaughtered. This drastic action interrupted many of the long-term feeding and breeding experiments of the bureau, costing the Bureau time and money. In an attempt to physically remove the infected cattle from the healthy experimental herd, an area in the Animal Disease Station was reserved for the quarantine of the tuberculin-infected cattle. Workers in Animal Disease Station were prohibited from entering the main dairy area for fear of contaminating the healthy herd. While these measures seemed to slow the spread of the disease among the herd, it did not remove all traces of infection. However, by the mid-

---

[113]Ibid, p. 19.

[114]Annual Report of the Beltsville Farm, Fiscal Year Ending June 30, 1922, NARA, RG 152, Entry 1, Box 29, p. 4.

[115]Ibid.

[116]Report of the Dairy Division Experiment Station for the Fiscal Year Ending June 30, 1918, NARA, RG 152, Entry 1, Box 29.

[117]Other dairy-related diseases are discussed in the chapter on the Animal Disease Station. Infectious diseases of dairy cattle were researched by the Animal Disease Division in cooperation with the Bureau of Dairy Industry. Animal Disease researchers took the lead in this area because of their expertise, and because the remote location of the Animal Disease Station offered a degree of protection to the healthy herd located in the Dairy Area.

1940s, the Bureau had recovered from the outbreak and their research was able to continue without any major interruptions.[118]

4.1.2.5 Building Material Research

Dairy engineers conducted experiments on alternative building materials for dairy barns and shelters. Building materials that were tested as early as 1913 in the construction of cow stalls in the west wing of the main barn (Building 167) were cork brick, creosoted wooden blocks, oak planks, and concrete. In the use of concrete, some stalls were constructed with sawdust included in the concrete mixture, while others had a layer of tar paper below the surface, and some were concrete with no additives. In some concrete stalls, oil was used as a top coating, while in others it was used as a base, in an attempt to develop a combination of materials that would retain a certain degree of warmth. The results of the test proved the concrete combinations were the most sanitary, and that additives to concrete had no effects on temperature.[119]

Many of the buildings in the Dairy Area were typical in construction materials, and often in size, of what might be found at dairy farms in similar climatic regions. Dairy engineers knew that if they built expensive farm buildings from atypical materials, average farmers would not be able to afford many advances, and thus would not benefit from the research conducted at BARC.

4.1.2.6 Summary

Like other bureaus and divisions at BARC, the Bureau of Dairy Industry conducted important research which greatly affected small dairy farms, larger commercial dairies, and dairy production and manufacturing industries. Through breeding and feeding research, those involved in the raising of dairy cattle were able to determine the most efficient and economically productive means for milk production. This work proved to be particularly important during World War II, when the nation needed to supplement its food supply. While the Bureau of Dairy Industry was the government showplace for dairy cattle and the research certainly addressed large-scale production, the researchers and scientists at BARC also addressed the needs of farmers who kept small herds.

Since dairy research at BARC commenced, the results of the experiments also had beneficial results for farmers, manufacturers, and consumers. The research made milk production more efficient and abundant, thus lowering its price level. This, in turn, increased the number of milk consumers and the overall consumption rate of milk per capita, ultimately translating into better nutrition for people who could not previously afford to purchase milk, and higher profits for farmers and those in the production industries.[120]

---

[118]NARA, RG 17, Entry 3, Box 649.

[119]NARA, RG 152, Entry 1, Box 29.

[120]NARA, RG 16, Entry 16, Box 2936.

research was conducted in three separate frame buildings, located in a row along the principal east-west station road: the three-story main laboratory, which included an incubator cellar in the basement, used by the poultry section prior to the construction of their new buildings; a small animal building; and a building for preparation of samples for experimental use.[125] Most of the buildings were not equipped to support the extensive laboratory needs of the division, and the potential dangers because of fire hazard were immense—due to the flammable liquids used in chemical work in animal products, in nutrition, and in the study of wool. Further, the animal husbandry research program measuring record of performance required equipment such as hot and cold constant temperature rooms and refrigerators, facilities that needed to be installed in permanent buildings.

The Bureau's building needs came at a fortuitous moment, with the advent of the New Deal funding projects. The plan for proposed new development called for the laboratories, abattoir, and animal buildings all to be grouped near one another, connected to a central heating plant.[126] The Public Works Administration allotted over $1 million for the new construction program of the Bureau of Animal Husbandry (Figure 22).

> *With 2,100 men, 1,850 employed under the PWA and CWA, and 250 Civilian Conservation Corps members, clearing timber, making roads, and erecting buildings over an area of 4,000 acres, the U.S. Animal Husbandry Experiment Station at Beltsville, Md., is undergoing rapid changes which will make it a permanent research station and the largest center of its kind in the world.*[127]

[125]J.R. Mohler, Chief of Bureau, to Dr. Tugwell, Assistant Secretary, August 2, 1933. NARA, RG 16, PI 191, Entry 17, Box 1761.

[126]Memorandum from Chief of Animal Husbandry Division to Drs. Mohler, Stockberger, and Woods, April 29, 1932. NARA, RG 17, Entry 3, Box 104.

[127]"Experiment Husbandry Station Arising in Woods Near Beltsville, Md.," *Washington Post*, January 20, 1934. NARA, RG 66, Entry 17, Box 28.

4.2.1 The Animal Husbandry Division

The Animal Husbandry Division of the Bureau of Animal Industry established operations at Beltsville on January 1, 1911, on a large section of the 475-acre parcel that the Department of Agriculture had acquired in 1910. Throughout its history, the division was the largest section (in terms of both personnel and land area) of the Bureau of Animal Industry at Beltsville. The division conducted research on the breeding and feeding of domestic animals—including poultry, but excluding dairy cattle, which were part of experiments conducted by the Dairy Industry Division. From the start the division worked in conjunction with state experiment stations, national organizations and farmers, as well as other offices in the Department of Agriculture.[122] The division was dedicated to research:

> *The purposes of which are (1) to bring to the Bureau of Animal Industry contacts with the livestock producers of the United States, (2) to study broad regional and national problems pertaining to animal production from the standpoint of the producer, and (3) to articulate with each branch of the Department of Agriculture and with State and National organizations which may be in a position to assist in the solution of these problems.*[123]

By the mid-1920s, the U.S. Animal Husbandry Experiment Farm's buildings—mostly wood-frame structures—were grouped together along a central north-south artery (today only small sections of this road system are still extant, at the rear of the 200 series area and in the Poultry Area). One approached the station on the principal east-west road (a straight road more or less at the latitude of Powder Mill Road) from the Dairy Industry farm to the west, which brought the visitor first to the office and residence of the Superintendent (Building 209). Known as Walnut Grange, the house formed a part of the early-1800s Black Walnut Levels estate of the prominent Snowden family. Slightly to the east of Building 209, clustered together at the intersection of the north-south and east-west roads, were a row of wood-frame buildings that contained the activities of many of the animal divisions: sheds for goats, sheep, cattle, and guinea pigs (which were used in genetics research), a nutrition laboratory, as well as the wool laboratory, and the machinery shed. Research was conducted in the nutrition laboratory on the influence of food substances on an animal's growth and reproduction. There was also a horse barn with horses both for farm work and research. To the north of this cluster lay the site of the swine investigations, including hog houses, silos, the abattoir (slaughterhouse), and a mill. The abattoir (Building 204), one of the first permanent masonry buildings in this area, was equipped with a laboratory for the study of meats and meat products. Research on the problem of soft pork, methods of curing meats, etc. were all studied at the abattoir.[124] At the termination of the road to the north, in the same location as it is found today, was the poultry research division, which included chicken houses, a nutrition laboratory, a residence for the poultry man, and a garage.

By the early 1930s, the laboratory needs for the Division had reached urgent new levels. The laboratory work was spread out in seven different buildings at the Experimental Farm, all of wood-frame or brick and wood construction (with the exception of the then-brand-new Poultry Area facilities). The nutrition

---

[122]Annual Report of the Department of Agriculture for 1924, p. 6.

[123]Houck, *The Bureau of Animal Industry*, p. 221.

[124]Annual Report of the Department of Agriculture for 1924, p. 6.

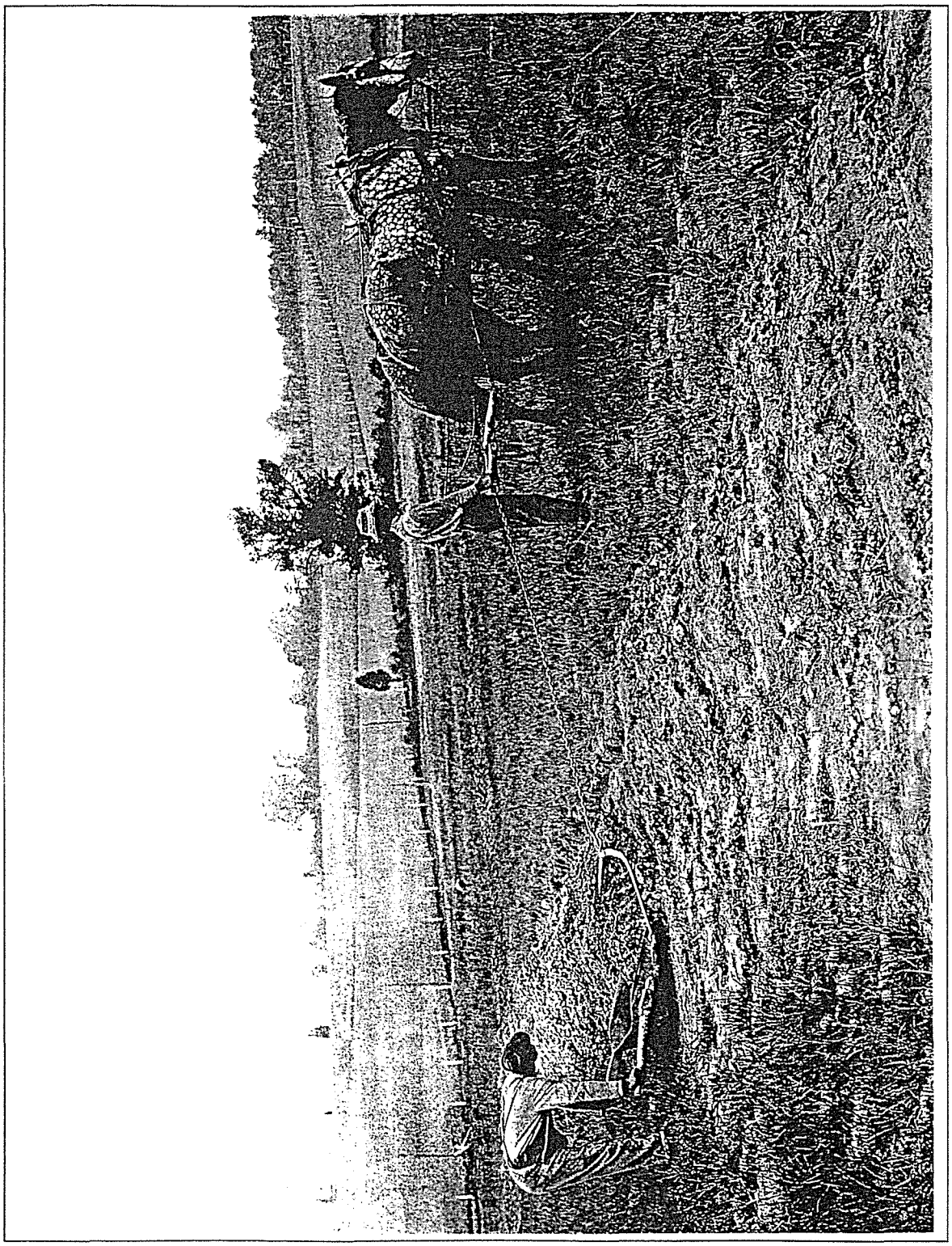


Figure 21 - Animal Husbandry Farm, c. 1915

4.2 THE BUREAU OF ANIMAL INDUSTRY

The Bureau of Animal Industry was established in 1884.[121] Its first duties related to the prevention of the export of diseased cows and to eradication of contagious diseases in domestic farm animals. Other major duties of the Bureau related to meat packing and inspection. Later the Bureau diversified into the area of animal husbandry of domestic animals. Major divisions of the Bureau included the Meat Inspection, Field Inspection, Tuberculosis Eradication, Biochemic, Pathological, Zoological, Tick Eradication, Hog Cholera Control, and Animal Husbandry Division. Of these, the Animal Husbandry and Zoological Divisions conducted work at Beltsville. The Animal Disease Station, which was also located at Beltsville, although not a formal division of the bureau, was also a major research facility.

The Bureau of Animal Industry's first experimental station, which was devoted principally to investigational work on animal diseases, was a small six or seven-acre tract on Benning Road at the outskirts of Washington, D.C. It was established in 1883, following close on the heels of the creation of the Bureau of Animal Industry. The buildings of the station included a residence, three small stables, hog pens, and a laboratory and autopsy room contained in a frame building. The station was operational until 1897, at which time it was moved to Bethesda, Maryland.

The Animal Industry station in Bethesda consisted originally of an 18-acre tract of land, located along Rockville Pike. By 1907, the tract had grown to over 50 acres, and there was still not adequate space for the experimental work of the bureau, especially given the growing interest in separating general animal husbandry work from the animal disease work. Congress appropriated $25,000 in 1909 for the purchase of additional land. Since the adjacent lands in Bethesda were deemed too expensive, the Department of Agriculture began looking elsewhere for additional lands.

The Department of Agriculture purchased 475 acres of land from the Hall family, a property that centered around Walnut Grange (Building 209), the early 19th-century plantation estate that the government subsequently referred to as the Mansion House. The house became the home of the Superintendent of the station. The station at Beltsville, which became known as the Experiment Farm of the Dairy and Animal Husbandry Divisions of the Bureau of Animal Industry, was dedicated to the study of animal production and of livestock problems such as genetics, wool, meats, and nutrition. In 1924, the Dairy Industry section, originally established under the Bureau of Animal Industry, became an independent Bureau. After this separation, the station land was divided between the two Bureaus, with Dairy occupying 190 acres and Animal Husbandry receiving 285 acres (Figure 21). [For a full history of the Dairy section at BARC, see Section 4.1.] Particularly from the 1920s onward, the Animal Husbandry Division was the dominant force in the development of the central portion of the Beltsville site.

[121]The Bureau was abolished in 1953 with the creation of the Agricultural Research Service. As to work conducted at Beltsville, its duties became part of the Animal Disease and Parasite Research Branch, the Animal and Poultry Husbandry Research Branch, and the Animal Disease Eradication Branch.

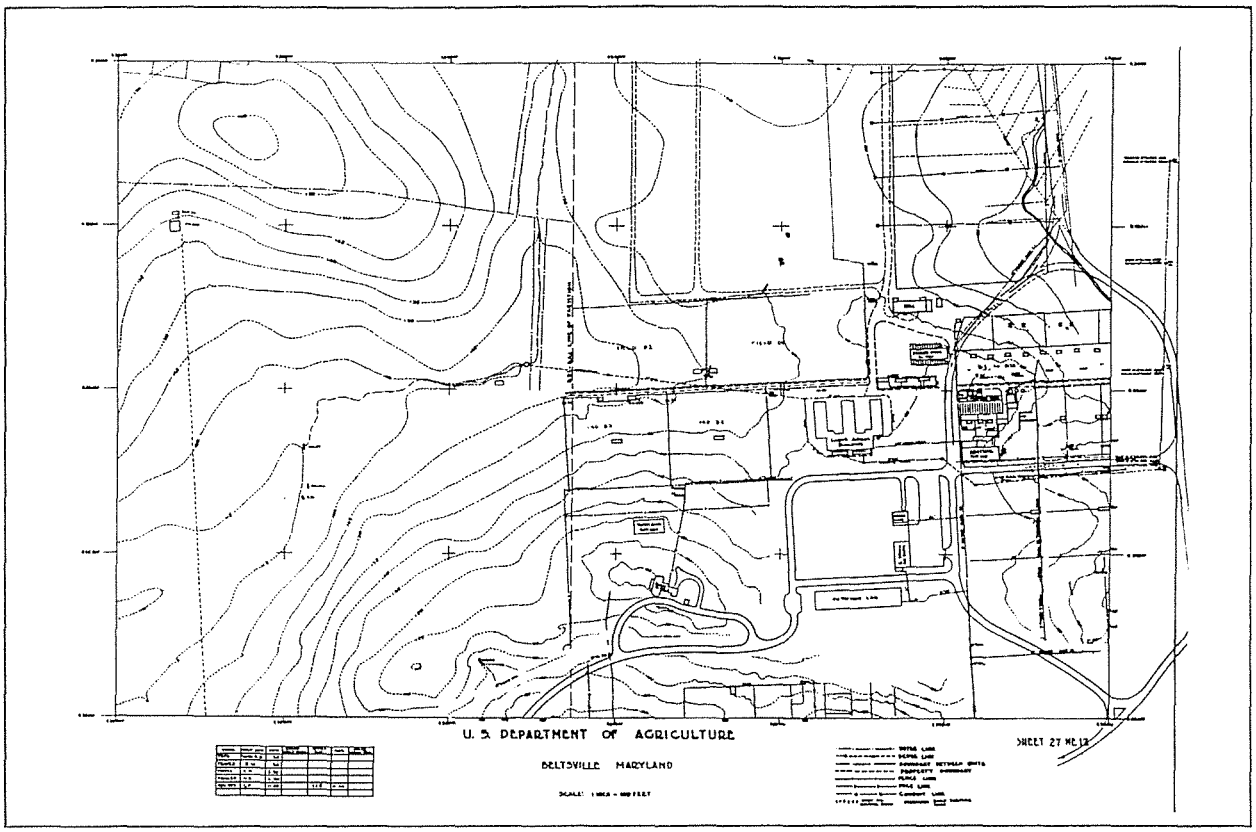


Figure 22 - Animal Husbandry area, site plan, 1938

One of the more unusual aspects of the massive construction effort that went on during this period was the fact that a majority of it—particularly in this first phase—was done with the federal government acting not only as architect, but also as general contractor. As such, it purchased materials, hired workers, and supervised construction. This technique—referred to as force account or day labor construction—was heavily criticized by local contractors who felt that the federal government was competing with them by acting as contractor itself. The process came to public attention in 1934. In May 1934, the Associated General Contractors of America wrote to Secretary of Interior Henry Wallace and Under-Secretary Rexford Tugwell complaining of the process. They also rebutted the Government's position that the process was faster and cheaper, by pointing out instances where the individual supervising the projects had stated that construction was completed (at budget) on certain projects that were not, in fact, complete.

In October 1934, irregularities like those noticed by the Associated General Contractors caused a minor scandal. The $1,314,890 allotment had been exhausted, and still only two-thirds of the planned campus had been completed. Some 64 frame chicken houses stood unfinished, as did the main laboratory building (Building 200). Photos of the clearly unfinished buildings appeared in the papers.[128] Public Works Administrator Harold Ickes ordered a halt to the construction and an investigation of expenditures. In the

[128]See for example "Beltsville: Barn de Luxe for Mrs. Cow, Her Husband and Neighbors," *The Washington Post*, October 20, 1934, p.1.

wake of the audit, although the probe found no evidence of embezzlement,[129] F.B. Brandon, superintendent of the animal husbandry section of the Experimental Farm, was forced to resign along with several others. H.C. Butterfield, then superintendent at the Arlington Farms station, was brought in on the heels of the scandal to serve as head of the newly established entity, the Beltsville Research Center. [See Section 3.3.7][130] The scandal resulted in major delays for all PWA Animal Husbandry work, which in some cases took years to complete. An additional $500,000 was appropriated to finish some of the unfinished projects.

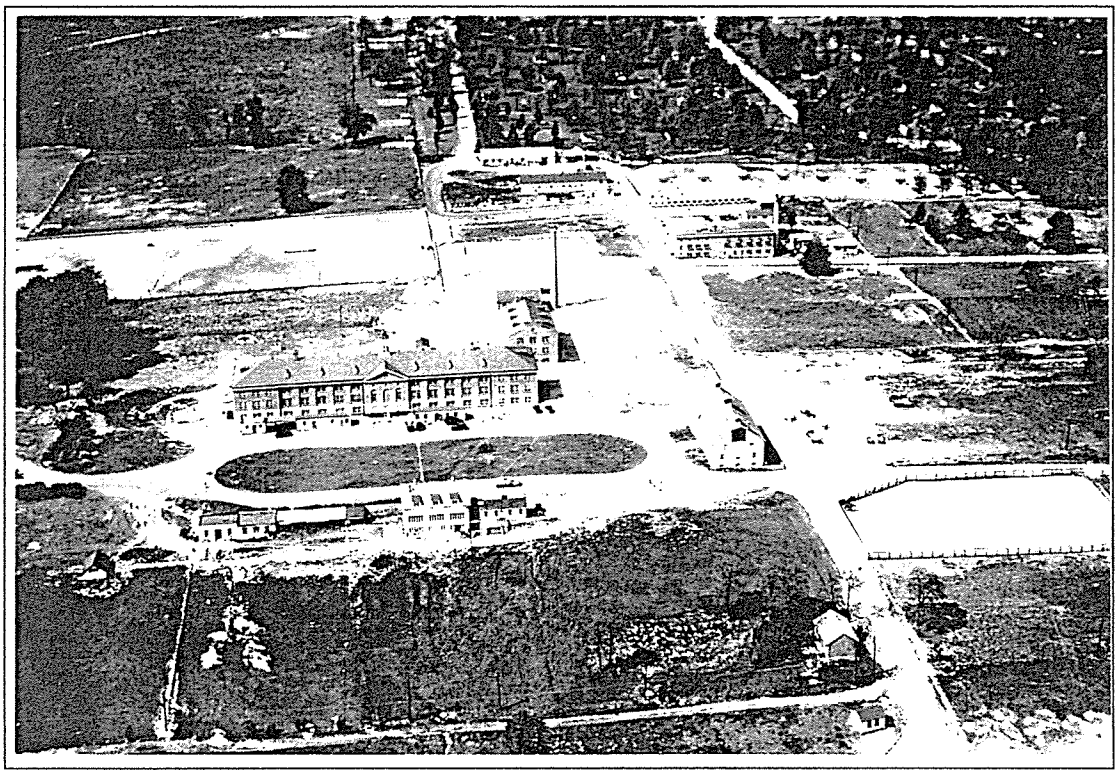


Figure 23 - Animal Husbandry area, aerial view, 1936

[129]The Chief of the Animal Husbandry Division, however, was transferred to a different post.

[130]Bob McCormick, "Spare Cash Sought by Agriculture Unit to Complete Beltsville's Chicken Coops," *Washington Post*, December 13, 1935. NARA, RG 66, Entry 17, Box 28.

The Main Laboratory (Building 200), when finally completed, served as the showpiece of the new Animal Husbandry area (Figure 23). It housed laboratories dedicated to animal nutrition, physiology and bacteriology, animal genetics, meat and wool investigations, and control work involving small animals. The building was "intended as a clearing house for the animal husbandry stations throughout the whole country. We expect to be equipped to handle any work sent to us from any part of the country and we hope to co-operate with all our present stations in the solution of any problems that may arise from time to time."[131] Designed by Washington architect Delos H. Smith, the three-story laboratory building was identified as the principal structure in the new plan for the center. It was the first major laboratory building on the site, forming the southern perimeter of an impressive planned quadrangle. As the first monumental building for the new area, the building set a stylistic precedent of brick construction with Georgian Revival-style detailing. The building suited the aesthetics of the Commission of Fine Arts, the regulatory body overseeing the design of the federal city, who overwhelmingly approved the building. Minutes of its meeting include Smith's explanation "that the building will face south but there is no central portico as it is proposed to have the refrigerator at the center of the building, leaving the wings for laboratory uses. Mr. Smith said he wished to keep the front of the building quiet and free from traffic for it is to be a cloister of the 'monks of science.' The entrances will be at the ends of the wings."[132]

As the largest experimental farm in the country, with the most extensive laboratory facilities, the Beltsville station served by the mid-1930s as the center of the nation's fundamental research into animal husbandry. Research related to the animal husbandry of poultry, swine, sheep, horses, guinea pigs, goats, and dogs was conducted at the station. On a national scale, most of the Division's research regarding poultry and swine was conducted at Beltsville, one large unit of the beef-cattle research was located there, as was the nutrition research concerning horses and other animals, to supplement fundamental research work being done elsewhere (such as, in the case of horses, at the Morgan Horse Farm in Middlebury, Vermont).[133] In the text that follows, each of the research units that conducted work at Beltsville is discussed.

4.2.1.1 Poultry

Poultry research was one of the original areas of study within the Animal Husbandry Division at the Beltsville Agricultural Research Center, as well as one of the areas that remained a critical focus of research that was national in scope. The Poultry Area has always occupied the same tract of land, to the north of Powder Mill Road within the Animal Husbandry Area. The area retains little of its early appearance, however, since it was extensively rebuilt during the public works-funded expansion of the 1930s. The only buildings remaining from the original 1910s-era construction are the House for Poultry Man (Building 281) and a small pump house (Building 240). According to a 1916 map, other original buildings (virtually all of wood-frame construction) included a cockerel house, a laying house, with an incubator cellar, a breeding house, and a shed.[134] By 1928, several other chicken houses had been added.

---

[131]"Beltsville Farm to be Expanded: Station to Become National Laboratory for Live Stock Industry," *Sunday Star*, October 15, 1933. NARA, RG 66, Entry 17, Box 28.

[132]Minutes of the Commission of Fine Arts, January 18-19, 1934. Records of the Commission of Fine Arts.

[133]"Animal Industry," a lecture given by Dr. Hugh C. McPhee, Chief of Animal Husbandry Division, January 31, 1941. U.S. Department of Agriculture, Office of Personnel, Series of Lectures, National Agricultural Library.

[134]NARA, RG 17, Entry 5, Box 54.

The large number of new facilities erected during the 1930s allowed for an increase in the depth and diversity of research; along with the addition of new land and new laboratories, special facilities for turkey research were incorporated into the poultry area (Figure 24).

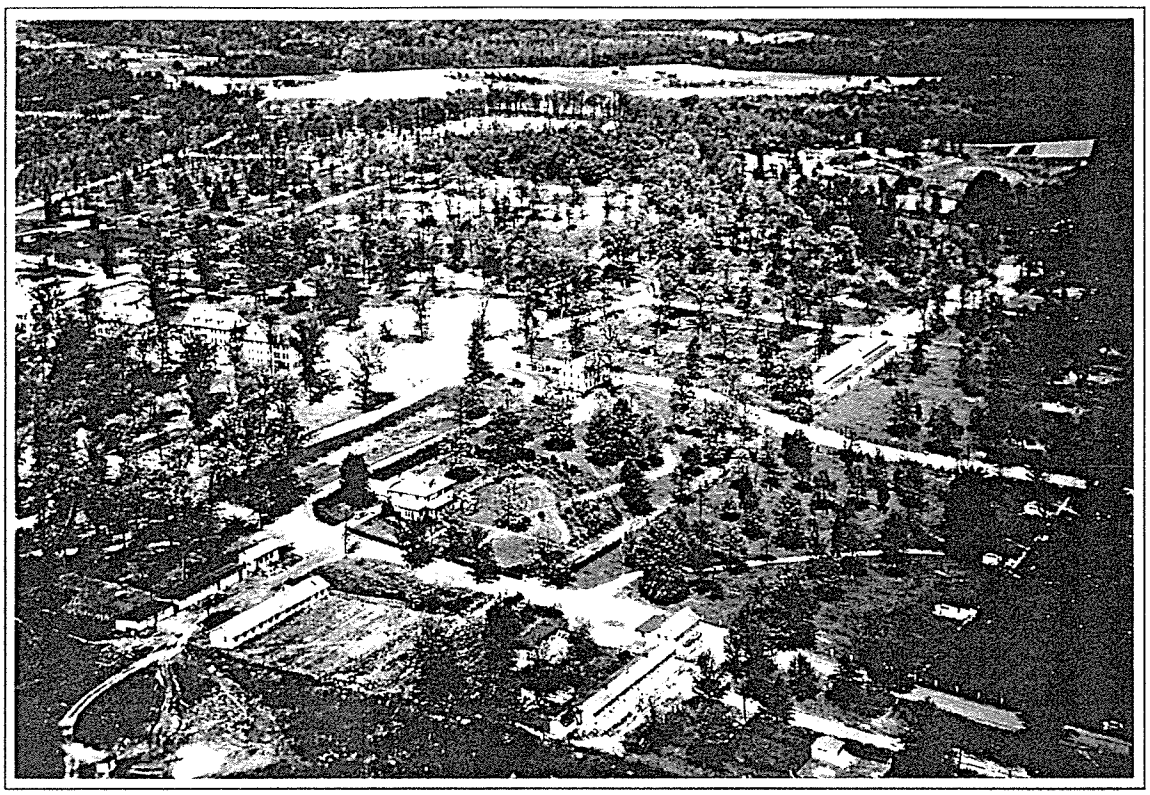


Figure 24 - Poultry area, aerial view, 1936

Poultry investigations were conducted by two separate divisions of the Bureau of Animal Industry: the Animal Husbandry Division, which focused on breeding research, and the Animal Nutrition Division, which focused on feeding investigations. Though two separate divisions, they shared many of the same goals. The primary mission of both divisions was to improve the quality of poultry products while increasing profitability for farmers. As in research conducted throughout BARC, the particular circumstances of a given time often dictated the exact nature of the research. For example, the restrictions of wartime (both World War I and II) significantly altered the focus of poultry research. Likewise, the changing needs of the consumer over time also affected the research. Most notably, the development of a smaller turkey, called the Beltsville Turkey, was spurred by the trend towards urbanization, smaller families, smaller refrigerators, and smaller kitchen ovens. In the 1930s, the Zoology and Animal Disease Divisions also undertook poultry investigations, which they conducted within their respective areas at Beltsville. [See Sections 4.2.2 and 4.2.3.]

4.2.1.1.1 Research (1910-1925)

Poultry breeding and feeding research at Beltsville began in 1912, with entirely new poultry stock, since

scientists had determined not to transfer the original poultry stock from the Bethesda station.[135] The foundation stock of 60 breeding hens and about 1,200 chicks in 1912 grew to 1,500 trap-nested hens, 32 pens of chickens, and some 250 pigeons by 1923, the last year prior to the 1930s redevelopment of the Poultry Area for which there is data.[136]

Breeding Research

Breeding experiments followed several lines. Foremost were attempts to breed hens that produced more eggs, had improved egg quality, and laid eggs earlier. Researchers hoped to develop these traits through the crossbreeding of different types of purebreds, and by inbreeding. They conducted similar research on the breeding up of the mongrel flock with pure breeds in an attempt to obtain a set of uniform characteristics within that flock.[137] Other work was done on the effect of mating poorer-producing lines, in the hopes of better understanding the inheritability of those traits. Throughout all the breeding experiments, important data was collected on the behavior and method of inheritance of many characteristics.

During the mid-1910s, work began on the development of a general-purpose chicken, named the Lamona breed after its producer, Mr. Harry M. Lamon, head of poultry husbandry for the Department's Animal Husbandry Division and the man who began the poultry stock at Beltsville in 1912.[138] The selection of birds for breeding work was defined by two principal characteristics, the conformation of a bird to type and the utility of the bird for egg production:

> *The success of this policy and of the work which has been done at Beltsville has been demonstrated repeatedly at the leading shows of the country. Birds of the Single Comb White Leghorn, Single Comb Rhode Island Red, Barred Plymouth Rock and Dark Cornish breeds exhibited at the Madison Square Garden Show have been good enough to win in the open classes if they were shown in competition.*[139]

Physiology Research

In addition to breeding hens to produce more eggs, research was also focused on getting a larger proportion of those eggs to hatch. To this end, researchers conducted several experiments that involved physiology studies. In particular they focused on trying to understand the development of the embryo and the factors that influence the likelihood of hatching.[140] In 1918, the Poultry Unit constructed a new two-story building (no longer extant) specifically to investigate the process of and physics behind incubation.

---

[135] Annual Report of the Department of Agriculture for 1911, pp. 22-23.

[136] Annual Report of the Department of Agriculture for 1912, p. 322; for 1923, p. 86.

[137] Annual Report of the Department of Agriculture for 1916, pp. 85-87.

[138] Houck, *Bureau of Animal Industry,* p. 236.

[139] Ibid.

[140] "Federal Poultry Research," Miscellaneous Publication No. 368, 1939, pp.13-14.

Researchers also undertook other research on the physiology of reproduction, in the hopes of gaining a better understanding of egg production and fertility.

Nutrition Research

Many feeding experiments shared the same goals as the breeding work, including increasing egg production and improving egg quality. Other research involved developing more economic rations and improving the quantity and quality of meat. In 1915, nine pens of fowls were used in evaluating the relative efficiencies of various combinations of feed and feeding conditions.[141] Some of this early work involved the value of fish meal and cottonseed as alternatives to beef scrap in poultry feed. Researchers discovered that hens fed fish meal laid nearly as many eggs as those fed beef scraps. The hens fed cottonseed produced unsatisfactory results. The use of cottonseed in feeds was part of a large-scale experiment to determine the feeding value of various plant protein-based feeds versus animal protein-based feeds, all spurred by an increase in the cost of animal protein. In reaction to the increasing cost of wheat, other experiments subjected chickens to either a wheat or wheatless feed to establish its effect on egg production and meat. Still, other variations of feeds used mussel meat and garbage.[142] The Poultry Unit also undertook research in cooperation with the Biochemic Division to examine how the composition of feed effects the vitamin content of various parts of the birds.

The USDA published many of the results from these experiments. For example, Bulletin 21, "The Commercial Fattening of Poultry," touted the results of several experimental tests that had been conducted to determine ways to increase the fattening rate of poultry under commercial conditions.[143] The Bureau also produced several films on various topics, such as egg development during incubation or the working of trap nests by the hens. Demand for these films was so great that the Bureau often could not keep up supplies.[144]

Pigeon Research

Research with pigeons first began in 1915, with 15 pairs of birds involved.[145] By 1923, there were four lofts (or groups), one each of the most popular breeds of pigeons. There were two major lines of pigeon research: the breeding, training, and racing of homing pigeons, and the breeding and keeping of records of squab production. The work with homing pigeons began during World War I. In 1918, BARC had 200 homing pigeons, which were used in research relating to signal work. Researchers regularly entered some of these birds into races. By the end of the war, interest in the work with homing pigeons was declining,

[141] Annual Report of the Department of Agriculture for 1915, p. 88.

[142] Annual Report of the Department of Agriculture for 1918, p. 71.

[143] NARA, RG 17, Entry 3, Box 429.

[144] Detailed Report of the Animal Husbandry Division for the Fiscal Year Ended June 30, 1917. NARA, RG 17, Entry 3, Box 429.

[145] Annual Report of the Department of Agriculture for 1916, p. 86.

and researchers retained only a small breeding nucleus.[146] Researchers used other types of pigeons in tests on the cost of feeding and production; they investigated methods of rearing, feeding, breeding, housing, killing, dressing, and managing. The USDA published the resulting information in the Farmers' Bulletin No. 884, entitled "Squab Raising."[147]

World War I Research

To aid the wartime effort, the Department of Agriculture, including the poultry unit at Beltsville, devoted a considerable amount of time to increasing the nation's annual production of food and livestock. An emergency campaign to stimulate production in cooperation with state extension forces began in the fall of 1917, and by 1919, included 29 states. This new work and the crisis of a government at war effectively halted the expansion of poultry work at Beltsville. Wartime restrictions forced researchers to put most of the pens on special rations. As a result, however, some new tests, to experiment with products adaptable to wartime feeding conditions, were devised at the station.[148] In particular, as more and more animal protein was earmarked for the war effort, researchers stepped up their investigation of plant protein in feeds.

4.2.1.1.2 New Deal Expansion (1930s)

With the influx of public monies in the 1930s, the antiquated and deteriorating wood-frame buildings that supported an ever-expanding poultry research program were replaced. Virtually the entire physical plant of the Poultry Area was redeveloped under the PWA projects of the 1930s. A series of colorful, multistory, masonry-construction laboratories were built as the centerpiece of the area, breeder and laying houses and a vast number of colony houses were erected to accommodate the growing poultry populations, and a new circulation pattern for the area was established. Around 1935, new buildings were constructed on land acquired from the Bureau of Dairy Industry to house research on turkeys, a unit which was transferred to Beltsville from the Miles City Station in Montana.[149] Colony houses for the turkeys were built, instead of the long houses used in Miles City. Colony houses were relatively small buildings designed for the raising of poultry for meat (versus longer buildings used for poultry raised for eggs).[150]

The four main laboratories (Buildings 262 through 265) formed the core of the new Poultry Area. Oriented along a north-south axis on the west side of Poultry Road, the buildings created a uniform and formal row. The first of the laboratories to be constructed during the redevelopment was the Poultry Laboratory (Building 264) in 1931. It was a stucco-finished building of concrete-block construction with

---

[146]Report of Pigeon Work at Beltsville Farm, 1920, NARA, RG 17, Entry 3, Box 449.

[147]Detailed Report of the Animal Husbandry Division for the Fiscal Year ended June 30, 1917, NARA, RG 17, Entry 3, Box 429.

[148]Report of Pigeon Work at the Beltsville Farm, 1920, NARA, RG 17, Entry 3, Box 449.

[149]Memorandum to Mr. H.A. Nelson, Acting Director, BARC, from Hugh C. McPhee, Chief, Animal Husbandry Division, April 5, 1935, NARA, RG 152, Entry 5, Box 77.

[150]Memorandum to Mr. Marsden of the Miles City Station from M.A. Jull, Senior Poultry Husbandman at Beltsville, NARA, RG 17, Entry 3, Box 104.

whites.[155]

The National Poultry Improvement Plan was initiated in 1935. Its goal was to improve the efficiency of the poultry industry. While the Plan was supervised by the Animal Husbandry Division, the Pathological and Biochemic Divisions as well as official state agencies were also involved. There were three directives of the Plan: (1) to develop more effective state programs for improving production and breeding qualities and to reduce mortality, (2) the identification of breeding stocks and the description of them in uniform terms, and (3) to establish an effective cooperation program.[156]

Physiology Research

By the early 1940s, researchers had greatly increased their understanding of poultry and were becoming more sophisticated in their research. As their knowledge grew, they believed the solutions to many problems concerning development and reproduction were to be found in studies of fundamental physiology. To this end, researchers investigated the mechanism of hormone control in the reproductive process and the study of the physiochemistry of the egg. Other research involved the study of the shape and weight of the eggs, embryonic mortality, and broodiness. Experiments in artificial insemination led to the ability to mate poultry of widely differing body sizes, which otherwise could not normally be mated.[157] Much of this work represented great advances in poultry research. During the previous three decades at BARC, such work had been unimaginable.

Nutrition Research

As breeding and physiology took off in new directions, much of the nutritional research during the 1930s and 1940s was a continuation of earlier work, including the effects of different feeds on egg and meat quality. In particular, researchers continued work on the development of an all-vegetable protein diet for chickens and turkeys.[158] Significant research involved the physiology of nutrition. This research included the study of the nutrition requirements for growth, maintenance, and egg production. Studies were conducted on the role of protein, minerals, and vitamins in the growth and health of poultry. One such study involved the chicken ailment called "slip tendon," which was caused by loose leg joints and resulted in crippled poultry. Although this disease was considered partly genetic, researchers discovered that a more significant contributing factor was a dietetic shortage of organic phosphorus and other minerals. Researchers were able to develop an adequate cure with two cheap by-products, rice bran and oat hulls, which contained the necessary minerals.[159]

---

[155]Research for Better Farming and Farm Living, USDA, August 1945, NARA, RG 310, Entry 1001, Box 2.

[156]Federal Poultry Research, Miscellaneous Publication No. 368, 1939, p. 7.

[157]Federal Poultry Research, Miscellaneous Publication No. 368, 1939, pp. 13-14.

[158]Research for Better Farming and Farm Living, USDA, August 1945, NARA, RG 310, Entry 1001, Box 2.

[159]National Agricultural Research Center, 1937, U.S. Resettlement Administration, Library of Congress, Prints and Photographs Division, Lot 1755.

World War II and Later Research

During World War II, animal protein feeds such as fish meal and beef scraps again became scarce and expensive. In the search for new types of feed, scientists experimented with feeding soybean meal to poultry. They soon discovered, however, that poultry on this diet grew more slowly and were less likely to produce eggs that hatched. Believing that the soybeans might be lacking in important vitamins, researchers added a small amount of cow manure to the feeds, because cows' first stomachs produced vitamins, and as a result, the birds thrived. Eventually researchers discovered that the missing key vitamin was B-12. When they injected fertile eggs with B-12, the eggs grew to be nearly twice as large as untreated eggs.[160]

During the 1950s and 1960s, research became increasingly sophisticated. The development of new techniques and the application of new scientific apparatus allowed researchers to gain an increasingly deeper understanding of the effects of physiology, breeding, and feed on poultry. Some modern advances included the development of an automated system for judging interior egg quality, the presence of blood spots, and the color of the eggs.[161]

4.2.1.1.4 Conclusion

In general, the work of the poultry section of the Division of Animal Husbandry was aimed at increasing the economic viability of poultry for producers and in improving the quality of poultry products for the consumer. Research to accomplish these goals embraced a variety of types of experiments. In 1937, for example, the American poultry industry produced nearly one billion eggs, only 50% of which hatched, at a cost to farmers and commercial hatcheries of more than 12 million dollars. Through hatchability studies at BARC, researchers were able to yield eggs that hatched 90% of the time. They accomplished this feat by developing a careful diet for the hens and by improving the method of incubating eggs. Researchers also succeeded in dramatically increasing the amount of eggs laid per chicken from an average of 90 to one of 190 per chicken per year.[162] They developed new experimental housing, designed to reduce mortality by keeping poultry comfortable and healthy.[163] These experiments, which resulted in the projected savings of millions of dollars for the nation's farmers, justified the poultry research in the eyes of Congress and ensured the continuation of the necessary funds for research.

The poultry unit at Beltsville was one of the largest and most important divisions of Animal Husbandry at BARC. Established in its own area at the very beginning of the experimental farm's operations, the poultry unit was also the only section to have its own husbandry man assigned to it (the Poultry Man was also given his own residence, Building 281). The work conducted by the unit has been continuous since

---

[160]Samuel W. Matthews, "Beltsville Brings Science to the Farm," *National Geographic Magazine*, 104 (August 1953).

[161]"Highlights of New Poultry Research," pamphlet, c. 1951, National Agricultural Library.

[162]National Agricultural Research Center, 1937, US Resettlement Administration, Library of Congress, Prints and Photographs Division, Lot 1755.

[163]Estimated Savings to American Farmers Made Possible by Animal Husbandry Research at the Nation Agricultural Research Center, 1933, 1934, 1935, NARA, RG 16, Entry 32, Box 1.

the establishment of BARC, occurring in the same location during this entire period. The research undertaken by this division encompassed breeding, nutrition, physiology, and other fields. One of the more prominent accomplishments of the section was the development of the Beltsville Turkey, a smaller turkey with more white meat designed for smaller, urban families. The Beltsville Turkey, although not by any means the most important accomplishment of the poultry unit, was one that remained as a lasting reminder of the BARC's contribution to poultry science.

4.2.1.2 Swine

The USDA's Animal Husbandry Division first began research on swine on July 15, 1905, prior to the establishment of the Beltsville station, at a small-scale quarantine station in Halethorpe, Maryland. Swine research first focused on studying the value of cottonseed meal in swine feed, but soon expanded into other areas of feeding research. The swine unit quickly outgrew the Halethrop Station, and on September 16, 1907, was moved to a larger site, the Animal Husbandry Area of the Bethesda Station. Continuing its rapid expansion, the swine unit moved again within a few years—this time along with the entire Animal Husbandry Division—to the new Beltsville station. The Swine Unit at Beltsville eventually comprised some of the most significant research efforts in swine husbandry conducted across the nation.

The original Beltsville swine facilities were grouped together with several other units of the Animal Husbandry Division along Animal Husbandry Road. As the work of all the units of the Animal Husbandry complex expanded during the 1910s and 1920s, it was deemed necessary to give each unit is own tract of land. The influx of public monies during the mid-1930s enabled the Division to relocate several of the Animal Husbandry Units to new areas within BARC. In 1934, a suitable location for the Swine Unit was chosen just to the east of the abattoir (Building 204), and numerous hog houses were erected, according to the 1934 PWA map. As it turned out, however, in a familiar tale of government planning, this location proved to be a very temporary one. This same location was selected as the most desirable location for the new Beltsville Research Center's Central Laboratory Group (Buildings 306 through 308), and so within a few years public monies were again used to move the Swine Unit. With the acquisition of new land far to the east, in what is today the East Farm, the Swine Unit was established on the Maier tract. Construction began in 1938.[164]

4.2.1.2.1 Swine Investigations at the Central Farm (Pre -1935)

Although the exact configuration of the original swine unit is unclear, according to a 1935 fire hazard survey, there were a number of wood-frame buildings dedicated to the project. Just to the north of the abattoir (Building 204), there were three hog pens. To the west of these buildings, there was a wood-frame farrowing house, designed to allow the maximum amount of sunlight into the building and built for ease of cleaning, both of which reduced the likelihood of disease. There was also a corn storage building, three colony houses, and a feeding house.[165] Other minor structures in the area included a dipping vat,

[164]Memorandum concerning moving the Swine Unit, 1938, NARA, RG 17, Entry 17, Box 2638.

[165]Fire Hazard Survey, June 21, 1935, NARA, RG 152, Entry 5, Box 77.

box-type portable houses, artificial shades, self-feeders, flat-bottomed troughs, and a system of pastures.[166] It is probable that a number of these buildings dated to the founding of the Beltsville Station.

From its inception, swine research revolved around several general topics, but its overall mission was always to protect and develop the hog industry in the United States. During the 1910s, swine research focused on feeding experiments. Breeding experiments were mostly limited to obtaining the best animals for use in the feeding experiments. The primary goal of these early experiments was to improve the growing and fattening rates of swine while minimizing the cost of feed. Most of these experiments were conducted in cooperation with other bureaus and divisions of the USDA. In conjunction with the Bureau of Plant Industry and the Bureau of Chemistry, research was conducted on the value of replacing corn in hog feed with sweet potatoes. This research first began in 1905, prior to the establishment of a research facility at Beltsville. The first record of this work at Beltsville is from the *Annual Report of the Department of Agriculture for 1915.* A similar experiment was being conducted with the Bureau of Chemistry to determine the feeding value of fish meal and other animal by-products as a supplement to corn, as well as the value of cottonseed meal and certain forage crops.[167] Research into fish meal was brought about because of the high cost of tankage along the east and west coasts. Researchers showed that fish meal was a good substitute. In cooperation with the Zoological Division, research was conducted into the value of different mineral mixtures in the prevention of worms.[168] Representatives from Beltsville also traveled throughout New England and the Middle Atlantic States researching the utilization of city garbage as feed for swine.[169]

To understand the influence of various feeds on the quality of the pork, it was necessary to slaughter and cure the swine. This work was performed at the abattoir (Building 204), in conjunction with the Biochemic Division.[170] Often the resulting meat was displayed at exhibitions, including the National Swine Show at Des Moines, Iowa and the Northeastern Fair Association at Rome, Georgia[171] (Figure 25).

---

[166]United States Animal Husbandry Experimental Farm, Beltsville Maryland, USDA Miscellaneous Publication 34, 1929, p. 9.

[167]Annual Report of the Department of Agriculture for 1915, p.86.

[168]Annual Report of the Department of Agriculture for 1917.

[169]Ibid.

[170]Detailed Report of the Animal Husbandry Division, June 30, 1917, NARA, RG 17, Entry 3, Box 429.

[171]Annual Report of the Swine Husbandry Office, 1919, NARA, RG 17, Entry 3, Box 449.

Figure 25 - Meeting of Pennsylvania Swine Breeders at Beltsville, 1924

While swine research formed a part of the Animal Husbandry Division's work at Beltsville from the beginning of the station's existence, it was not until 1917 that a swine specialist was assigned to the farm. The 1920s at Beltsville saw the continuation of feeding experiments, with the expansion of investigations into the soft pork problem, which were initiated in 1919. Soft pork—meat that is soft and oily, and thus reduced in market value—was caused by the consumption of oily foods, such as peanuts and soybeans.[172] These experiments focused on the use of different types of feed to limit the amount of soft pork. Research included the effect of soybeans on the firmness of pork, the study of the appetites of individual pigs for soybeans, and the influence of high protein versus low protein rations on the amount and character of fat stored by swine.[173] Most of this research was conducted with the help of several state experimental stations in the South and Corn Belt and with the help of the Association of Southern Agricultural Workers, the National Swine Growers' Association, and the Institute of American Meat Packers. All the hogs involved in the soft pork investigation were slaughtered at Beltsville. Once slaughtered, the characteristics of the pork were studied, including cooking and eating qualities. Data was obtained on the dressing percentage, weight, class of hog, on the proportion of bone, skin, and meat, and on the effects of different methods of curing and smoking on the quality of pork products. As an example, in 1921, 416 hogs were fed and slaughtered and their meat graded and tested as part of the soft pork investigation.

[172]Experimental Curing of Pork and Exhibition of Meats, NARA, RG 17, Entry 3, Box 449.

[173]Annual Report, Office of Swine Investigation, 1928-1929, NARA, RG 310, Entry 1049, Box 1.

Samples of this pork were used in meat-cutting and curing demonstrations held at Beltsville.[174]

Other research in the 1920s spanned a wide range of topics. With the help of the Zoological Division and the use of fishery by-products, scientists studied the control of lice and their effect on the fattening properties of swine. In cooperation with the Agricultural Engineering Division of the USDA's Bureau of Public Roads, work was conducted on the design and construction of self feeders. In conjunction with the Biochemical Division, the possibility of serum-virus immunization of suckling pigs against cholera was explored.[175] After a ten-year study, a serum virus inoculation was developed that made suckling pigs permanently immune to cholera.[176] Studies were also undertaken with the School of Hygiene and Public Health of Johns Hopkins University and the American Dental Association to study the diet deficiencies in pigs and its relation to teeth and skeletal development.[177] Most of the research performed during the 1910s and 1920s was conducted in conjunction with other bureaus and divisions of the USDA.

In the 1930s, breeding studies became a more significant portion of the research. Research was conducted into inbreeding and cross breeding in the hopes of developing hogs to meet changing needs. The goal was to develop hog strains that butcher well both for lean hams and loins and for a good proportion of bacon.[178] During this time, several feeding experiments were continued, including work on the soft pork problem. Research was also conducted on several native pastures to determine which ones produced the highest rate of fattening in swine.[179]

Official descriptions of the research conducted at BARC was regularly described in terms of how the work could yield significant savings for farmers. Around 1933, for instance, it was projected that the feed research would save the average farmer 40 pounds of feed per hog and result in nationwide savings of $2 million. Improved methods for chilling, preparing, and preserving meat could increase the amount of meat taken from a hog carcass by 15%, resulting in nationwide savings of $3.5 million. Furthermore, plumper strains of hogs developed at BARC added about 50 cents to the value of each live hog—nationwide, an increased value of $5 million.[180]

---

[174]Annual Report of the Department of Agriculture for 1921, p. 12

[175]Annual Report of the Department of Agriculture for 1923.

[176]National Agricultural Research Center, Library of Congress Prints and Photographs Division, Lot 1755 NARC Beltsville MD 1937.

[177]Annual Report, Office of Swine Investigation, 1928-1929, NARA, RG 310, Entry 1049, Box 1.

[178]National Agricultural Research Center Summary Report, May 1936, NARA, RG 16, Entry 32, Box 1.

[179]National Agriculture Research Center, Library of Congress, Prints and Photographs Division, Lot 1755 NARC Beltsville, MD, 1937.

[180]Estimated Savings to American Farmers Made Possible by Animal Husbandry Research at the National Agricultural Research Center, 1933, 1934, 1935, NARA, RG 16, Entry 32, Box 1.

4.2.1.2.2 Swine Investigations on the East Farm (1938-1950)

The need for a new swine area was first discussed in a 1933 memorandum from J.R. Mohler, Chief of Bureau. Mohler stated that the present buildings were in very poor condition and were located on objectionable land, "not well suited for the study of the most pressing problems especially along breeding, nutrition, and performance lines."[181] A new location would allow for the consolidation of several scattered units, resulting in a more efficient and economical operation. The first relocation of the Swine Unit, accomplished with PWA funds, was to a tract of land just to the east of the abattoir (Building 204). Twenty colony houses were erected in this area, and a 1½-story hog house of cinder-block construction with stucco finish was planned to house an office, a record room, a locker room, a coal room, a boiler room and a hospital.[182]

The Swine Unit moved again in 1938, only a few years after its first move, as the land it then occupied was selected for the construction of the new Central Laboratory Group, Buildings 306-308. A permanent site was selected on what was known as the Maier Property, on what is today the East Farm. The entire tract consisted of 233 acres, though the swine unit occupies only a portion of it along Soil Conservation Road. The original owner and farmer of the land, Joseph Maier, had emigrated from Germany to the United States in 1893.[183] After the government purchased the land, the Maier House (Building 531) was renovated and used as an employee residence for the swine herdsman. It is located to the south of what was to become the main Swine Area and is separated from it both by the topography and by a cluster of trees.

To prepare the area for swine research, a project application was submitted in 1938 to clear the land, install fencing, water lines, power lines, roads, and construct the buildings. A sum of $53,500 was allocated from the Public Works Administration, and another $21,500 from the Works Progress Administration.[184] Civilian Conservation Corps workers began clearing the land on September 8, 1938, and by October 21, 1938, were about half through the job.

The first phase of construction began in 1938 and was completed in 1939. The Hog Farrowing House (Building 536), the Feed Storage Barn (Building 539), and a combination field office and tool shed had been completed.[185] Repairs were also undertaken on the Maier house, and the CCC had installed water lines, fencing, and drainage, with most of the fencing being recycled from the previous Swine Area.[186] In general, buildings were arranged along a north-south axis, running parallel to, and east of, Soil Conservation Road.

---

[181]Memorandum to Tugwell from J.R. Mohler, August 2, 1933, NARA, RG 16, Entry 17, Box 1761.

[182]Fire Hazard Survey, June 21, 1935, NARA, RG 152, Entry 5, Box 77.

[183]U.S. Census, 1920, Maryland, Prince George's County, District 14.

[184]Project Application, WPA, 1938, NARA, RG 16, Entry 177, Box 7.

[185]Report of New Swine Area, October 21,1938, NARA, RG 16, Entry 177, Box 7.

[186]H.A. Nelson, Director, National Research Center, to A.W. Miller, Acting Chief, Bureau of Animal Industry, September 12, 1938, NARA, RG 16, Entry 177, Box 7.

The second phase of construction ran from 1940 to 1942, during which time the other principal buildings of the Swine Area were built. They included the Record of Performance Barn (Building 537), the Swine Isolation and Feeding Barn (Building 540), and a large shed (Building 538). Also, by 1942, approximately 32 hog houses had been constructed on individual pastures. It is possible that some of these houses were moved from the Central Farm to the Swine Area. [187] Of the original hog houses, only Buildings 541 and 541A, B, C, and D remain. These are located to the north of the main grouping. In 1955, an additional eight hog houses were built (Buildings 535 and 535A through G) and in 1959, two large hog houses (Buildings 554 and 555), were constructed to replace others that had deteriorated. These in general are located toward the center of the grouping. In 1971, the shed (Building 538) burned down and was replaced with a large metal shed (Building 538-1).

In general, all of the major buildings in the Swine Area have a very similar style. Buildings 536, 537, 539, and 540 are all constructed of concrete block with a stucco finish, gabled roofs with asbestos shingles (some today replaced by corrugated metal), and brick window sills.

Breeding and Swine Management Research

The move to new facilities in the East Farm enabled researchers both to continue along the same lines of investigation and to expand into new study areas. In particular, the research into swine breeding, which first began in 1935, increased exponentially.[188] In 1945, the breeding herd consisted of 200 hogs; some 250 litters of pigs were farrowed.[189] Considerable effort was undertaken to develop strains of swine that improved on feeding performance for producers and provided consumers with high-quality meat. Begun in 1934, this research was undertaken in cooperation with the Iowa Agricultural Experimental Station. Studies were conducted in inbreeding, crossbreeding, reproduction efficiency, and the physiology of reproduction in swine. Researchers wanted to determine the effects of different systems of breeding on such characteristics as prolificacy, mothering ability, vigor, rate of gain, efficiency of feed utilization, and meat quality. This research also involved the study of the inheritance of tenderness and of muscle-skeleton ratios.[190] Progeny tests of crossbreeding purebreds resulted in pigs that produced faster gains and required less feed per unit of gain.[191]

In cooperation with the Montana Agricultural Experimental Station and the University of Maryland Agricultural Experimental Station, researchers at Beltsville conducted experiments aimed at producing superior inbred lines, as well as research into the usefulness of different intensities of inbreeding, top crossing inbred boars with non-inbred sows, and hybridizing inbred lines within and between strains.[192]

---

[187] Around 1990 many of these hog houses were destroyed due to lack of use and poor condition.

[188] Annual Report of Swine Investigations, 1942-1943, NARA, RG 310, Entry 1049, Box 1.

[189] Research for Better Farming and Farm Living, USDA, August 1945. NARA, RG 301, Entry 1001, Box 3.

[190] Swine Research, USDA, Bureau of Animal Industry, 1947, National Agricultural Library.

[191] Annual Report for Uniform Investigations, NARA, RG 310, Entry 1049, Box 1.

[192] Work Project Annual Report 1947, NARA, RG 310, Entry 1049, Box 1.

By 1948, significant progress had been made in developing hybrid hogs with superior characteristics. Researchers bred hogs that produced 13.6% more pigs per litter, with a 29.4% increase in weight at birth. These hogs also had a 4% higher average daily gain in weight from weaning age to 225 pounds.[193] Importantly, these findings could be translated into great savings for farmers and consumers. As researchers continued to improve hog breeds, farmers and packers became more and more interested in the new strains. During 1949, 126 boars and 66 sows from Beltsville were sold. In addition eight new herds were established in seven agricultural experimental stations across the country.[194]

During this period, research into the management of swine also became important, including methods of feeding, housing, sanitation, and disease control. For example, a study was conducted on the durability of various roofing materials for hog shades. Similarly, a plan for a standard hog house was developed that adequately met the functional requirements of swine, although it is unclear if this design was ever used at BARC.[195]

Feeding Research; World War II Efforts

During the war years, feeding experiments continued. Specifically, research was conducted on the value of soybeans and fishmeal in hog feed. Other research investigated nutritional deficiencies that caused nerve degeneration and lack of coordination in swine. Further studies were conducted on feed expenditure and weight of hogs, to determine the amount of feed required per unit gain as hogs increased in weight. Beltsville researchers also worked with home-grown legume hay and discovered that although the hog is not ruminant, it can utilize small amounts of hay to its advantage as a supplement to the ordinary ration.[196] In cooperation with the medical school of Johns Hopkins University, observations were made on the role of vitamins in nutrition as it relates to blood formation and the physiology of the nervous system.[197]

Conditions during World War II brought unique aspects of swine research to the fore, particularly in the field of feeding experiments. The great demand for increased meat production in all classes of livestock, and a shrinking supply of traditional feeds, forced researchers to examine new types of feeds. The shortage in supplies of critical animal protein feeds such as tankage and fish meal prompted an experiment to compare combinations of protein feeds with both animal and plant origins. The goal was to decrease the animal protein content of swine-fattening rations. Studies were also conducted to determine the quality and nutritional value of pork in relation to several factors, including meat processing and preservation, anatomy and physiology, characteristics of live animals, and characteristics of dressed carcasses.[198]

---

[193]Annual Report of the USDA for 1948.

[194]Annual Report of the USDA for 1949, p. 148.

[195]Annual Report of Swine Investigation, 1942-1943, NARA, RG 310, Entry 1049, Box 1.

[196]Research into Better Farming and Farm Living, USDA, August 1945, NARA, RG 310, Entry 1001, Box 1.

[197]Annual Report of Swine Investigation, 1942-1943, NARA, RG 310, Entry 1049, Box 1.

[198]Ibid.

Conclusion

The swine unit of the Division of Animal Husbandry was one of the largest and most important research units located at Beltsville. Since the establishment of the farm in 1910, and despite numerous moves, the section conducted important research that significantly affected the swine industry throughout the world. Its work in improving both the size and health of the swine population has been particularly significant.

4.2.1.3 Sheep Unit (1910-1950s)

The Animal Husbandry Division's Sheep Unit occupied some 100 acres of tillable land along Powder Mill Road, officially designated by order of the Secretary of Agriculture in 1921 as "Sheep Acres."[199] Little evidence remains of any sheep buildings in the original Animal Husbandry Area. A 1928 map of the area shows that a single large sheep building was located to the southeast of Walnut Grange (Building 209.) This structure was a two-and-one-half-story, wood-frame building with a gabled roof. In one of the major catastrophes of the station, this building burned down in 1915, resulting in a loss of almost all of the sheep and the long-term experiments. This fire was to have a significant effect on later building design at Beltsville, which thereafter generally relied on masonry materials for exterior walls. After the barn burned down (Figure 26), the Bureau subsequently constructed a similar one in its place.[200] In 1921, there were 216 purebreds at Beltsville; by 1945, this number had expanded to more than 500.

The Sheep Unit received Public Works funds in the mid-1930s to purchase more land and construct new facilities.[201] Around 1933, the new sheep area was established along Beaver Dam Road, directly south of the original Animal Husbandry farm area, in the surrounds of a mid-19th century, Greek Revival-style homestead, the William Shea House (Building 216), which the government purchased in 1938.

The sheep area presently contains seven buildings, a number of which are less than 50 years old. The main Sheep Barn (Building 215) was the first constructed. Under Federal Project 33, the PWA allocated $8,250 and construction began in 1934.[202] To the south of Building 215 are several other structures (Buildings 215A through C) that date to the 1960s. There is some evidence to suggest that these buildings replaced older ones that might have dated to the mid-1930s. Just to the south of the residence (Building 216) is a wood-frame sheep shed (Building 217), constructed around 1940. As the area was first laid out, there were also three sheep shelters and at least seven fenced pastures in the area just north of Building 215, on the other side of Beaver Dam Road.

---

[199]Houck, *Bureau of Animal Industry*, 241, 254.

[200]Memorandum to Dr. A.D. Melvin, Chief, Bureau of Animal Industry, from F. R. Marshall, April 6, 1915, NARA, RG 17, Entry 3, Box 423.

[201]Architectural Drawings Collection, Facility Engineering Branch, Building 426, BARC.

[202]Statement of Expenditures, NARA, RG 54, Entry 151A, Box 1.

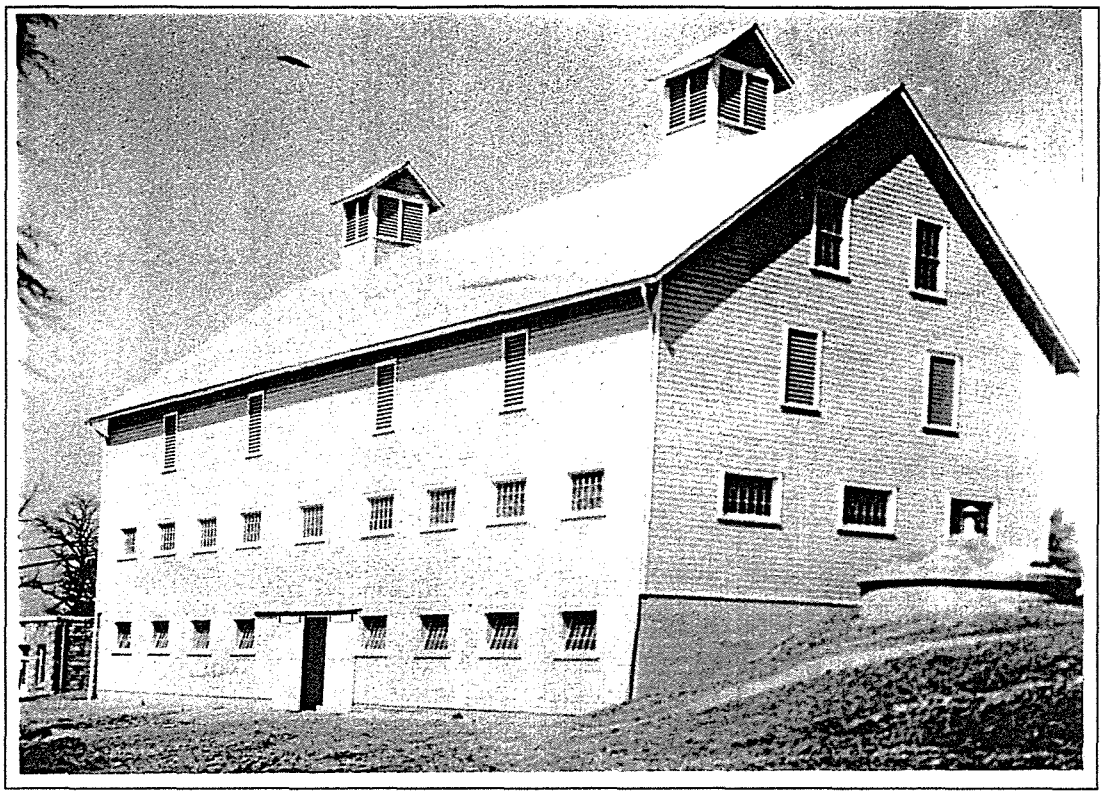


Figure 26 - Sheep barn, U.S. Experimental Farm, 1914

4.2.1.3.1 Research

The focus of sheep investigations remained relatively constant over the years: to improve the quality and quantity of wool, fur, and meat produced by sheep. To achieve these goals, researchers concentrated on breeding and feeding investigations. The breeding investigations revolved around two major areas: trying to obtain a uniform set of characteristics within several different strains of sheep, and increasing the quality of wool, fur and meat. Feeding experiments examined how variations in feed composition and feeding method affect wool, fur, and meat characteristics. Researchers also gathered information on the growth of sheep.

Breeding Investigations

The most significant breeding experiments revolved around trying to fix the characteristics of various strains of sheep. There were three types of sheep involved in this work: Southdown, Hampshire, and Shropshire. During the first few years of operation, significant numbers of these types of sheep were obtained from the Morgan Horse Farm in Middlebury, Vermont, which at that time was operated by the USDA. In 1915, for example, 53 Southdown ewes were shipped from the Morgan Farm to Beltsville.[203]

[203] Yearbook of the Department of Agriculture for 1926, p. 652.

Once the flocks were established, researchers used selective breeding to fix the characteristics of the different strains of sheep. A quarter of the sheep were replaced each year with new lambs produced at BARC. The sheep were selected based on how well they measured up to the standard for their strain. Those with inferior traits were disposed of. Through this process, researchers were able to set the type and fix the characteristics of each flock.[204]

Important breeding work was undertaken at Beltsville in connection with two other types of sheep. One was the Karakul sheep, which was praised for its fur value, and for its resistance to drought and severe climate conditions. The Department of Agriculture was hopeful that these traits could be successfully bred into the native sheep of the American southwest. Because of limitations on the importation of Karakul, experiments were begun in 1911 at Beltsville breeding Karakul rams with domestic ewes to produce sheep that had high quality fur and were economical for farmers. The other sheep breeding project concerned the Barbados Sheep, brought from the West Indies and valued for being extremely prolific and for producing mutton of fine quality. Research had begun in 1904 at the Bethesda Station and was transferred to Beltsville with the sheep in 1911. Efforts were made to cross the Barbados sheep with the Southdown flock. Both the Karakul and Barbados projects were abruptly halted in March 1915, when the sheep barn burned down and destroyed all but four ewes.[205]

Researchers eventually restarted the work with Karakul sheep, though the exact date is unclear (sometime after 1924). The earliest record of the work is a report written in 1937 that mentions the use of Karakul sheep in cooperation with the Bureau of Biological Survey (BBS). In this agreement the sheep unit was responsible for research into genetics, fiber technology, and sheep husbandry. The BBS was responsible for evaluating the quality of the fur. Research was also done with the Fish and Wildlife Service of the Department of Interior. The purpose was to explore the possibilities of producing high quality lambskins for fur trade by selective breeding and to study various methods of preserving and skinning pelts.[206]

Wool Investigations

At least as early as 1916, researchers were conducting wool investigations. They wanted to show farmers and ranchmen how they might improve their output. Research focused on determining the factors that influenced the quantity and quality of wool. Researchers also wanted to develop practical methods by which sheep breeders could judge the various important qualities in the fleece. A wool laboratory was established that analyzed information on length and fitness of the fleece.[207] At the laboratory:

> *Each [12-ounce sample of sheared wool] is scoured by an original process and the net yield of scoured wool determined. Separate determinations of grease and dirt content are also made. This work is done for its genetic value. It is believed that the wool laboratory at Beltsville is the only one of its kind in existence and that the Division's records on net yields of wool and separate*

---

[204]Ibid.

[205]Yearbook of the Department of Agriculture for 1915, p. 250.

[206]"Karakul Sheep Breeding Experiments at the Agricultural Research Center," NARA, RG 17, Entry 3, Box 129.

[207]*The National Agricultural Research Center of the Department of Agriculture*, 1939.

percentages of grease and dirt are the first of this sort to be obtained on a large experimental scale.[208]

Feeding Investigations

Feeding research involved two main areas, flushing and forage grazing. This work appears to date from the early 1920s. Flushing refers to the practice of letting pregnant ewes eat all the feed they want, starting at the time of conception. Researchers hoped that through this practice ewes would be more likely to produce twins. Eventually, researchers were able to increase the dams' yield by 15%. This research was published in the Department Bulletin 996, "Flushing and Other Means of Increasing Lamb Yield."[209]

Research was also undertaken into the method of feeding. Most significantly was the examination of forage grazing. Researchers experimented with a system of forage-crop pastures under which sheep were pastured longer and moved from field to field more often then the usual permanent-pasture method. Using this method, it was possible to keep farm flocks on available feed instead of stored feed, such as silage, which is more expensive. Furthermore, it helped control the parasites that plagued the sheep industry on the East Coast. Researchers also showed that temporary pastures double the capacity of the land to carry sheep and that the sheep grew to market age without loss of vitality or depreciation of gains.[210] These findings were published in the Farmers' Bulletin 1181, "Raising Sheep on Temporary Pastures."[211]

Meat Research

In 1925, a project was initiated to improve the method of inspecting meat. Researchers were eventually able to measure distinct difference in the quality and palatability.[212] Researchers also undertook investigations to improve the quality of mutton. In 1927, a total of 481 lambs were slaughtered at BARC in connection with this research. Researchers were able to identify three principal factors that influence meat quality: the composition of the feed, the breed of the sheep, and whether the sheep had been castrated. By being better able to determine the quality of meats and the factors that influence that quality, researchers were able to produce sheep with high quality meat on a consistent basis.

Growth Research

In connection with the two major lines of research, breeding and feeding, researchers conducted studies on the various phases of sheep growth. Data was collected on birth weight, the weight gain of dams during

---

[208]Houck, *Bureau of Animal Industry*, 243.

[209]National Agricultural Research Center, 1937. Library of Congress, Prints and Photographs Division, Lot 1755, Beltsville, MD.

[210]Ibid.

[211]Yearbook of the Department of Agriculture for 1926.

[212]Annual Report of the Department of Agriculture for 1927, NARA, RG 16, Entry 26, Box 3.

gestation, weight and the age of the dam, and the size of the sire.[213] This data greatly helped the breeders by allowing them to predict the characteristics of offspring. Feeding researchers focused on the effect of various feeds on growth and development.

World War II Research

As was happening at bureaus across the Beltsville research station, work at the sheep unit during World War II shifted to help in the war effort. Due to the restrictions on traditional feeds, researchers conducted nutritional studies with soybeans and alfalfa. They discovered that the oil of soybeans was well-digested by sheep and not deposited in body tissue, as occurred in pigs. Also, they studied the value of grasses and the influence of dietary deficiencies on fertility in sheep. They also undertook wool research with an eye toward wartime needs, which required an increase in wool production. They analyzed thousands of fleeces to determine the influence of breed, feed, and management. They developed two rapid tests of fitness and variability in wool, which speeded the determination of valuable characteristics in sheep to be selected for breeding stock.[214]

4.2.1.3.2 Conclusion

The sheep unit at BARC was established at the very beginning of the station in 1910. Investigations concerned efforts to improve the quality and quantity of wool, fur, and meat produced by sheep. Extensive, long-term breeding and nutrition experiments were conducted at Beltsville which involved trying to obtain a uniform set of characteristics within several different strains of sheep, and increasing the quality of wool, fur, and meat. Such long-term research was one of the strengths of the work at Beltsville. Much of the early work of the station was lost during the devastating fire of 1915, which resulted in the loss of the sheep barn and most of the sheep. This event had a significant impact on the development of the station as a whole, influencing the design of subsequent buildings at the farm and making fire-proof design an essential planning element of the station.

4.2.1.4 Equine Animals (1910-1940)

The first horses and mules were transferred to Beltsville from the Bethesda Station within a week of the purchase of the farm on June 30, 1910 (Figure 27). The remaining horses, zebras, donkeys, and zebra hybrids (mules crossed with zebras) were transferred in the following months.[215] Some of the more attention-grabbing research conducted in the first years at Beltsville involved crossbreeding experiments, such as those undertaken with zebras and mules.[216] The crossing of Grévy zebras with mares and asses was begun in 1905 at the Bethesda Station, using Dan, the original Grévy zebra at the National Zoological Park, which had been presented to President Theodore Roosevelt by the King of Abyssinia. The

---

[213]Yearbook of the Department of Agriculture, 1926.

[214]Research for Better Farming and Farm Living, USDA, August 1945, NARA, RG 310, Entry 1001, Box 2.

[215]Houck, *Bureau of Animal Industry*, 252.

[216]Chief of Animal Husbandry Division to The Country Gentleman, The Curtis Publishing Company, Philadelphia, PA, October 27, 1911, NARA, RG 152, Box 39, Entry 1.

experiment was terminated in 1913 and the hybrids were turned over the National Zoological Park or sold to circuses.[217]

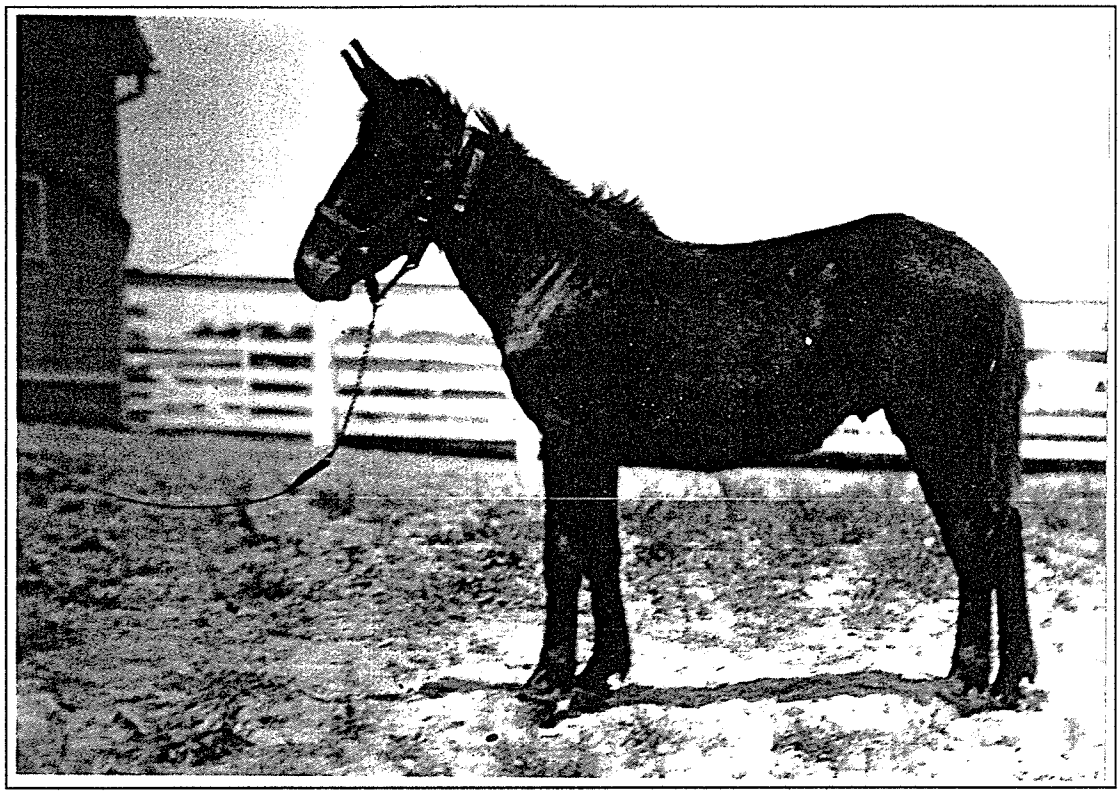


Figure 27 - Mule colt, U.S. Experimental Farm, 1914

In the 1910s and 1920s, the horses and mules at Beltsville were mostly work animals involved in the establishment and daily work of the USDA's Experimental Farm. They shouldered the hard farm work, doing the ploughing, harrowing, and fall seeding. In addition to the cross breeding work, certain feeding experiments on horses and mules at Beltsville were conducted,[218] and investigative work was begun around 1917 in the study of the economy of various rations and the use of artificial impregnation in breeding.[219]

---

[217]Houck, *Bureau of Animal Industry,* 234.

[218]For five months beginning in September 1916, feeding tests were done on mules at Beltsville; the experiments involved observing the work efforts and weight/condition of the animals after various different combinations of cottonseed meal and linseed oil meal mixed in with the grain (corn, oats, hay). Animal Husbandry Division Report for FY 1917; NARA, RG 17, Entry 3, Box 429. In 1920, a 22-week test to compare the relative value of light-weight barley with heavy-weight barley as feeds for farm horses was made at Beltsville, using eight Percheron mares that were routine work animals (plowing, etc.); no great difference in results was found between the two barleys. From an internal report, covering work during 1919-1920; NARA, RG 17, Entry 3, Box 449.

[219]Annual Report, Animal Husbandry Division, 1917, NARA, RG 17, Entry 3, Box 429.

The main work-horse barn at Beltsville was located "on a central knoll overlooking a large part of the station" (near the present location of Building 200). In 1933, when plans were made for a main laboratory building for the Division, it was agreed (and approved by PWA Administrator Harold Ickes) that the horse barn and hay storage should be moved, "not only to facilitate the construction of the laboratory building but to locate the work stock to a more advantageous location for work on the station."[220] The new horse barn was established farther to the east, south of the new main shop (Building 426). The area around the barn, as seen in a 1936 photograph, was seeded for permanent pasture. The building was intended to be supported by a cluster of related structures, including a stallion barn and three colt sheds, although it is not clear that these other buildings were ever erected.[221]

During the mid-1930s, the Animal Husbandry Division at Beltsville concerned itself with studies in colt development. Foals were lost principally for two reasons: an infectious disease called "joint ill" and a lack of milk when the mother had died at parturition (childbirth). Studies included examining milk substitutes in the raising of orphan foals. As is seen in most of the bureau work at BARC, the studies were justified with an eye to the bottom line, by projecting that the American horse industry could save some $450,000 if the foal losses were eliminated.[222] The division was also dedicated to the breeding of light and draft horses for replacement purposes, the investigations of factors affecting the growth of horses, and fundamental studies concerned with the physiology of reproduction.[223] Specimens of the Morgan and Thoroughbred breeds were kept for special breeding and for general utility work.[224] No information has been located about horse investigations after the late 1930s at Beltsville, and they may have been phased out at around this time.

Although some significant research on horses was conducted at Beltsville, in general through the years, the herd served mostly utilitarian purposes. The Bureau's principal research on horses and mules, especially as related to breeding, was conducted not at Beltsville but in other areas of the United States, in conjunction with the state stations. Nutrition studies conducted at Beltsville served as a support to the principal work being conducted on horses at places like the Morgan Horse Farm in Middlebury, Vermont.[225]

---

[220]R.G. Tugwell, Assistant Secretary, to Harold L. Ickes, Administrator, Public Works Administration, November 2, 1933, NARA, RG 17, Entry 3, Box 104.

[221]Application for Allotment of Funds Under the Emergency Relief Appropriation Act of 1935, NARA, RG 17, Entry 3, Box 636. [no date; post-passage of 48 Stat. 467, March 26, 1934.]

[222]Estimated Savings to American Farmers Made Possible By Animal Husbandry Research at National Agricultural Research Center, 1933, 1934, 1935, NARA, RG 16, Entry 32, Box 1.

[223]Animal Husbandry Research Activities, Beltsville Research Center, NARA, RG 16, Entry 32, Box 1.

[224]The National Agricultural Research Center of the Department of Agriculture, Beltsville, Maryland, U.S. Department of Agriculture, 1939, p. 3.

[225]"Animal Industry," a lecture delivered by Dr. Hugh C. McPhee, Chief Animal Husbandry Division, at Raleigh, North Carolina, January 31, 1941, U.S. Department of Agriculture, Office of Personnel Series of Lectures, c. 1940, National Agricultural Library.

4.2.1.5 Goats (1910s -1940s)

Beginning in 1911, a herd of milk goats, bred from a foundation of native stock obtained in the hills of Alabama and other southern states, was maintained at the Beltsville station. These goats, which were considered part of the sheep research investigations, had been transferred from the Bureau's original Experiment Station in Bethesda, Maryland, at the same time as the sheep, hog, guinea pigs, and poultry. Research on goats was dedicated primarily to developing a profitable milking breed of native goats. After two years of study, purebred Saanen and Toggenburg goat bucks from Switzerland were introduced and bred with the American does—which did result in an increase in milk production.[226] Feeding and management methods were also being studied with these goats, and the goat milk produced was employed principally in studies of its nutritive properties. For the first several years at Beltsville, the herd numbered approximately 100 head, but by late 1915 it had been cut to 40 head.

The goat milk research was one of the most significant aspects of research conducted at Beltsville in its early years, since there was a high demand for goat milk as a potential substitute in nursing babies. In cooperation with the Sea View Hospital of New York and with the University of Colorado at Boulder, research was conducted as to the value of goat milk as food for infants, convalescents, and tubercular patients.[227] As the investigations continued, goat milk was compared with the milk of Holstein and Jersey cows for its sugars, calcium, iron, iodine, and vitamin content. By 1929, feeding studies with human infants were being conducted in conjunction with Johns Hopkins University. Surplus goat milk was also used for the treatment of skin problems in infants and adults with sensitivity to the proteins of other foods. This study was conducted in conjunction with doctors at George Washington University and doctors in private practice in Washington, D.C.[228]

The enormous expansion of facilities undertaken in the mid-1930s with the influx of public works monies enabled the goat research to be established in its own area. In 1933, the master plan landscape architect A.D. Taylor located the proposed goat barn on a tract of land south of Powder Mill Road to the east of the Beef Cattle area: "We have yet to select the exact site on which to construct this barn but will select it as soon as you have approved the general location of this property. Inasmuch as these buildings are not expensive buildings, there may be the possibility at some future time that this area will be more valuable for some other use, in which even the goat outfit can be moved elsewhere."[229] By the summer of 1934, the Goat Barn (Building 434), a large masonry building, was in use, with all equipment installed except the heating boiler.[230]

---

[226]Clark S. Hobbs, "U.S. Making 14,000 Acres Near Beltsville World's Biggest Farm Laboratory," [newspaper unknown], n.d. [c. 1937] NARA, RG 16, Entry 32, Box 1.

[227]Mr. McWhorter, Junior Animal Husbandman in Sheep and Goat Investigations, to Mrs. Morton Lindley of Oakland, California [public inquiry], November 5, 1915, NARA, RG 17, Entry 3, Box 426.

[228]Annual Report of the Department of Agriculture for 1929, p. 15.

[229]A.D. Taylor to Dr. Sheets, November 23, 1933, NARA, RG 8, Entry 17, Box 306.

[230]Memorandum on Construction at the Animal Husbandry Farm, Beltsville, Md., July 2, 1934, NARA, RG 8, Entry 18, Box 314.

In 1944, the division completed a 20-year study of hermaphrodism and how to prevent it in the Beltsville herds of Saanen and Toggenberg goats. The research revealed a strong link between polled (hornless) goats and hermaphrodism; all 79 hermaphrodites in the herd were produced by polled (hornless) parents. The results also showed that hermaphrodites were females genetically. It was determined that hermaphrodism could be bred out of herds by using one horned parent in each mating.[231]

4.2.1.6 Beef Cattle (1920s-1950)

In the early 1920s, the Department of Agriculture's research on the production and fattening of beef cattle was conducted principally in the Appalachian region, the Corn Belt, the Cotton Belt, and the Western and Southwestern range areas of the United States, with all work being conducted cooperatively with the respective state agricultural experiment stations.[232]

Beef cattle research at Beltsville, established in the 1920s, consisted of efforts to establish true breeding strains that would pass along characteristics of high fertility, feed experiments that would maximize the efficiency of feed for beef and milk production, management of pastures for beef production, and research to determine the values of new feeds in maintenance and fattening rations for the cattle.[233] In 1928, construction of a large beef-cattle barn (Building 224) was initiated south of Powder Mill Road across from the Poultry area. This T-shaped building was divided into sections to provide space for handling a breeding herd of beef cattle, the individual feeding of 30 steers, and the milking of 18 Milking Shorthorn cows. The herd of "Milking Shorthorns is kept for the purpose of studying the inheritance of beefiness and milking qualities in Shorthorns and financial returns yielded by such cattle."[234] The Milking Shorthorns were subsequently removed to their own section, the Dual-Purpose Cattle area, when the Hayden Farm in the present East Farm area was acquired by the Department in the early 1930s. (See Dual-Purpose Section below) The principal beef-cattle experiment at Beltsville in the late 1920s consisted of a steer-grazing experiment, conducted over a six-year period, which was concluded in the fall of 1933.

Cattle-breeding projects at Beltsville were still relatively new in the mid-1930s. Experiments were dedicated to discovering methods of producing high-quality meat more efficiently, methods that could be reliably put into practice by the nation's farmers and that would produce large margins of annual savings:

> *The results for 1933 were average, showing that 195 pounds of gain on steers could be made per acre when stocked at the rate of one steer per acre. It is estimated that there were over 18,000,000 acres of plowable grazing land (1930 census) in the area (Maryland, Pennsylvania, Virginia, Ohio, Kentucky, WVa, and New York) which could possibly be improved like the Beltsville land. If only 10 percent of this vast acreage were handled and improved as the Beltsville pastures, 351,000,000 pounds of beef would be produced. [This was a difference of 280,800,000 pounds from what would be produced without any of the improvements, which*

---

[231] Annual Report of Department of Agriculture, Bureau of Animal Industry, 1944, p. 55.

[232] Annual Report of the Department of Agriculture for 1922, p. 7.

[233] Animal Husbandry Research Activities, Beltsville Research Center, NARA, RG 16, Entry 32, Box 1.

[234] Annual Report of the Department of Agriculture for 1929, p. 8.

would represent $12,636,000 at 1933 feeder cattle prices.][235]

The conclusion of the experiments in 1933 coincided with the creation of new pasturage areas for the beef cattle, since the original area was planned for other use by the Beltsville Research Center. Public works money was requested to provide fencing and watering facilities for the new pasture lands.[236] The new lands encompassed the areas to the south of the main Beef Cattle Barn--essential to the experiments conducted at Beltsville.

In conjunction with this expansion to the south was the construction of a Beef Bull Barn (Building 214B-no longer extant), designed by the Bureau of Agricultural Engineering. It housed seven bull pens and one breeding pen. Typical of many of the barns of this era at Beltsville, this building was of concrete-block construction with a stucco finish; it had a single metal ventilating cupola and an asbestos-shingle roof.

In 1946, the herd at Beltsville numbered about 140 head (Shorthorns). The facilities encompassed about 350 acres, two barns, five sheds, and an office building; the abattoir and meat laboratory (Building 204), located in the original Animal Husbandry area were available to the unit as needed. Investigations centered on records of performance experiments, in which the merits of the sires and dams were judged by the performance of their offspring and their ease for adaptation to farm use. During the war years, Beltsville scientists had success in developing an average increase of 18% gain in the beef cattle.[237]

Beginning in 1950, experiments were undertaken to determine the effects of continuous versus interrupted growth on beef cattle. These nutrition experiments used identical twin calves (which were very rare, approximately one set to every 2,000 born) to project results comparable to a herd of 40 head; one calf of each pair was kept on a full feed diet, and the other was given full feed for a time and then restricted on one of the essential elements of the feed for a set period of time.[238]

Carried out in conjunction with state and regional stations, the beef cattle research conducted at Beltsville represented one important component of the work of the Animal Husbandry Division. In particular, the work at Beltsville was particularly strong in nutritional studies that would be of use to the entire country. The beef cattle work, however, never assumed the importance of the poultry and swine divisions which

---

[235]Estimated Savings to American Farmers Made Possible By Animal Husbandry Research at National Agricultural Research Center, 1933, 1934, 1935, NARA, RG 16, Entry 32, Box 1. As was true with other research areas, the staff working on beef cattle were interested in demonstrating the bottom-line effect, the savings, that their experiments would provide to the average American farmer or homesteader. While the result-oriented experiments won funding more easily from Congress, it is not possible to determine whether any of these improvements were in fact adopted by farmers in the surrounding states or counties; and for this reason, it is difficult to gauge whether these experiments were truly significant ones.

[236]Application for Allotment of Funds Under the Emergency Relief Appropriation Act of 1935, NARA, RG 17, Entry 3, Box 636. [n.d.; post-passage of 48 Stat. 467, March 26, 1934.]

[237]"Brief Description of Beef and Dual-Purpose Cattle Investigations," May 13, 1946, National Agricultural Library.

[238]The Agricultural Research Center of the United States Department of Agriculture, Agricultural Handbook No. 43, n.d. [c. 1955]

throughout their history dominated the Animal Husbandry work at Beltsville.

4.2.1.7 Dual-Purpose Cattle (1920s-1940s)

Experiments in "breeding for milking quality in beef cattle," projected to span 20 years, were initiated in 1915 at Manhattan, Kansas, in cooperation with the state agricultural college.[239] The Dual-Purpose Cattle project began in the late 1920s at Beltsville, with the construction of the Beef-Cattle Barn (Building 224). The Milking Shorthorns were also housed for a short time in the Beef-Cattle area, until the leasing of the Hayden Farm (Figure 28).

In 1930, the Department of Agriculture began leasing the Hayden Farm, an extensive dairy farm—something of a rarity in a county that had historically been heavily oriented towards tobacco and grass.[240] The Hayden Farm, which had been established on the old Forest Manor tract, was farmed around the turn of the century by August Herr and George Emmons, farmers who had emigrated from northern Europe.[241] They had acquired the land in 1895. In 1911, Ernest Jenkins purchased from Emmons nearly 700 acres of this farmland, upon which he built the residence now known as the Hayden Farmhouse (Building 522).[242] It was Jenkins who developed the dairy farm—accumulating nearly 1000 acres over successive years from neighboring farms, including the Niemann, Ronnbon, Wehner, and Knauer farms. In 1924, he sold the farm to James R. Hayden.

---

[239]Annual Report for the Department of Agriculture for 1922, p. 8.

[240]Susan Pearl, "Hayden Farm," *Maryland Historical Trust Inventory Form #64-4*, 1985. This MHT Form also includes the chain of title for the Hayden Farm tract.

[241]Prince George's County Historic Site Summary Sheet, PG: #64-4.

[242]Susan Pearl, Maryland-National Capital Park and Planning Commission, conducted research in the tax records on the Hayden Farm; her findings led her to believe that the house was erected after the 1911 transfer of land, c. 1912. Telephone interview conducted by Robinson & Associates, Inc., June 17, 1996.

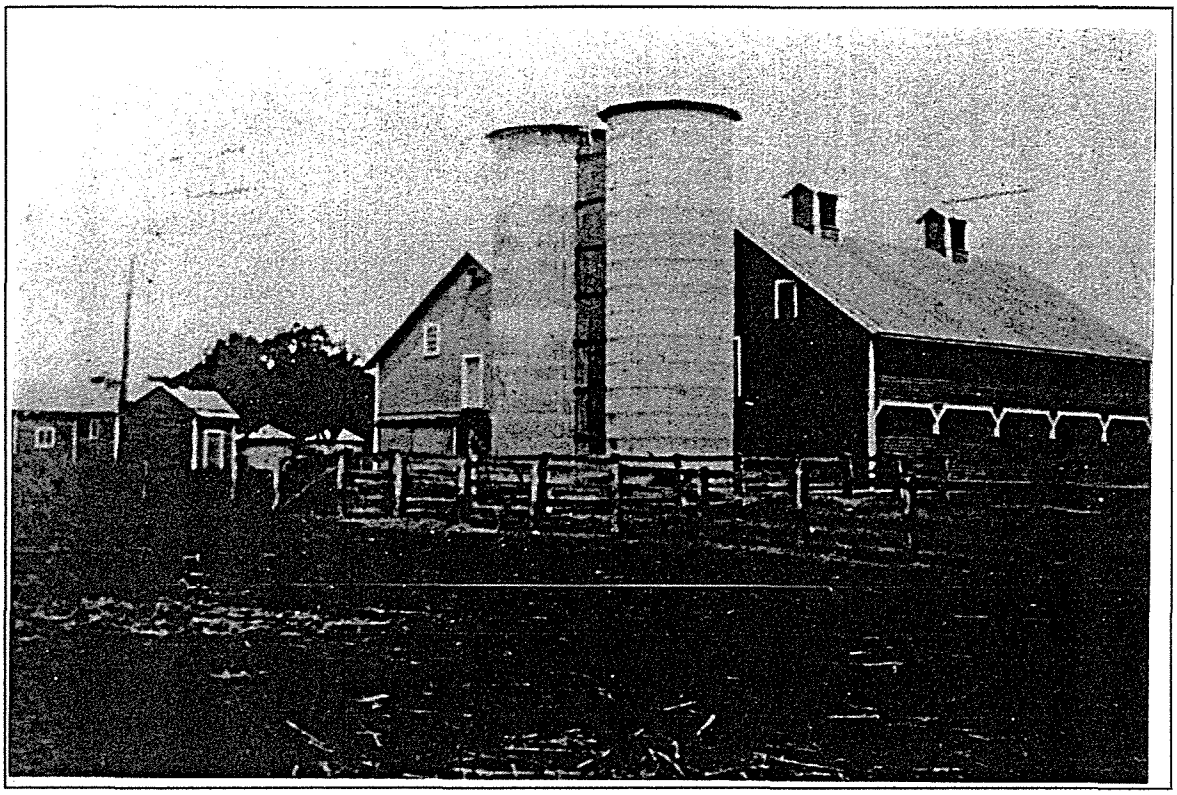


Figure 28 - Hayden Farm, no date

In 1933, three years after the government had begun leasing the Hayden Farm, the Chief of the Bureau, J.R. Mohler, argued for the government's acquisition of the property, "in order to consolidate and coordinate the work of the Bureau and to make adequate provision for the solution of the more pressing problems affecting the livestock industry."[243] As the land had already been under lease to the government since 1930, about half of the farm was already cleared and seeded to permanent pasture and feed crops. Mohler's memorandum stated that the land was "well drained, in good condition, and especially suited for the purposes for which it is being used." The same memorandum related that there were "dwellings, barns, silos, sheds, etc.," extant on the farm. He argued that purchasing this tract and others adjacent to the Hayden Farm (which would link Hayden to the Central Farm area already owned by the government) would enable the transfer of all operations at the Bethesda Experiment Station. Following his recommendation, the Bureau purchased the 920 acres from Hayden in 1933 for $40,000.

While Mohler's memo indicated that the Department of Agriculture intended to reuse the buildings extant on the site, the government did also erect a cluster of new buildings in the vicinity of the Hayden Farm. They included a 1933 Cattle Breeding and Record Performance Barn (Building 526), a 1933 Bull Calf Barn (Building 527—the only principal building still extant), as well as PWA project No. 42, the Dual-

[243]Memorandum for Assistant Secretary of Agriculture, Tugwell, from the Chief of Bureau, J. H. Mohler, on August 2, 1933, NARA, Record Group 16, Entry 17, PI 191, Box 1761.

Purpose Cattle Barn, constructed prior to July 31, 1935, for $15,000 (Building 525).[244] After 1939, according to maps, the development of the area on the south side of Beaver Dam Road was initiated.

The Milking Shorthorn herd of dual-purpose cattle established at Beltsville by the mid-1940s consisted of approximately 140 head in the herd. The site encompassed about 300 acres, and included six barns and a milk house. As in other areas of animal husbandry research, the abattoir (Building 204) and meat laboratory (Building 201) located in the central Animal Husbandry area were available to scientists as needed[245] (Figure 29).

The purpose of the research in the Dual-Purpose area was to develop a breed of "utility cow" that would produce an adequate amount of milk or butterfat and also create calves that when fattened would be acceptable on the market. Record of performance breeding experiments similar to those with beef cattle were undertaken, except that in addition to measuring the efficiency and quality of beef produced, the milk yield of dams and daughters was also measured. Breeding experiments conducted in the Dual-Purpose Cattle area involved studies of improved types of animals for the production of beef and milk combined. Record of performance experiments involved studying the merits of sires and dams as judged by the performance of their offspring—good performance was measured in terms of feed economy and efficient beef production, as well as good milk production. By 1939, officials had singled out for praise the sire of the dual-purpose cattle foundation herd: "This animal, Sunridge Clay King, is the first Milking Shorthorn bull to be proved for the transmitting ability of both beef and milk. He has sired 18 record-of-merit daughters and 15 steers that have completed the record-of-performance test for efficiency of feed utilization and carcass quality."[246]

As with other divisions at Beltsville, the research conducted on dual-purpose cattle was geared towards the potential benefits for the American farmer:

> *It is believed that this type of cattle can be used by the general farmer who wants a check for milk or cream each month, or who milks part of his herd and lets the remainder nurse all of the calves to be sold for veal or as feeder cattle, or who milks all of the herd and raises the calves for feeder cattle.*[247]

---

[244]"Statement of Expenditures," through July 31, 1935, NARA, RG 54, Entry 151A, Box 1; also, "Memorandum on Status of Development of BAI Beltsville Buildings," April 2, 1934, NARA, RG 8, Box 306.

[245]"Brief Description of Beef and Dual-Purpose Cattle Investigations," May 13, 1946, National Agricultural Library.

[246]United States Department of Agriculture, Bureau of Animal Industry, Memorandum, December 2, 1939, RG 16, Entry 16, Box 2936.

[247]*The Farm Post*, December 12, 1940, No. 16, National Agricultural Library.

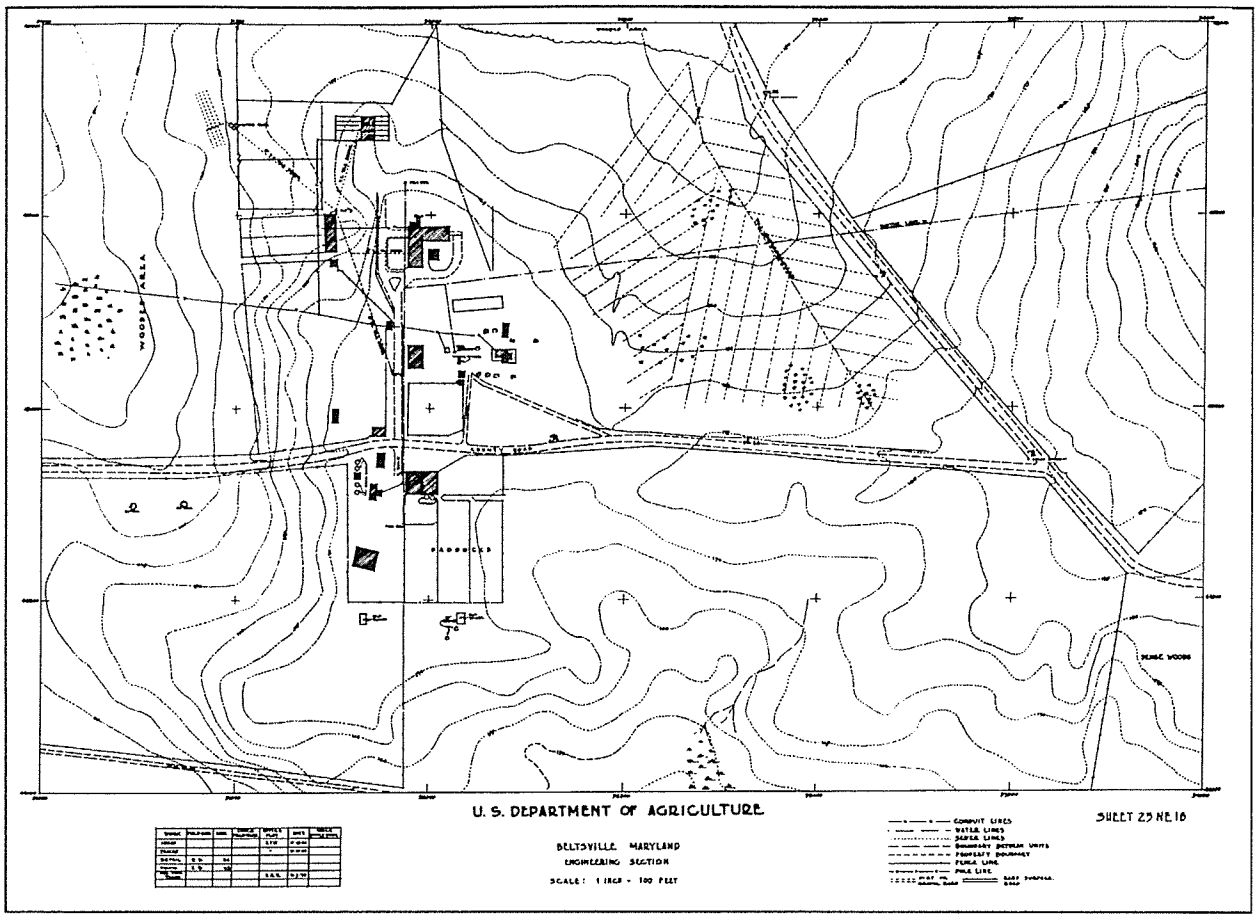


Figure 29 - Dual-purpose cattle area, site plan, 1939

After the 1940s, interest in the dual purpose investigations appears to have waned. It seems likely that with the end of the Depression and the war-time shortages, economics no longer favored this type of production.

4.2.1.8 Dogs (1935-1950)

Research at Beltsville on dogs was established in 1935 with the arrival of four Puli sheep dogs, or "Juhasz Kutya" (shepherd dogs). These dogs were shipped to Beltsville from Hungary for use in breeding experiments. Henry Wallace, then Secretary of Agriculture, who had conducted substantial work himself in the field of genetics, had recommended their importation.[248] They were crossed with other breeds and their offspring again crossed, as part of the Bureau of Animal Husbandry's general investigations into the role that genetics plays in livestock performance. The Puli dogs were given "all kinds of tests to determine for the record the degree of intelligence, the natural aptitudes, and the disposition of each dog born in the

[248]"U.S. Buys Foreign Horses, Cows, and Dogs for Breeding Work," USDA Press Release, November 7, 1935, NARA, RG 17, Entry 3, Box 115.

experimental kennels."[249]

With the acquisition in 1936 of a 44-acre parcel that the government had been leasing from Paul Hense, research on dog breeding was established in its own area along Springfield Road on what is today the East Farm. The Hense House (Building 542), a Craftsman-style bungalow probably built in the 1920s, was to be used as an employee residence.[250] The principal building of the Dog Area, the Main Dog Kennel (Building 543), was constructed adjacent to the Hense House in 1939, from plans that were initially prepared in 1936.[251] The building featured dog pens on either side of a central corridor, as well as puppy pens, whelping pens, a kitchen, an operating room, and an office at the south end of the building where the entrance hall was. Most of the basement was unexcavated, except for a coal storage and boiler under the south end. The paddocks adjacent to the building on either side were surfaced with gravel. Dog runs were planned northwest of the kennel.

In 1938, plans were also drawn up for a Feed House (Building 546) of masonry construction with a cream-colored stucco finish. Notations on the drawings called for the building to have "bronze green finished woodwork and red asbestos shingles"—yet another instance of the careful detail given to the aesthetic appeal of the research center.[252]

According to a March 1939 map of BARC, the newly developed Dog section, as well as the new Swine section, were not yet easily accessible by the East-West Road (now Powder Mill Road), the primary drive through the Beltsville property. This road, a key element of the Taylor master plan for the Experimental Farm, had been laid out and surfaced from the entrance gate to the Goat Barn in 1936 by the Civilian Conservation Corps stationed at Beltsville. It seems that the road, while perhaps graded, was not yet at this time surfaced with asphalt. The unsurfaced road, indicated on the 1939 map by a dotted line, culminates at the Biological Survey grouping. The Forest Service and Biological Service areas, located at the very far east of the property, engendered some additional development of this area of BARC.

During World War II, the Army K-9 Corps housed dogs that they were training for scout work in the kennels (Building 543). After the war, the Animal Husbandry Division assigned the dog kennels for use as swine sheds.[253] In 1963, the Dog Kennel was again adapted, this time quite extensively, in order to serve as the Animal Husbandry Radiological Biological Laboratory. The dog openings (approximately 24) along the main facades of the building were sealed up, cabinets and furniture were installed, as well as

---

[249]The National Agricultural Research Center at Beltsville, Md., n.d. [c. 1940], NARA, RG 16, Entry 32, Box 1.

[250]Report transmitted to Harold L. Ickes by Harry L. Brown, November 1, 1938, RG 16, Entry 17, Box 2692.

[251]Annual Report of the Director of the Beltsville Research Center for the Fiscal Year 1936, submitted by H.A. Nelson, August 20, 1936, RG 16, Entry 17, Box 2278. Plans at Facility Engineering Branch (Building 426) are dated October 1939.

[252]Architectural Drawings Collection, Facility Engineering Branch, Building 426, BARC.

[253]Ernest J. Smith, Macroom Kennels, South Hanson, Massachusetts, to Sirs, USDA, Beltsville, Maryland, 1946, Archives, Facility Engineering Branch, Building 427, BARC.

air-conditioning and asbestos vinyl tile. The building was divided into an office, a metabolism area, a counting room, a large laboratory with cabinets, and an isotope storage room.[254]

Research conducted within the Division of Animal Husbandry at BARC on dogs was not one of the more significant or large-scale efforts conducted at the station. Begun in the mid-1930s as something of a pet project of Agriculture Secretary (and breeder) Henry Wallace, the dog breeding research was only one aspect of the work that was being carried out in different areas of the country. Interesting work, in connection with the Army, occurred during World War II at the site; such unusual training efforts in conjunction with the war effort were occurring throughout the country at this time, however.

4.2.1.9 Guinea Pigs

Under the department of Animal Genetics within the Animal Husbandry Division, the USDA used guinea pigs in the first decades of the twentieth century to conduct studies of inbreeding. The work had been initiated at the Bethesda Experiment Station in 1906 and was continued at Beltsville after the establishment of the station in 1910. Some 30 generations of continuous brother and sister mating were reared over a period of 25 years to study the effect of close inbreeding on the vigor of the animals—measuring their fertility, growth, and viability.[255] The genetics program at BARC enabled the Department to examine more thoroughly the part that genetics played in livestock performance, aiming "to uncover new principles of farm animal improvement by systems of mating and to test old theories for soundness." The guinea pigs were used "extensively in this work, because they are well adapted to an artificial life, have numerous and large litters, and are easy to handle. Promising results with them are checked later with the larger animals."[256] The guinea pigs were located during the first decades at Beltsville in a wood-frame building that formed a part of the cluster of Animal Husbandry facilities in the center of the Beltsville complex, to the east of Walnut Grange (Building 209). Although it is not clear how long research using guinea pigs was conducted on the site, it appears to have been phased out by the 1930s.

Research on genetics was one of several areas in which the Animal Husbandry Division at Beltsville conducted work applicable to that being carried out across the nation. Like the nutrition work at BARC, the genetics research provided essential groundwork for the regional and state stations; it was a key element of the work that earned BARC the title during the 1930s of the National Agricultural Research Center.

---

[254]Architectural Drawings Collection, Facility Engineering Branch, Building 426, BARC.

[255]"Pigs is Pigs," *The Farm Post*, November 14, 1940, No. 12, National Agricultural Library. According to the Annual Report of Animal Husbandry Division, FY 1917, some of the guinea pig families were then in the seventeenth generation of breeding; NARA, RG 17, Entry 3, Box 429.

[256]"The National Agricultural Research Center at Beltsville, Md," n.d. [c. 1940] NARA, RG 16, Entry 32, Box 1.

4.2.1.10 General Conclusion About Animal Husbandry

Of the many divisions operating at Beltsville, both within the Bureau of Animal Industry and outside it, the Animal Husbandry Division dominated both the development of the site and—simply by its size—the overall research effort. This is particularly apparent during the New Deal boom at Beltsville. During this period many of the farm-wide initiatives, including the master plan, the sewage treatment system, the Log Lodge/community center and other efforts were all funded through the Animal Husbandry Division. The central laboratory (Building 200) grouping also played a dominant role on the central farm offering key facilities that were available to all sections as necessary.

Many of the biggest advances from the division in general may not have received a great deal of publicity. These include the extensive breeding and nutritional work conducted on a variety of animals. Others, such as the much-heralded Beltsville Turkey, helped to build the Beltsville Agricultural Research Center's international reputation.

4.2.2 Zoology Division

4.2.2.1 History of the Division

The Zoological Division (Figure 30) was first recognized as a distinct entity in 1891, when the Division of Animal Pathology formed a branch known as the Zoological Laboratory. The Zoological Laboratory was recognized as a distinct division in the 1901 Annual Report of the Bureau of Animal Industry, where it is referred to as the Zoology Division and the Zoological Division. The Division was developed to provide a basis for fundamental research on parasites that affect livestock. With headquarters in Washington, D.C., the Division conducted small-scale field studies in a variety of locations. Beginning in 1914, more extensive experiments were performed at a farm in Vienna, Virginia, which was leased by the USDA for experimental purposes.[257]

In 1929, the Division moved its experimental headquarters to Beltsville. This field station, under the direction of the Chief of the Division and Washington project leaders, moved to the Beltsville Research Center to carry out field studies that developed from the Washington laboratory activities. These studies were designed to provide for the control or eradication of livestock parasites throughout the United States. After identification of the parasites and preliminary laboratory studies on life history were completed in Washington, the work passed into the experimental stage at Beltsville, where studies such as identifying intermediate hosts, testing the parasites' responses to factors such as moisture, light, soil conditions, and temperature, and determining drugs and chemicals required for eradication were conducted. From these findings, control campaigns were outlined and tested. Since the goal was to find solutions to problems throughout the United States, the results of the BARC experiments were then tested in selected regions and the control procedures were adapted to fit local conditions. The principal parasitic forms under investigation included stomach worms and related nematodes of sheep, kidney worms, lung worms, and stomach worms, and protozoan parasites of swine, blood worms of horses, blood parasites of cattle, tapeworms and roundworms, as well as coccidiosis and other protozoan diseases of poultry, heartworm of

[257]Houck, *Bureau of Animal Industry*, 89.

dogs, and roundworms and tapeworms of dogs and cats.[258]

Researchers at BARC had to prove the value of their investigations to Congress in order to obtain funding. While some of their research may have had the potential to yield important scientific data, Congress generally approved research that could be applied to a specific problem and would yield economic benefits either to farmers or to animal industries.[259] Large-scale application was another factor in prioritizing research. If the nationwide eradication of a certain parasite found in dairy cattle would save individual farmers—as well as the dairy production industry—large sums of money, that research would take precedent over research that might only benefit farms in limited geographic locales. Similarly, devastating outbreaks of parasitic diseases were given a higher priority (with BARC scientists taking the lead in research tasks) than diseases which were not classified as outbreaks. Strictly regional diseases were

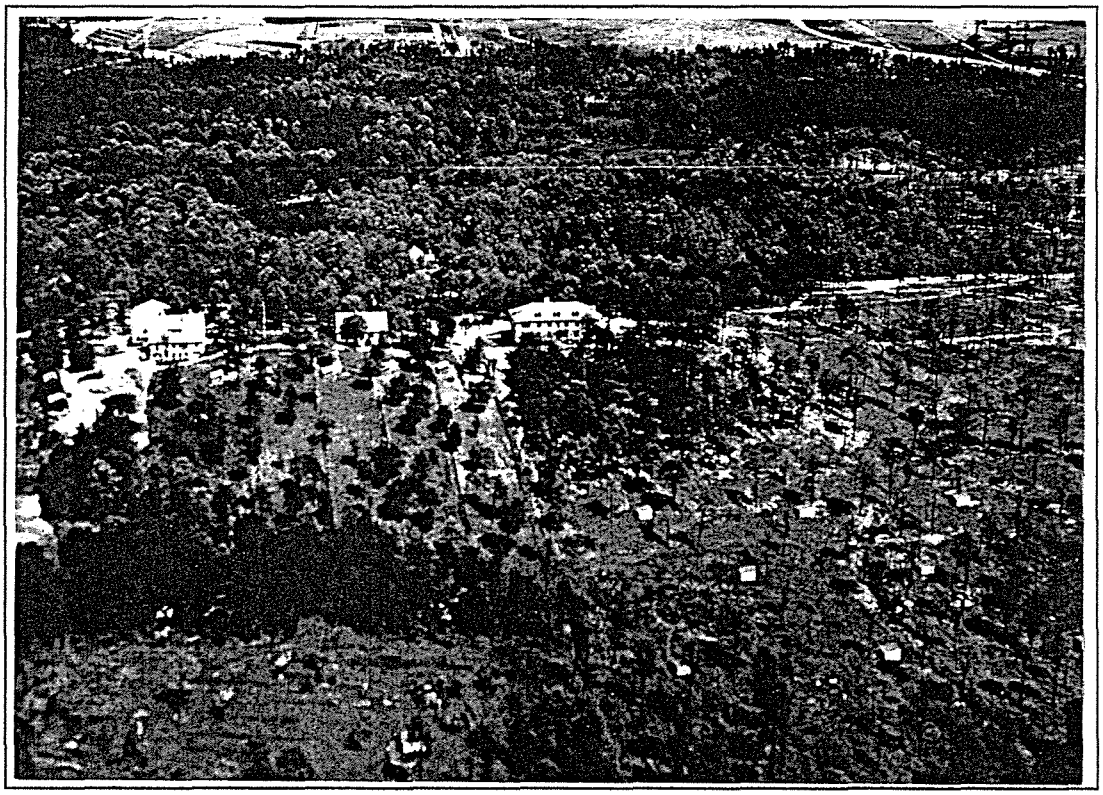


Figure 30 - Zoological Division area, aerial view, 1936

[258]The National Agricultural Research Center of the Department of Agriculture, USDA, 1939.

[259]This trend of funding applied research was true of much of the research work at BARC, not just that of the Zoology Division.

usually investigated by local experiment stations.[260]

In addition to conducting their own research, BARC scientist also directed investigations at many state experiment stations. Their laboratories served as clearinghouses for scientific data. BARC scientists were in high demand as lecturers and consultants for veterinary associations, and foreign agencies, both private and public, continually called on the researchers for their expertise. Although the work of the scientists focused on animal parasites, many of the same parasites infested humans. Therefore, directly or indirectly, the scientists provided scientific knowledge to farmers, as well as physical and economic relief for farmers and citizens alike.[261]

The first scientists of the Zoological Division moved to BARC in mid 1929. Work was officially instituted in 1930, when the first two buildings, a laboratory and a barn, were completed.[262] While there were many key figures from the USDA, the Bureau of Animal Industry, the Bureau of Agricultural Engineering, and the Zoological Division who contributed to the character and design of the Zoological Area, one of the most important people was Dr. Maurice C. Hall, who was Chief of the Division during the New Deal era. Hall was responsible for the direction of scientific research in parasitology at the Beltsville station. His correspondence reveals that he was also concerned with the overall appearance of the land and buildings in the Zoology Area. Just as his guidance in the experimental work had lasting implications, his input into the architectural style of the site is still apparent.

4.2.2.2 Evolution of the Zoology Site

In 1929, the original tract of land designated for the Zoology Division consisted of six acres. This land was located at the top of a ridge in what is now the Central Farm Area and was deemed to be especially desirable as a building site. In 1930, an additional 68.8 acres was allocated for zoological investigations. The area was northeast of the original section and was shaped irregularly, to follow the contours of the land. Its remote location was chosen to prevent interference with the experiments on healthy animals conducted by the Animal Husbandry Division. Caution had to be exercised in locating the experimental parasite-infested animals far enough away from healthy animals used by the Bureau of Animal Industry.[263] Although the Division's location was necessary due to the type of work conducted, their remote site in a wooded area also exposed the experimental animals to hazards posed from wild animals. An administrator of the Division requested and received a shotgun for use in an official capacity to "shoot things that may have worms—wild things."[264]

More land adjacent to the original site was acquired in 1933, and in addition to its use for building

---

[260]Telephone interview with Wayne Rasmussen, by Stephanie Foell, Robinson & Associates, Inc., May 1, 1997.

[261]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[262]*The National Agricultural Research Center of the Department of Agriculture*, NARA, RG 54, Bureau Chief's Correspondence.

[263]NARA, RG 17, Entry 5, Box 54.

[264]NARA, RG 17, Entry 3, Box 98.

operations, it provided space for studies of dual-purpose cattle, hogs, and chickens. The increased acreage also provided testing plots for the Bureau of Entomology to study the life cycles of intermediate parasite hosts, such as insects. The scientists found it necessary to cultivate plots of land to study the life cycles of various parasites that could survive in the ground.[265] Studies on the survival of important swine parasites revealed that the eggs of the large roundworm in cultivated soil may hatch up to five years after original infestation, that embryos of thorny-headed worms may survive in the soil for four years, and that larvae of swine nodular worms on permanent pastures may remain alive for one and one-half years. These facts were useful in formulating control measures for parasites with particularly long life cycles.[266]

Early in the site development, several zoologists, including Hall, suggested that when clearing the fields for experimental purposes, trees should be saved in clumps wherever possible. This would look more "artistic" and at the same time a clump effect would prevent animals from trampling the roots and killing trees. If necessary, workers were instructed to erect fences around the outer rows of trees to protect the clumps.[267] A 1936 aerial photograph of the Zoology Area shows that several large forested areas remained on the site. However, in areas that were cleared for animal shelters, these plans were not followed. Trees generally stand alone, with no evidence of the original concept being executed.[268]

The types of experiments performed in the Zoological Area mandated certain alterations to the landscape. In order to prevent cross infestations from one experimental group to another, a number of measures were instituted. In the poultry area, deep ditches were dug around each pen to prevent seepage from one pen to another. Fences were also added to restrain experimental animals. In many areas, double fences prevented livestock in any pen from coming into contact with those in other pens.[269]

By 1945, the Zoology Area had grown to approximately 110 acres. A portion of the area, divided into 54 plots, varying in size from one quarter of an acre or smaller to five acres, was used as pastures or for small-scale field experiments.[270]

---

[265]USDA Press Release, "New Construction at Beltsville Makes Experiment Station a Model," November 16, 1933.

[266]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 30.

[267]NARA, RG 17, Entry 3, Box 54.

[268]NARA, RG 16, Entry 17.

[269]Federal Poultry Research, Miscellaneous Publication No. 368, USDA , October 1939, p. 25.

[270]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 29.

4.2.2.3 Architectural Evolution of the Zoology Area

Most of the buildings in the Zoology Area were constructed during a New Deal building campaign conducted in the 1930s at Beltsville. The first buildings were constructed in 1930 and 1931, with the next wave of construction occurring in 1933 and 1934. The majority of the 1934 construction was funded by PWA money. These buildings display a similar architectural vocabulary, with the majority of concrete-block construction covered with a warm, cream-colored stucco. Roofing materials were originally either wood shingle or red, diamond-shaped, asbestos shingle. The similar building materials assured a degree of aesthetic uniformity, while the concrete and asbestos provided resistance to fire.[271] Many of the buildings bear cornerstones, which were Hall's suggestion. He wanted the buildings to reflect accurate construction dates, giving the area an easily identifiable evolution. Memos from the Chiefs of the Bureau of Agricultural Engineering and the Zoological Division reveal that it was important for the site to have pleasing aesthetic qualities and for the buildings to maintain a high degree of consistency with other buildings that were constructed by the Bureau of Animal Industry at BARC at the same time.[272]

To provide adequate facilities, the building plans for the Zoology Area called for a laboratory, insectaries, aquariums, and vivariums for raising suitable hosts of worm parasites. Provisions for temperature controls for the study of factors that influence the survival of parasites in pastures, barns, and stables were also included in the plans. The Zoology Area was also designed to contain many small pastures for intensive studies of the parasitic populations of animals and pastures. The object of this work was to develop methods by which stockmen could raise animals as free as possible from parasites and their injurious effects.[273] The USDA and BARC scientists agreed that large-scale construction in one period of building was advantageous for the Zoological Division because the type of work that the Division conducted involved long-term studies. Inadequate facilities, interruptions, and changes in experimental conditions were particularly undesirable in livestock studies. When the construction was completed in the mid 1930s, the Division was able to raise adequate numbers of animals under well-controlled conditions for long periods of time.[274] These conditions greatly expedited the Division's experimental work with all species of livestock, and also led to a consistent architectural style because of the relatively small window of time in which development occurred.

S.H. McCrory, Chief of the Bureau of Agricultural Engineering approved the use of $10,000 in 1933 for the construction of new animal shelters for use in animal parasite studies in the Zoological Division. These shelters, which were a PWA project (FP 57), were to be stuccoed using stucco of the same color as other new buildings at BARC, indicating that the wish for a uniform, pleasing finish to the buildings extended to even simple structures for animals. McCrory stated that if the buildings on the Animal

---

[271]Several documents pertaining to general construction at BARC, including a 1935 fire hazard survey, indicate that this subject was influencing the Bureau of Agricultural Engineering in the 1930s. Many buildings constructed during this time were of either poured concrete or concrete construction, with stucco finishes.

[272]NARA, RG 17, Entry 5, Box 54.

[273]USDA Press Release, "New Construction at Beltsville Makes Experiment Station a Model," November 16, 1933.

[274]USDA Press Release, "New Construction at Beltsville Makes Experiment Station a Model," November 16, 1933.

Industry Farm at BARC were to have a satisfactory appearance, they must have a uniform treatment and that it would add materially to the appearance of the farm if the existing structures could be painted to conform to the general plan.[275]

Another unifying feature of the Zoology Area is the cottage-type style of building that was adopted for the smaller laboratories. Most of these laboratories are one-story, side-gable buildings with simple, yet deliberate, landscape features such as foundation plantings and shade trees. These buildings have a domestic appeal, which gives the area a residential feeling.

By 1945, improvements to the area consisted of an administration building, three laboratories, and four other buildings used for research studies. In addition, there were 75 other buildings, including barns, animal shelters, an incinerator, and miscellaneous structures.[276]

Although the Zoological Area had been continuously occupied since the 1930s, the buildings were abandoned in April 1997 when research was moved to other areas of BARC.

4.2.2.4 Research of the Zoology Division

The Zoological Division investigated parasites that affected a variety of domestic animals, including poultry, swine, sheep, cattle, and dogs. In 1945, approximately 500 large animals, including horses, cattle, sheep, goats, and swine and approximately 1,200 chickens and turkeys were maintained for experimental purposes.[277]

One of the more significant research findings consisted of developing a phenothiazine treatment for the removal of worms that infest cattle, sheep, and swine. Beltsville scientists developed this revolutionary drug, which had first been tested as an insecticide. Later, they discovered that it was also effective in controlling internal parasites of farm animals. By 1953, approximately four million pounds of phenothiazine were used annually to treat livestock with parasitic diseases.[278]Another revolutionary drug developed at BARC was barium antimonyl tartrate, which was used to remove gapeworms from poultry.[279]

---

[275]Memo to J.R. Mohler from S.H. McCrory, September 13, 1933, NARA, RG 8, Entry 19, Box 306.

[276]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, page 29.

[277]Ibid.

[278]Samuel W. Matthews, "Beltsville Brings Science to the Farm," *National Geographic* 104 (August 1953): 212.

[279]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 30.

An important part of the strategy to eradicate parasites was to determine the most vulnerable point in the parasite's life cycle and find either a drug or a husbandry practice to break the cycle.[280] Many animal parasites spend a portion of their life cycles in intermediate hosts, such as insects. Often, eradication of parasites involved killing them before they reached domestic animals. New intermediate hosts of poultry tapeworms were constantly being found. Scientists at BARC investigated various arthropods such as beetles, flies, earthworms, slugs, snails, and grasshoppers. Due to the large number of insect investigations relating to poultry, an insectary (Building 335A) was constructed in the Zoology Area. The site selected was removed from other experimental areas where winged insects could reach. In the 1930s, scientists also discovered that ants were intermediate hosts for two of the most common tapeworms in poultry. Methods for eradicating the ants were then developed, thus eradicating the poultry parasites.[281]

Sometimes the results of research revealed how a combination of methods could best be used. Scientists found that the larvae of the stomach worm, nodular worm, and other injurious internal parasites of sheep did not survive under pasture conditions for more than four months, indicating that the worms carried over in their hosts from one season to another constitute the source of infection. These facts formed the basis of a control program that involved treatment of the breeding flock with phenothiazine in the late fall and early spring and then placing the sheep on pasture that has been allowed to lie idle over the winter.[282]

Poultry parasite investigations, including the parasitic diseases of chickens, turkeys, pigeons, guinea fowl, and ducks, constituted a major portion of the work of the Zoological Division. The scientists assigned to this project devoted their entire time to investigating the life cycles of parasites. Much of the research focused on coccidiosis, a microbe which burrows into the bird's digestive tract. This work proved to be so important that a separate coccidiosis laboratory (Building 338) was constructed for the scientists whose research was focused in this area.[283]

Parasitic investigation also included swine. In 1935, BARC scientists developed a simple and inexpensive method to control the swine kidney worm, a parasite which at one time forced meat packers to discard 95 percent of hog livers and kidneys from hogs raised in the South, which were particularly affected by this parasite. Prevention of this waste saved the pork industry approximately $1 million in its first year of use.[284]

Another important innovation the Zoological Division developed was a treatment for canine heartworm, a condition that often affected valuable hunting dogs. Prior to the development of this remedy, this parasite attacked dogs with fatal results. In addition to research with dogs, the diseases of sheep were also studied. Stomach worms of sheep were researched with reference to methods of preventing losses of lambs and sheep. Numerous anthelmintics (recommended for the removal of worms from various host animals) were

---

[280]Ibid.

[281]Federal Poultry Research, Miscellaneous Publication No. 368, USDA, October 1939, p. 26.

[282]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 30.

[283]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[284]Ibid.

tested and where found effective were studied with reference to the therapeutic dose and the proper technique and procedure in administering.[285]

Much of the research performed by zoologists took years to complete. Studies of the life cycles of certain parasites could take as many as five years to complete, while the consequential effects of the parasites on their livestock hosts could take another five years. In spite of these limitations, scientists were able to meet the needs of livestock farmers by curing and preventing a variety of parasitic diseases.

The Zoology Division, now known as the Animal Parasitology Institute, is the largest research facility in the world devoted exclusively to research on parasites of food-producing animals. Parasitologists, veterinarians, chemists, entomologists, and immunologists cooperate in interdisciplinary approaches to develop treatments for parasitic diseases.

4.2.2.5 The Food and Drug Administration in the Zoology Area

In mid 1931, plans to move some of the Food and Drug Administration work to BARC were underway. The research conducted involved parasites and related diseases, so the logical choice of locations was the Zoology Area because of its distance from locations that housed healthy animals. The Zoological Division cooperated with the Food and Drug Administration in testing drugs and remedies that were offered for sale or advocated for use in the treatment of parasitic diseases. Dr. Maurice Hall expedited the onset of work by requiring the erection of animal shelters and the clearing and fencing of areas used for the new work. Dipping vats (to smother lice in petroleum or tar) and buildings, including a laboratory and a barn, were also requested. However, the nature of the work was urgent and efforts were made to begin work and share laboratory space with existing zoologists. A completion date for the new buildings was anticipated in the early fall of 1931.[286]

The FDA work in the Zoological Division continued and expanded. In 1933, Hall assisted the FDA in testing insecticides and drug products in the enforcement of the Federal Food and Drugs Act and the Insecticide Act. For the purpose of aiding the enforcement of both Acts, investigations of questionable veterinary proprietary products were conducted in the Zoology Area. These proprietary preparations were collected from all sections of the United States, and the necessary research work, in connection with this program, was also conducted at BARC.[287] Hall requested an appropriation of $11,000 of PWA funds to more effectively conduct his work. The money was to be used to erect a storage and laboratory building, six animal shelters, and one dipping vat.[288](For a more information on FDA research at BARC, see Section 4.5.)

---

[285]Alfred Charles True, *Three Centuries of Science in America*, "Alfred True on Agricultural Experimentation and Research," (New York: Arno Press, 1980).

[286]Federal Poultry Research, Miscellaneous Publication No. 368, USDA , October 1939, p. 26.

[287]The National Agricultural Research Center of the Department of Agriculture, USDA, 1939.

[288]Memo from W.G. Campbell, Chief of the FDA, to J.R. Mohler, Chief of the Bureau of Animal Industry, NARA, RG 17, Entry 5, Box 54.

traditional detailing. In 1934, Buildings 263 and 265 were constructed, in a style resembling Building 264. Building 262, the fourth main laboratory, and the Boiler House (Building 261) were distinct stylistically from the other main laboratories. Flat-roofed, and lacking in ornamentation, these two buildings were modernistic variants of the other poultry laboratories.

4.2.1.1.3 Post-New Deal Research (1930s-1950s)

By 1945, the Poultry Area included 177 acres, four well-equipped labs, ten large laying houses, three brooder houses, five large turkey houses, a shop, and nearly two hundred colony houses. The area had the capacity to house approximately 8,000 adult chickens and 1,500 turkeys. The facilities could also brood 13,000 chicks, 2,500 poults, and incubate some 5,000 eggs each year.[151]

Turkey Research: The Beltsville Turkey

One of the most significant research subjects at the new poultry facilities was the research on turkeys. The Beltsville Turkey, a smaller turkey designed for the modern American consumer, constituted one of the major lines of work. As family size shrank, and the population became more urban—using smaller kitchen ovens and refrigerators—the demand for smaller turkeys increased. Researchers were looking to obtain a small turkey, white in color, with a compact body, short legs, long knee bones, and plenty of breast meat. They also wanted a bird that matured in 25-26 weeks and was able to lay plenty of eggs. To obtain these characteristics, researchers crossbred several different types of turkeys. By the early 1940s, the best individuals of the flock exhibited these characteristics, but several more years of intensive breeding were necessary to establish the type so it would breed true.[152] In 1945, the Beltsville Turkey was officially introduced to the public.[153] By the end of the 1940s, the Beltsville Turkey was being produced in commercial quantities.[154]

Breeding Research

Like much of the other research conducted at Beltsville, breeding experiments were primarily concerned with improving the economic value of poultry work. One of the most important lines of breeding work was the development of high-laying strains of Rhode Island Reds, White Leghorns, and Light Sussex. Researchers made significant strides in understanding the role genetics played in obtaining increased egg production, large and hatchable eggs, and low mortality in chicks and adults. Within a five-year period researchers were able to increase the average annual egg production of a low producing flock from 129 to 177 eggs per hen. Many of these breeding experiments involved the use of the "3-P Program," which stood for Production records, Pedigrees, and Progeny testing. Of the three, the progeny test was considered the most significant, as it resulted in improvements in the weight of eggs and in thicker

---

[151]Research for Better Farming and Farm Living, USDA, August 1945, NARA, RG 310, Entry 1001, Box 2.

[152]National Agricultural Research Center at Beltsville, NARA, RG 16, Entry 32, Box 1.

[153]"The USDA's Beltsville Agricultural Research Center," *Smithsonian Magazine*, March 1982, p. 62.

[154]Annual Report of the Department of Agriculture for 1949, p. 110.

4.2.2.6 The Impact of the Research of the Zoology Division

The work of the Zoology Division had lasting impacts for farmers who were struggling to make their farms more profitable, and for a variety of animal industries that were able to use greater portions of the animals to produce larger profits and make products available to the American public. One of the most important discoveries to come out of the zoological research at Beltsville was the development of phenothiazine to treat infestations of various animals. Additionally, the discovery that many parasites spend a portion of their life cycles in insect hosts also brought about a new era and many new approaches to research in the field of parasitology.

The buildings located in the Zoology Area form an architecturally cohesive unit. Because of the building boom that occurred in 1933 and 1934, the majority of the Division's buildings were constructed at the same time. Consequently, these buildings share common features, such as concrete block and stucco materials, asbestos-shingle roofing material, and a general cottage-like appearance of many of the smaller labs. The funding for this building boom was primarily from PWA and WPA sources, thus contributing to the overall influence of the New Deal at BARC.

The Zoology Area also offers a unique perspective on the history of land, research, and buildings at BARC. While many of the other Bureau of Animal Industry areas used land for grazing purposes only, the Zoology Division cultivated parasites and intermediate hosts on plots of land. This field research, which led to many important discoveries in the field of parasitology, was linked directly to the laboratories and barns at BARC. These three components—buildings, land, and research—combined to contribute to the overall history of the site.

4.2.3 The Animal Disease Station

4.2.3.1 History of the Animal Disease Station

The Animal Disease Station at BARC had its origins in the Veterinary Division of the United States Department of Agriculture (Figure 31). The research work of the Veterinary Division, which was established in the late 19th century, required separate facilities for work on infectious and contagious diseases of domestic animals. This work was best conducted in a setting that was closely guarded and included experimental buildings such as laboratories, but otherwise resembled customary farm and field conditions. In 1883, a small tract of land, consisting of approximately six acres and located approximately one-quarter of a mile from the northeast boundary of Washington, D.C., on Benning Road was secured. For fourteen years, this tract of land, with several small laboratories, pens, stables, and a brick dwelling served as the USDA's experimental disease facility.[289]

[289]Houck, *Bureau of Animal Industry*, pp. 48-49.

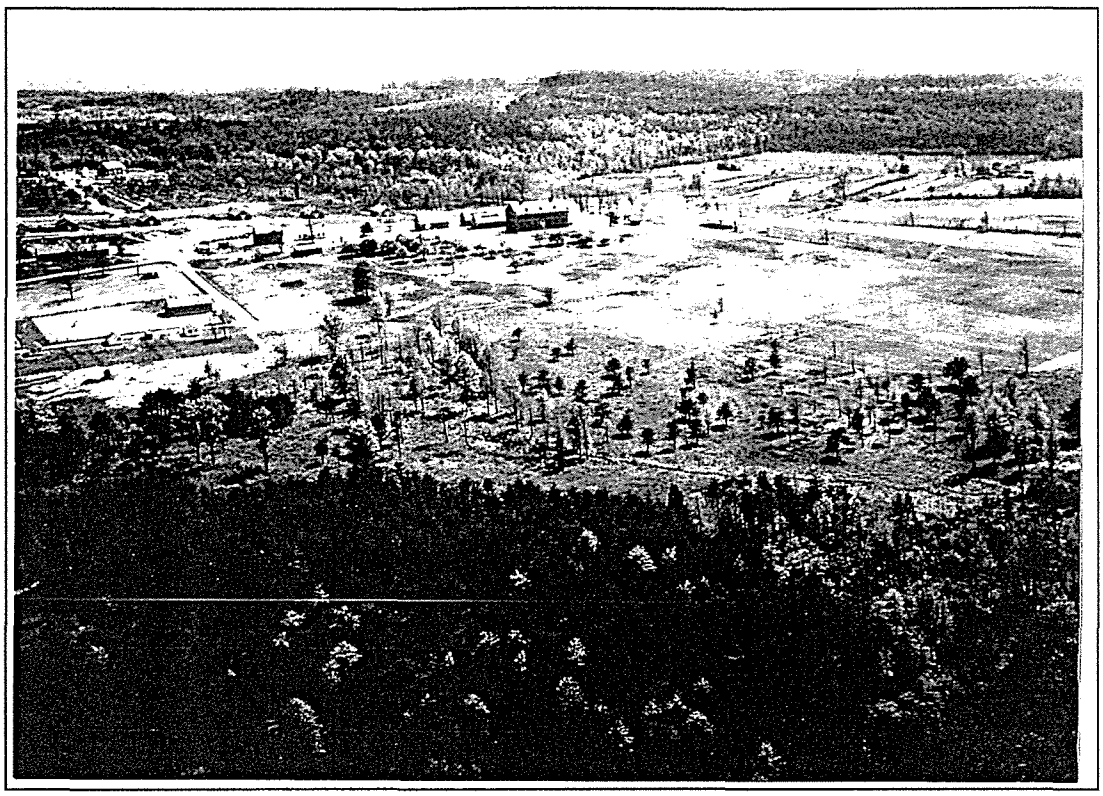


Figure 31 - Animal Disease area, aerial view, 1936

In July 1897, the Station was moved from Benning Road to an area approximately five miles north of Washington on the Rockville Road in Bethesda, MD. Eighteen acres of land were secured, and various buildings, such as barns and laboratories, were constructed. Subsequently, the government purchased more adjacent land, and the size of the parcel increased to 110 acres by 1909.[290] By 1934, the Bethesda Experiment Station, as it was then known, had outgrown its land and plans were underway to move the Station, by then a part of the Bureau of Animal Industry, to the Beltsville Research Center.[291] This relocation was also undertaken in an attempt to consolidate many of the bureaus and divisions of the USDA in one central location. Because the Animal Disease Station worked closely with the divisions of the Bureau of Animal Industry, which had relocated to the Beltsville site in 1911, the choice for the National Agricultural Research Center as the site for Animal Disease was a logical one.

[290]Ibid., pp. 49-50.

[291]The Division of Animal Husbandry was the first division to move to Beltsville in 1911. Animal Disease stayed in Bethesda in an attempt to prevent contamination of healthy experimental animals.

The Bureau of Animal Industry's Animal Disease Station was established at BARC in 1935.[292] Scientists carried on independent research in communicable diseases of livestock until the Station moved in the 1960s, and also supplied facilities and assistance to other divisions of the Bureau of Animal Industry, investigating diseases requiring the use of large animals or field conditions. The independent investigations included brucellosis of cattle (Bang's Disease), brucellosis of swine, tuberculosis of cattle and swine, mastitis of cattle, various poultry paralyses, and other diseases affecting livestock. Investigations of other diseases were undertaken as conditions warranted. Studies were directed toward discovering facts and principles concerning the cause and nature of the diseases, and using the practical application of information to control them. The Station furnished facilities and aid to other bureaus and divisions at BARC in investigations of diseases such as anthrax, anaplasmosis, hemorrhagic septicemia, encephalomyelitis, swamp fever, rabies, pullorum diseases, poison plant diseases, and forage poisoning.[293]

The Animal Disease Station occupied quarters at the research center that were intentionally separated from other units. This was necessary due to the infectious natures of the diseases studied. Rigid sanitary precautions were observed at the Station. Visitors were requested to report to the central office before entering, ensuring that the facilities remained secure and that visitors' health was in no way jeopardized.[294]

In 1961, research relating to infectious diseases was moved from BARC to the National Animal Disease Laboratory at Ames, Iowa. The Animal Disease Area at BARC now houses animals used in feeding experiments.[295]

4.2.3.2 Evolution of the Animal Disease Station Site

The station covered an area of approximately 350 acres, about 100 of which were used for growing feed crops for the experimental animals. The remainder was devoted principally to research work.[296] The station was located on the south portion of what is now the Central Farm. The area was located away from the main area occupied by the Bureau of Animal Industry, to ensure that healthy experimental animals were not at risk of infection.

---

[292]National Agricultural Research Center of the Department of Agriculture, NARA, RG 54, Bureau Chief's Correspondence.

[293]The National Agricultural Research Center of the Department of Agriculture, USDA, 1939.

[294]Federal Poultry Research at the Agricultural Research Center, Beltsville, Md., Miscellaneous Federal Publication No. 368, USDA, October 1939.

[295]Discussion with George Shaffer, USDA employee, held with Stephanie Foell, Robinson & Associates, Inc., March 1997.

[296]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 29.

The landscape of the area was designed by A.D. Taylor, landscape architect of much of the BARC site during the New Deal era. Correspondence indicates that Taylor was involved with landscape issues as they arose during the construction of the new buildings at the Animal Disease Station. The areas east and west of the main laboratory building presented problems to the BARC personnel in 1934, as construction commenced. Joseph C. Gardner, Taylor's assistant, responded to M.C. Betts, Chief of the Division of Plans and Service, offering advice to Betts on how to address certain landscape issues as they arose. Gardner assured Betts that when Taylor completed the planting plan for the Animal Disease Station, any changes that Gardner recommended to Betts would be incorporated on the final submittal.[297] (For more information on the landscape of the Animal Disease Station, see the Animal Disease and Quarantine Landscape Form.)

In 1938, additional land west of the original tract was allocated for use by the Bureau of Dairy Industry as a quarantine area for cattle infected with tuberculosis. This area was originally known as the Dairy Disease Station, but in 1941, the area became part of the Animal Disease Station, and was renamed the Animal Quarantine Area, although Dairy continued using the site.[298]

When the Animal Disease Station was moved to Beltsville, an effort was made to duplicate many of the facilities left behind in Bethesda (Figure 32). New facilities were also added, and others were improved as the research demanded. At the end of 1933, the Chief of the Bureau of Animal Husbandry proposed that $28,100 of Civil Works Administration funds be spent to ready the area for the new Animal Disease Station. Land was cleared, electrical and water connections established, and fences erected. This work was completed in February 1934.[299] Additional funds for moving the Bethesda Station to Beltsville came from the Federal Project/PWA funding. In early 1934, PWA funds in the amount of $265,000 were committed for general structures. These buildings were completed in late 1934 and early 1935.[300]

Buildings from this time period in the Animal Disease Station site included laboratories, hospital houses, small-animal breeding houses, incinerator, rendering plant, and various barns for horses, cattle, sheep, goats, and swine. Numbers of small animals, such as guinea pigs and mice, were raised to supply the needs of the Animal Disease Station and other laboratories of the Bureau.[301]

The buildings in the eastern portion of the Animal Disease Station were built during one campaign in 1934 and 1935. Although smaller sheds and equipment buildings were erected later, the main laboratories, barns, and animal shelters were constructed as a result of the immediate need for new facilities when the Station moved to Beltsville from Bethesda. Instrumental in the move from Beltsville to Bethesda was Dr. W.E. Cotton, who determined the building and experimental needs of the Station. So involved was Dr. Cotton with the Station that official correspondence during the planning phase of the buildings routinely

[297]Memo from Joseph C. Gardner to M.C. Betts, April 23, 1934, NARA, RG 8, Box 307.

[298]Archives Facility Engineering Branch, Building 427, BARC.

[299]NARA, RG 17, Entry 3, Box 54.

[300]NARA, RG 8, Entry 17, Box 306.

[301]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 29.

referred to the unit not as the Animal Disease Station, but as "Dr. Cotton's Group."[302]

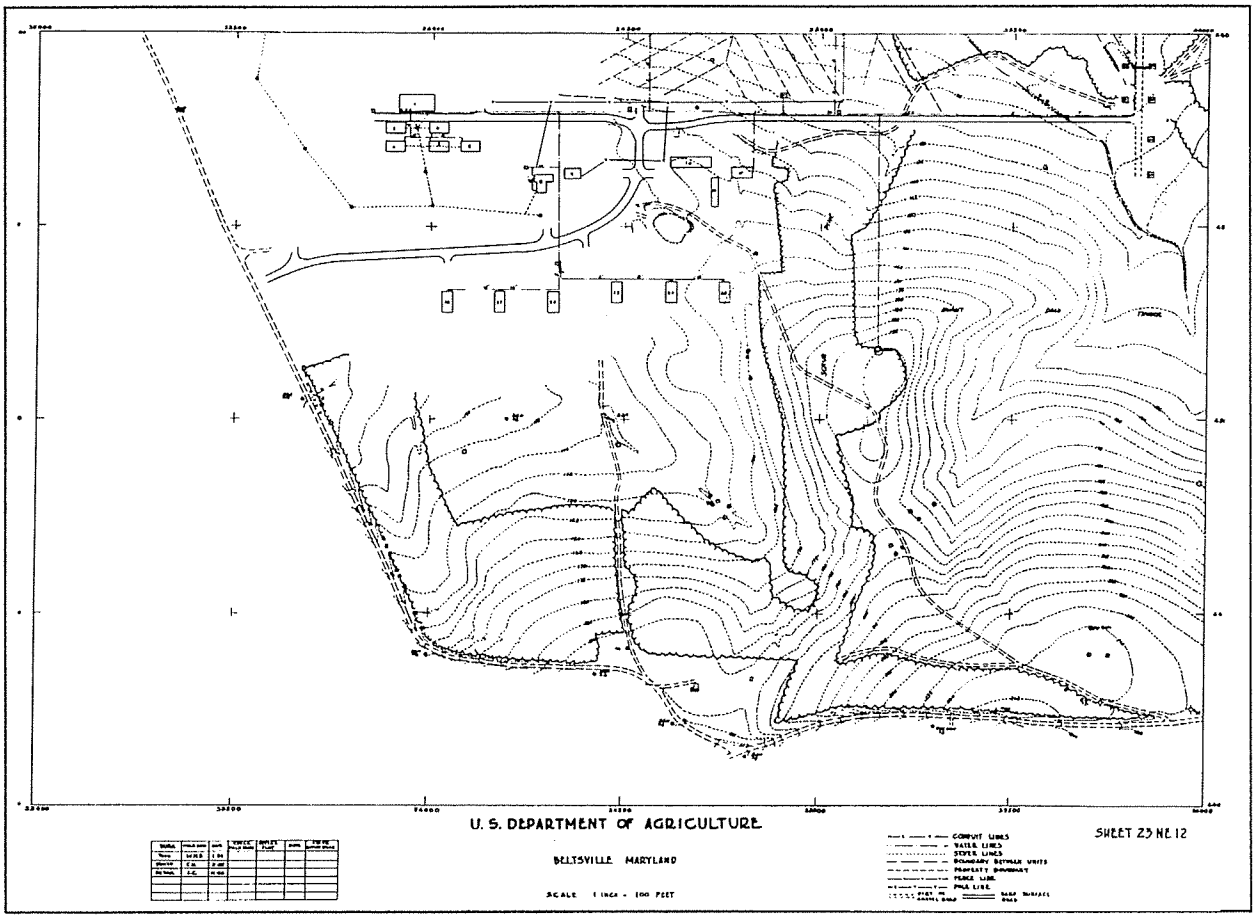


Figure 32 - Animal Disease area, site plan, 1934

The 1934 and 1935 buildings are of several different types. The laboratory building (Building 1040) was a large, red brick building, with decorative brickwork, arched window openings and dormers, and a slate roof. The small animal hospitals (Buildings 1043, 1044, and 1045) were also brick, with decorative arched windows and slate gambrel roofs. Clerestory windows allowed for maximum lighting. The interior of the buildings were designed to hold steel shelving and steel cages for animals. The post-mortem buildings (Buildings 1041 and 1042) are identical to the small animal hospitals in design and materials. These buildings form the main core of the cluster of the Animal Disease Station.

In 1935, there were ten large barns on the site. They were all identical, with cinder-block walls and wood frame roofs covered in slate, and the interior spaces were framed into stalls. Of the original ten barns, five remain. New buildings have been constructed on the sites of the other five. An anthrax barn was also constructed at the same time as the other barns. While it was similar in scale and materials to the other barns, it featured two small frame buildings attached to the gable end of the barn. This building also

[302]NARA, RG 8, Entry 19, Box 314.

remains on the site.

A large hay barn (Building 1122) was constructed during the initial phase of building. Used as a storage space for hay to feed the experimental animals, its materials matched the other barns; however, it was larger than the other barns, providing nearly twice the square footage.

In addition to these major buildings, the Animal Disease Station contained approximately 45 smaller buildings, such as isolations stables, animal sheds, implement and storage buildings, and swine pens, all of which were all constructed in 1934 and 1935. These buildings were originally constructed as frame buildings ranging in size from 4' x 6' to 16' x 20'. In the 1970s, these buildings were essentially rebuilt. The roofs were raised, the original frame construction demolished, new concrete block buildings were constructed on the same footprints, and the original roofs were then placed on the new buildings.[303]

Because the Animal Disease Station housed a variety of animals, various shelters specific to these animals were necessary. Poultry colony houses, swine shelters, and cattle barns were all present, as were small animal buildings for rats, mice, and guinea pigs. Measures were often taken to ensure that animals infected with different diseases were not allowed to interact, or that waste from one pen was not allowed to run into a separate pen. Consequently, the many of the pens featured double fencing or ditches were dug around some of the areas, giving the Animal Disease Station a distinct building placement and landscape character.

Three residences were also constructed in the Animal Disease Station in the early 1930s, and are extant. The Superintendent's House (Building 1070) and the Foreman's Cottage (Building 1072) are two-story brick dwellings with slate roofs. The material and general massing recall the main laboratory building. Garages were also constructed in conjunction with these two residences. A two-car garage served the Superintendent's House, while a single-car garage was constructed for the Foreman's Cottage. Both garages were brick with slate roofs to "harmonize with the architecture of the surrounding buildings."[304] The Men's House (Building 1050), a frame building with a T-shaped floor plan and a slate roof, was constructed to house administration staff.

The western portion of the Animal Disease Station, used for the quarantined dairy cattle, was developed between 1938 and 1940. It comprises barns, laboratories, and shelters (Buildings 1001 through 1007, and 1016 through 1019), all constructed of concrete block with stucco finishes. They are similar in scale and materials to the earlier buildings in the original eastern portion of the site. The Quarantine Area, as it was known, also included a separate granary for feeding the infected animals. This, along with many other precautions, was part of efforts to limit contact between infected animals and the healthy experimental animals located in other areas of BARC.[305]

By July 1950, the Animal Disease Station contained 119 structures, encompassing barns, laboratories,

---

[303]Oral interview with George Shaffer, USDA employee, by Stephanie Foell, Robinson & Associates, Inc., April 29,1997.

[304]NARA, RG 8, Entry 19, Box 307.

[305]Memo to R.F. Hendrickson, Director of Personnel, from J.R. Mohler, Chief of the Bureau, October 19, 1938, NARA, RG 17, Entry 3, Box 649.

animal shelters, residences, and storage buildings.[306] In its entirety, the Animal Disease Station forms a cohesive unit of brick laboratories and animal hospitals and stucco farm buildings. Some of the 1934 and 1935 buildings have been either destroyed or altered since their construction, and many of the smaller buildings are now abandoned due to changes in legislation, which require larger spaces for housing experimental animals. However, many buildings from that era remain on the site. These buildings principally retain their original forms and materials.

4.2.3.3 Work of the Animal Disease Station

The work of the scientists and veterinarians of the Animal Disease Station concerned a number of different topics. Scientists were primarily concerned with diseases and their effects on livestock. However, in many cases, the diseases of livestock were also transmissible to man. Eradicating an animal disease often resulted in a cure for a human ailment as well. Finally, the control or eradication of a disease translated into increased profits for individual farmers as well as for larger industries involved in animal production.

On the average, about 800 large experimental animals (horses, sheep, cattle, goats, and swine) were maintained. Numbers of small animals, such as guinea pigs and mice, were raised to supply the needs of the Animal Disease Station and other laboratories of the USDA, both at Beltsville and in Washington, D.C.[307] The station also assisted other bureaus located at BARC. When these divisions experienced outbreaks of diseases, the Station undertook studies of anthrax, swamp fever, and hog cholera.[308]

Much of the research conducted by scientists at the Animal Disease Station was dictated by need. If a devastating disease was causing economic hardships for farmers and for animal industry, Congress was likely to fund research that would yield some type of relief. As seen throughout the bureaus at BARC, obtaining funding from Congress was directly related to saving money for both farmers and industries. Congress was most likely to fund projects that would yield some form of applied science, rather than a project that would yield theoretical knowledge only. Projects that had broad geographic applications were most likely to be funded, with more regional problems investigated by local experiment stations. When large, catastrophic, and costly outbreaks of disease occurred, BARC scientists often took the lead in investigations, with smaller regional and local facilities acting in supportive roles. Two diseases which were particularly devastating to farmers across the United States, and also to the experimental dairy herd at BARC, were brucellosis and tuberculosis.

Brucellosis, also known as Bang's disease, the contagious abortion of cattle, received major attention from the researchers at BARC. A problem for individual farmers and the dairy industry for many years, Bang's Disease caused the loss of 325,000 calves and a billion pounds of milk each year during its height in the 1940s. In human beings, the illness, known as undulant fever, causes remittent fever, pain and swelling in the joints, and great weakness. It can be contracted by contact with infected cattle or the consumption of products from infected cattle. By preventing the disease in cattle, humans were given a degree of

---

[306]Building Valuations, Agricultural Research Center, July 1950.

[307]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945.

[308]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

protection.[309] While there is no known cure for the disease, a vaccine used widely throughout the world was developed at BARC in the late 1930s and early 1940s. Researchers had a great deal of trouble developing any type of cure for the disease. However, vaccines offered much more promise. At Beltsville, these vaccines were prepared and tested. Certain vaccines, such as Beltsville's Strain 19, when administered to calves, prevented the virus as the cows matured.[310] This vaccine was an excellent preventative when administered to calves, and facts discovered during the course of developing the vaccine also assisted in detecting infected animals.[311]

Researchers tested to discern whether cows were infected with Bang's Disease. Certain chemicals were mixed with milk, and within two hours, a purple ring formed at the top of the test tube if the milk came from an infected cow. Blood sampling tests verified which cows were infected. The development of the test also allowed milk depots to test their supplies.[312]

When the Experiment Station was established in 1884, one of their first tasks was to investigate the causes and cures of bovine tuberculosis. As late as 1935, there had still only been partial triumphs in this battle. The perfection of the pasteurization process made milk from infected cows safe for human consumption. The discovery that manure from infected cattle could pollute streams for many miles, and appeared to be the cause of many cases of progressive tuberculosis in swine, was another important development. Scores of vaccines, including ones found successful in human infants, were tested, but none proved successful. To eradicate the disease, all infected cattle at BARC were routinely slaughtered, costing the Bureau of Dairy Industry thousands of dollars in cattle and terminating long-term breeding or nutrition experiments. [313]

In 1938, the Bureau of Dairy Industry began using a tract of land adjacent to the Animal Disease Station as a quarantine area for tuberculin-infected cows. Although the land became part of the Animal Disease Station in 1941, its function serving the Bureau of Dairy Industry remained the same. While the source of the infection remained a mystery, the employees of the Animal Disease Station took various precautions to contain the spread. Diseased animals were quarantined, their manure was not transported to other areas of BARC, and workers such as carpenters, plumbers, and painters were prohibited from working at the Animal Disease Station and then proceeding to other areas of BARC where healthy cattle were located. The fight against bovine tuberculosis proved to be a difficult one for the BARC scientists. Preventative hygiene measures and quarantining or slaughtering infected cattle were the only solutions that prevented the further spread of the disease.[314]

---

[309]Samuel W. Matthews, "Beltsville Brings Science to the Farm," *National Geographic*.

[310]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945.

[311]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[312]Ibid.

[313]Ibid.

[314]Memo to the Secretary from the Chiefs of the Bureaus of Animal Industry and Dairy Industry, November 17, 1938, NARA, RG 17, Entry 3, Box 649.

At times, the animal pathologists succeeded in eradicating diseases in the United States. In 1935, pleuropneumonia, a typically fatal dairy cattle disease was obliterated as a result of the work of BARC scientists. Similarly, quick reactions to foot-and-mouth disease by BARC scientists kept the disease beyond United States borders.[315]

As of 1945, diseases being studied included infectious anemia and sleeping sickness of horses, tuberculosis of cattle, swine, and poultry, bovine mastitis, paratyphoid and erysipelas infections of swine, vesicular stomatitis of cattle, hogs, and horses, and paralysis and encephalomyelitis of poultry.[316] By 1955, thirty diseases constituted a comprehensive research programs at BARC. These diseases were the subjects of diagnostic and testing work for control and regulation.[317]

During the Animal Disease Station's tenure at BARC, many important contributions were realized at the Beltsville site. Dr. Adolph Eichorn, Director of the Animal Disease Station in 1940, submitted a short article to the *Farm Post*, the employee newsletter of BARC, listing several of the outstanding achievements of the Station. The director counted the development of an effective vaccine preventing Bang's disease as one of the major accomplishments of the Station. The discovery that tubercle bacilli may be present in cream, ice cream, butter, and soft cheese for a considerable period of time following preparation, and the development of an approved method for sterilizing hides contaminated with certain infectious viruses were also important discoveries for both economic and health-related reasons.[318]

Unlike other bureaus and divisions of the USDA, the Animal Disease Station was not affected by national events such as the Depression or World War II. However, scientists at the Station responded swiftly to widespread disease epidemics, attempting to curb large economic losses by farmers or those in animal-related industries.

---

[315]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[316]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 29.

[317]NARA, RG 328, Entry 7, Box 91.

[318] From a submittal by Dr. Adolph Eichorn, Director of the Animal Disease Station, in *The Farm Post*, October 31, 1940, Volume 2, Number 11.

4.3 THE BUREAU OF PLANT INDUSTRY

The Bureau of Plant Industry was created on July 1, 1901, and organized plant science in the federal government is often traced to that date.[319] Some of the work later conducted by the Bureau, however, dates back as far as 1819, when the Treasury Department directed U.S. consuls to collect plant specimens and information on soil, cultivation, and insect pests in the countries in which they were located. The job of collecting foreign plant matter passed to the Commission of Patents in 1839. In 1856, the Commissioner employed the first federal botanist in the Patent Offices' Agricultural Division and the same year set up a garden on the Mall in Washington to grow sorghum. The Department of Agriculture was established in 1862 and research continued along a number of separate lines. In 1901, work relating to fruit and vegetable diseases and physiology; research to improve cereals, fibers, tropical crops, grasses and other forage plants; investigation into the production of tea; and the introduction of foreign seeds and plants were consolidated into the Bureau of Plant Industry.

From its beginning, the research work of the Bureau was conducted not only at Department of Agriculture facilities, such as greenhouses located on the Mall in Washington and at Arlington Farm—predecessor of the Bureau's operation at Beltsville—but also at cooperative research facilities operated by the states. The cooperative nature of the Bureau's work continued and increased through the years.[320]

In 1938, the Bureau of Soils, and in 1943, the Bureau of Agricultural Engineering were merged into the Bureau of Plant Industry, and the Bureau was renamed the Bureau of Plant Industry, Soils, and Agricultural Engineering. The Bureau of Soils' research related to fertilizer, soil management and irrigation, and soil survey. The Bureau of Agricultural Engineering brought research relating to farm buildings and rural housing, farm electrification, farm machinery, and the mechanical processing of farm products into the fold. The Bureau remained in this configuration for less than ten years. In 1952, the Bureau was abolished and its functions were transferred to the Agricultural Research Service, which today continues to coordinate all research of the USDA.

4.3.1 Evolution of the Bureau of Plant Industry Sites at Beltsville

The Bureau of Plant Industry's first work at Beltsville apparently dates to around 1928. At that time it signed an agreement to conduct cooperative research with the Bureau of Animal Industry on what today is BARC's East Farm. Known as the Knoblauch Tract, the site was located immediately to the west of Springfield Road near the airport site. In addition to research fields (which in 1929 were planted with clover) this area originally contained approximately 13 frame farm buildings, none of which are now extant. Although little detailed information has been located about the experimental work conducted on this site, in general it related to pasture investigations conducted by the Office of Forage Crops. These

[319]See "Plant Science After Fifty Years," *Science*, 113: Sup. 3 (June 29, 1951).

[320]As early as the Bureau's founding year, joint research in grass and forage crops was carried on in thirteen states. By the early 1950s, the Bureau had research in progress on 925 projects at 199 locations in 45 states, the District of Columbia, Puerto Rico, the Canal Zone, and 11 Latin American countries. In addition to the cooperative state programs each division also had a significant number of field stations.

experiments were ongoing in 1929.[321] It is likely that forage crop research on the site ended in the mid-1930s.[322]

Aside from this minor work at Beltsville in the late 1920s, and work at greenhouses on the [Washington National] Mall, from 1900 to the 1931, almost all Bureau of Plant Industry research in the Washington Area was conducted at Arlington Farms, in Arlington, Virginia. Arlington Farms was a 400-acre tract of land acquired by the Department of Agriculture from the U.S. Army in 1900. The site fronted on the Potomac River's Boundary Channel and included part of what is today the eastern portion of Arlington Cemetery and part of the land that today surrounds the Pentagon. Scientific experiments by a number of divisions of the Bureau of Plant Industry as well as a few other USDA bureaus were conducted at the site, and the operation expanded, eventually encompassing some 105 buildings. However, beginning as early as 1911, the Army realized the utility of the site and began to lobby to have it returned to its jurisdiction. By the 1920s a number of federal agencies were eying the spot.[323]

Around 1930, the Division of Fruit and Vegetable Crops and Diseases needed land for a number of long-term experiments such as those with tree fruits, nuts, and grapes. Given the "recurring agitation" as to the future of the Arlington Farm lands, the Division began searching for land for another field station. Their official rationale for seeking out the land was to concentrate scattered research in one location, and to provide "a nucleus for such a move [from Arlington] if it should ultimately come about."

A study was made of land areas in the suburban Washington area and two adjacent farms in the Beltsville area came out as the top choices. Soil type was a major criteria for picking the sites. According to a 1932 memorandum:

> *These two farms lie together as a unit approximately one to two miles west of Beltsville, Md., back from the Baltimore boulevard but with one small area fronting on the boulevard for about 800 feet. The land has been selected particularly for the conduct of horticultural research. Of the Sellman tact, something over 100 acres is strong river bottom land, admirably suited for truck crop experiments. Approximately 100 acres is equally good land but slightly higher, and the balance is rolling land with good air drainage and particularly suited for experimental work with fruit crops. The Miller tract is largely river bottom, a small area being higher land reaching forward to the boulevard. These areas now are almost entirely under intensive cultivation and can be utilized immediately . . . It must be borne in mind that the bulk of this land is now in truck crop production, being used for intensive cropping. Trucking soil is, of course, to be found only in limited areas and wherever found is far more expensive than the ordinary soils.*[324]

---

[321]NARA, RG 152, Entry 5, Box 78.

[322] Unlike earlier site maps, plans of BARC dated after 1936 do not show the area as being in use for forage crop research.

[323]By the 1920s, the Commission of Fine Arts had weighed in on the side of using the site for an expansion of Arlington National Cemetery, and the National Park Service was eyeing the site for a riverfront park. Soon after, officials of Washington Hoover Airport made known their interest in the site in order to extend the Airport's runways.

[324]Memorandum from William A. Taylor, Chief of the Bureau of Plant Industry, to the Secretary of Agriculture, January 18, 1932, NARA, RG 17, Entry 19 (1943), Box 1933.

According to the memorandum, proximity to the existing USDA facilities (including a reliable supply of fertilizer) and general closeness to Washington were also decisive factors in locating what today is the North Farm.

The two original plots identified in the 1930 survey of possible sites were owned by Irvine L. Miller and Theodore Alexander Sellman and Robert Lee Sellman (Figure 33). Working through a middleman, the Division secured options for the lease and future purchase of the farms. The lease of the 300-acre Sellman farm was executed December 18, 1931 (effective February 1, 1932) with rent of $2,740 per year and an option to purchase the land at $150 per acre. The Miller lease was executed January 9, 1932 (effective February 1, 1932). Rent was $1,600 per year, and the purchase price was $300 per acre. Extant on the Sellman farm at the time it was acquired were:

> 1 dwelling house (14 rooms and basement, hot water heating system, water and bath, telephone, and Delco electric plant) [Building 023]
> 1 barn 45 x 72 ft., about 50 ft. high, with granary, basement and electric lights [Demolished]
> 1 wagon shed about 35 x 50 with upstairs storage space [Demolished]
> 2 implement sheds (fertilizer room in one, corn crib in the other) [One Demolished, One Building 023B]
> 1 2000 bushel corn crib [Demolished]
> 1 potato cellar (about 20 x 30 x 8) with upstairs storage room [Demolished]
> 1 five-room tenant house [Building 016]
> 1 three-room tenant house [Likely Combined as Part of Building 022]
> 1 four-room tenant house [Likely Combined as Part of Building 022]
> 1 garage (16 x 20)[Building 023A]
> 1 woodshed and pumphouse [Demolished]
> 2 wells and three springs all working.
> 2 chicken houses [Demolished][325]

In February 1932, the land was divided between the different projects of the Division of Fruit and Vegetable Crops and Diseases. Planting of apple, peach, nut and other fruit trees was completed in the spring of the year. A few indicator crops were planted that season also. The next year, on October 1, the Government exercised its option to purchase the properties. Funding for the land came from a Public Works Administration (PWA) allotment. The total purchase cost was $80,793.15 and the site officially became the "U.S. Horticultural Field Station at Beltsville, Maryland."

[325]Lease between Theodore Alexander Sellman and Robert Lee Sellman and the United States of America, December 18, 1931, NARA, RG 54, "Deed & Title Records."

In addition to paying for the acquisition of the land, 1933/34 PWA funds amounting to $100,237 were expended to clear the land, put in drainage and water lines, install an irrigation system, construct roads and fences and bring electricity to the site. Building activities funded under this appropriation included the construction of a foreman's cottage (Building 018) and various other smaller utilitarian/service structures, preliminary work on the Range 1 greenhouses and headhouses, and the horticultural laboratory (Building 004), and the drawing up of plans for a cold storage building (Building 002, which was not built until 1939). The siting of these first buildings does not appear to have been based on any plan.

Figure 33 - Sellman House, Building 023, 1938

Because they were relatively fast to construct, the service buildings appear to have been the first structures actually completed on the North Farm. Most of these buildings, and all of the surviving examples, were located about three-quarters of a mile west of what was to become the main laboratory/office area along Route 1. This area, between the greenhouse area and the Sellman House (Building 023)[326] was never given an official name although it (and/or the later service grouping to its west) was occasionally referred to as the farmhouse group (a reference to Building 023), the field station group, or (later) the north service area. Service Buildings known to be constructed during this first period that are still extant include the Bank Storage Buildings (Buildings 038, 039, and 040), the Sweet Potato Storage Building (Building 035) three garages/storage buildings (Buildings 033, 034, and 037), and a soil and fertilizer house (Building

[326]A few early service buildings (since demolished) were located near Building 006 and a few were constructed to the west of the east section of Range 1. The latter buildings were either demolished or incorporated into the existing building.

036).[327]

From early December 1933 to April 1934, Civil Works Administration (CWA) labor provided improvements to the site valued at $95,467. The largest items funded by the CWA were for tile draining approximately 200 acres and for the construction of ditches to divert drainage water. Other items funded through the CWA include building and repairing roads and bridges, cutting fire guards along property lines, clearing woodland, selective thinning of trees, repairing existing buildings on the site, removing ditch banks, digging gas and water lines and a sewage disposal system, moving propagating equipment and 2,500 feet of Skinner irrigating system, excavating for new buildings, making fences posts and erecting fences, terracing and grading 25 acres of land to prevent erosion, cleaning and straightening three miles of ditches and improving the bed of Paint Branch Creek (as well as building levees along its banks).[328] The work relating to flood control along the Paint Branch was aimed at preserving land along the creek, which had been subject to erosion due to flooding. It was described in one source as an "opportunity for testing new methods of flood fighting."[329]

PWA funds for 1935, which amounted to $361,793, were used to complete the Horticultural Laboratory and Range 1 greenhouses. New projects for the year included constructing the Fruit Products Laboratory (Building 006).

In 1938, the Station's boundaries were expanded as it was assigned the "University of Maryland" tract consisting of 262.87 acres and "Toomb's Tract" of 48.05 acres owned by the Resettlement Administration. This land, which forms a connection between what is now the Central Farm and the North Farm, is presently referred to as the Linkage Farm.[330] Extant on the site when it was purchased were four residences (one of which was used temporarily as a library), and 13 utility buildings including implement sheds, pumphouses, and garages. None of these buildings are extant today. Perhaps because they did not own the land, the Bureau of Plant Industry never constructed new buildings on the site.[331]

The second wave of construction at the Plant Industry Station also occurred around 1938-39. The Range 2 Greenhouses and the cold storage building were all completed around this period using mostly PWA funds. Also around 1938, a new service area was planned for an area to the west of the existing service area (i.e., to the west of Building 023). The impetus for moving the center of service activities farther to

---

[327]Because the early service buildings are described only generally, for instance as "garages" or "implement sheds" it is difficult to definitely identify the buildings. Other buildings which may have been part of this building period include Buildings 031, 032, and 13A (moved).

[328]H.P. Gould, "The United States Horticultural Field Station, Beltsville, Maryland Early History." 1937, NARA, RG 54, Entry 151A, Box 1.

[329]"Beltsville Agricultural Research Center Does Well a Multitude of Duties," *The Washington Post*, February 20, 1938.

[330]At the time, the area was referred to as the East Farm.

[331] This area has always had relatively few built structures on it. In 1970, the National Agricultural Library was constructed facing Route 1 and for many years it was the only building on the site. When it is completed, the USDA Office Complex, now under construction, will be the second major structure on the Linkage Farm.

the west is not clear, however it seems likely that there was a desire to concentrate service buildings in a more remote area not visible from the main North Farm Buildings.[332] PWA and WPA monies had been secured for two buildings, a Washroom/Lavatory (Building 030) and Farm Storage Building "B" (Building 29A). These monies needed to be expended quickly in order to preserve the appropriation. A memo dated August 6, 1938 from E.C. Auchter, Chief of the Bureau of Plant Industry set out the layout for the new service area.

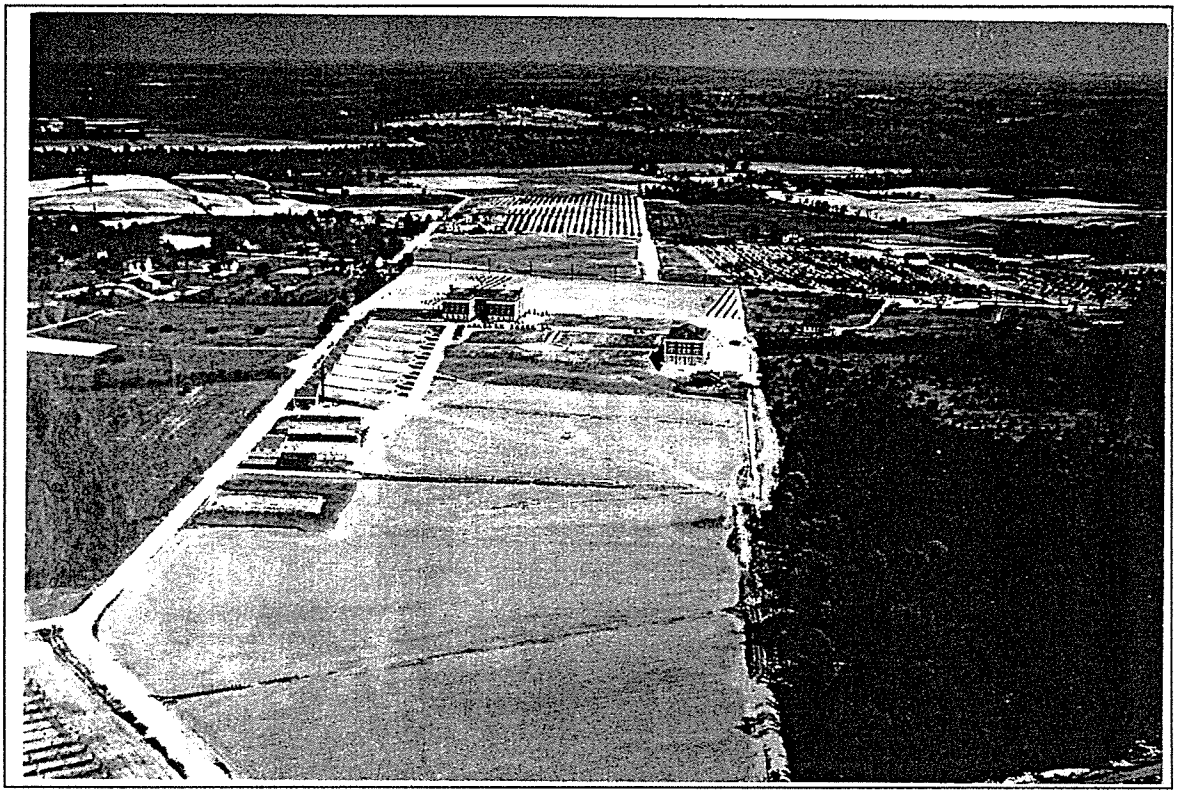


Figure 34 - Bureau of Plant Industry area, aerial view, 1936

> *Principal problem is new location for barns, shops, etc. If the site back of [Sellman] house which we all saw Sunday is O.K. [Superintendent of the Plant Industry Station J.H.] Beattie could use the W.P.A. Grading-Terracing-Leveling item and get in a steam shovel and truck and level that area if CCC camp will not do it. He could buy some cinder blocks etc. from PWA and that would constitute a start by August 15th. Both the men's building and storage shed should go back there. If we could get a plan for the whole area at once so we would know where these two minor*

[332]It is interesting to note at approximately the same time, other federal agencies were experimenting with the proper design for service areas. In the 1920s and 1930s, at the National Park Service, the concept of clustering all maintenance-related facilities together in a single location gained favor. A typical ensemble included stables, equipment sheds, a garage, a warehouse, shops for machinery, blacksmithing, electrical work, painting, plumbing, and carpentry. The buildings themselves were arranged for maximum efficiency and were usually located on side roads, out of the way of the park visitors. The areas were often rectilinear with long, narrow buildings located around the periphery of the rectangle and within the rectangle in parallel rows.

buildings should be placed - elevation, etc. I suppose a plan would be somewhat as follows.[333]

The accompanying sketch shows a U-shaped court arrangement of buildings some of which, like current Buildings 029 and 029A, are set in a hill and have a basement ground level on one site and a second floor ground level on the other. A later more formal version of this plan, shows a rectangular area (longer north/south than east/west), with three lines of planned buildings running parallel to Building 029A and 030. At least two shorter buildings were planned for the site of current Building 029. The plan was centered on the axis of Building 023 (the Superintendent's Residence).

Contemporary with the initial construction at the North Service Area, two new service buildings, a farm storage building (Building 012) and the central heating plant (Building 014), were located slightly to the west of Range 2.[334] The placement of these two buildings was informed to some degree by a 1938 master plan of the main portion of the North Farm.[335]

Around September, 1938, Malcom Kirkpatrick of the Department of Interior was detailed to the Department of Agriculture to prepare a development plan for part of the North Farm. His plan covered a triangular piece of land the wide (east) portion of which was along Route 1. The plan ended at a point to the west which is currently the site of the heating plant. The plan is extremely formal in design with a number of tree-lined allees leading from Route 1 and numerous circular open areas. Unfortunately, the plan was completed before the site was greatly expanded as a result of the Arlington Relocation project. Although it correctly assumed that additional property would be acquired to the south of the Bureau's actual holdings at the time along Route 1, it did not predict that additional property would also be acquired to the north. Thus the shape of the land included in Kirkpatrick's plan was significantly different from that finally acquired by the Bureau. This greatly limited its utility for the Bureau after the new land was acquired.

The next major flurry of development came as a result of the closing of Arlington Farm. Pressure to release the Arlington land had increased dramatically as defense activities expanded in the late 1930s, and the Department continually lobbied Congress for funds to move the Arlington facility.[336] Finally, on

---

[333]Letter from E.C. Auchter, August 6, 1938. National Archives and Records Administration RG 54, Entry 151A, Box 1.

[334]Both buildings apparently needed to be located fairly close to the main part of the farm. The farm service building was the original, central section of Building 012 (referred to as Farm Service Building "C"). The Central Heating Plant was also significantly enlarged four years later.

[335] The master plan called for the two buildings to be located slightly closer to the Range 2 greenhouses than they were finally located but the relationship between the two buildings was more or less set out in the master plan.

[336]Officially, the Bureau strongly resisted moving at least up through 1943. They argued that the closeness of the Arlington site to Washington permitted upper-level scientists with administrative responsibilities to move back and forth quickly. The 35- to 45-minute commute to Beltsville did not compare favorably with the 15-minute commute to Arlington. According to a 1934 memo, "The loss of time resulting from this situation would greatly decrease the efficiency of the work by the higher grade employees of the Bureau . . ." (NARA, RG 17, Entry 16 (1934), Box 1933).

October 1940, an appropriation in the Department of War's budget was approved to provide $3.2 million for the relocation of Arlington Station. The appropriation was to have a sweeping effect on the Plant Industry Station and was to permanently establish the size and layout of the North and South farms. It was used for the acquisition of 606 acres of additional land (at the North and South Farms) and for the construction of most of the major buildings and many of the minor buildings on the North and South Farms.

In terms of the land acquired with the funds, approximately 227 acres were added to the North Farm and 375 acres were pieced together to form the South Farm.[337] The South Farm land was acquired between 1941 and 1943 in five different parcels (having four owners). The largest tracts, both acquired in 1941, were the Heitmuller Tract (196 acres) and the Boteler Tract (119 acres). Both parcels were being farmed and although both originally had two houses on them, only one of the Heitmuller houses survived until the recent past. [338]

The North Farm parcels expanded the site to the south and west and roughly doubled the Bureau's holdings along Route 1. Two houses came along with the new North Farm purchases. One, Building 017, was on the Brown property, about 100 feet south of Building 001. It was moved on skids to its present location soon after its purchase. Another house (the Frey house) was moved to a site on the north side of the property and was subsequently demolished.

With the anticipated expansion of land and buildings relating to the Arlington Relocation, a new master plan was prepared in 1941 by the Bureau of Agricultural Engineering. It located a number of the buildings that were constructed around this time and set out locations for many buildings that were never constructed. In addition to showing Buildings 001 through 007 on their current sites and the current general layout of the entrance area, the plan called for future buildings to be located in groupings to the west of, and between, Buildings 001 through 005. Quadrangles consisting of two facing buildings were to be located at the north and south ends of the area, Buildings were also planned in an area set back from, and between, Buildings 001 and 002 and between Buildings 004 and 005. Overall, the plan was formal, and classically symmetrical in its organization of buildings and landscape.[339] An existing hexagonal cooling pond with fountains, located behind where Building 003 was constructed, was a centerpiece of the design.

Arlington Relocation monies funded the following major buildings on the North and South Farms:

---

[337]In 1940, purchases included: Frey (26.431 acres). In 1941, purchases included: Boteler (119.155 acres), Brown (19.494 acres), Gatti (66.897 acres), Heitmuller (196.235 acres), McCoy (32.962 acres), Mills (97.683 acres), Moser (4.1298 acres), Nichols (14.298 acres). In 1942, purchases included: Walker (26.936 acres). In 1943, purchases included: McCoy (.146 acres). (See "Removal and Reestablishment of Arlington Farm," NARA, RG 54 Entry 151A, Box 1.)

[338] One of the Heitmuller houses was demolished in 1941 or early 1942 and the Boteler houses were demolished thereafter. The Heitmuller Tract was purchased by the government from the family of W. Charles Heitmuller. Heitmuller, a Washington resident who was involved in real estate in the area, purchased the land in 1907 and rented it for farm use. During his ownership of the property, approximately half of the land was tillable acreage, with the other half being woods.

[339]The very large size of the plan prohibits its reproduction in this document.

South Building (Building 001)
North Building (Building 005)
Administration Building (Building 003)
Soils Building (Building 007)

Range 3 Greenhouses and Headhouses (Building 009)
Service Building "D" (Building 060)
Service Building "E" (Building 029)
Tobacco Barn (Building 028)
Threshing Barn (Building 062)[340]

In addition, the appropriation funded the expansion of the Headquarters Farm Service Building (Building 012) and the heating plant, and the outfitting of part of Building "E" for mushroom production (all on the North Farm) and construction of miscellaneous service buildings (on the South Farm).

The many new labs and offices funded under this appropriation were arranged in a symmetrical arrangement along Route 1, loosely following earlier master plans. Most service buildings were located at the North and South Service areas. Because of the distance between the two farms and the large cultivated area on each, service areas were clearly necessary on both. To some extent the square footage of certain types of space was simply divided between the two areas. (For instance, 720 square feet of paint shop space was thought to be needed on the South Farm and 960 square feet of such space was thought to be needed on the North Farm.) In other cases, however, the site for a specific service function/building appears to have been largely arbitrary.

[340]Arlington Relocation Documents, NARA, RG 54, Entry 151A.

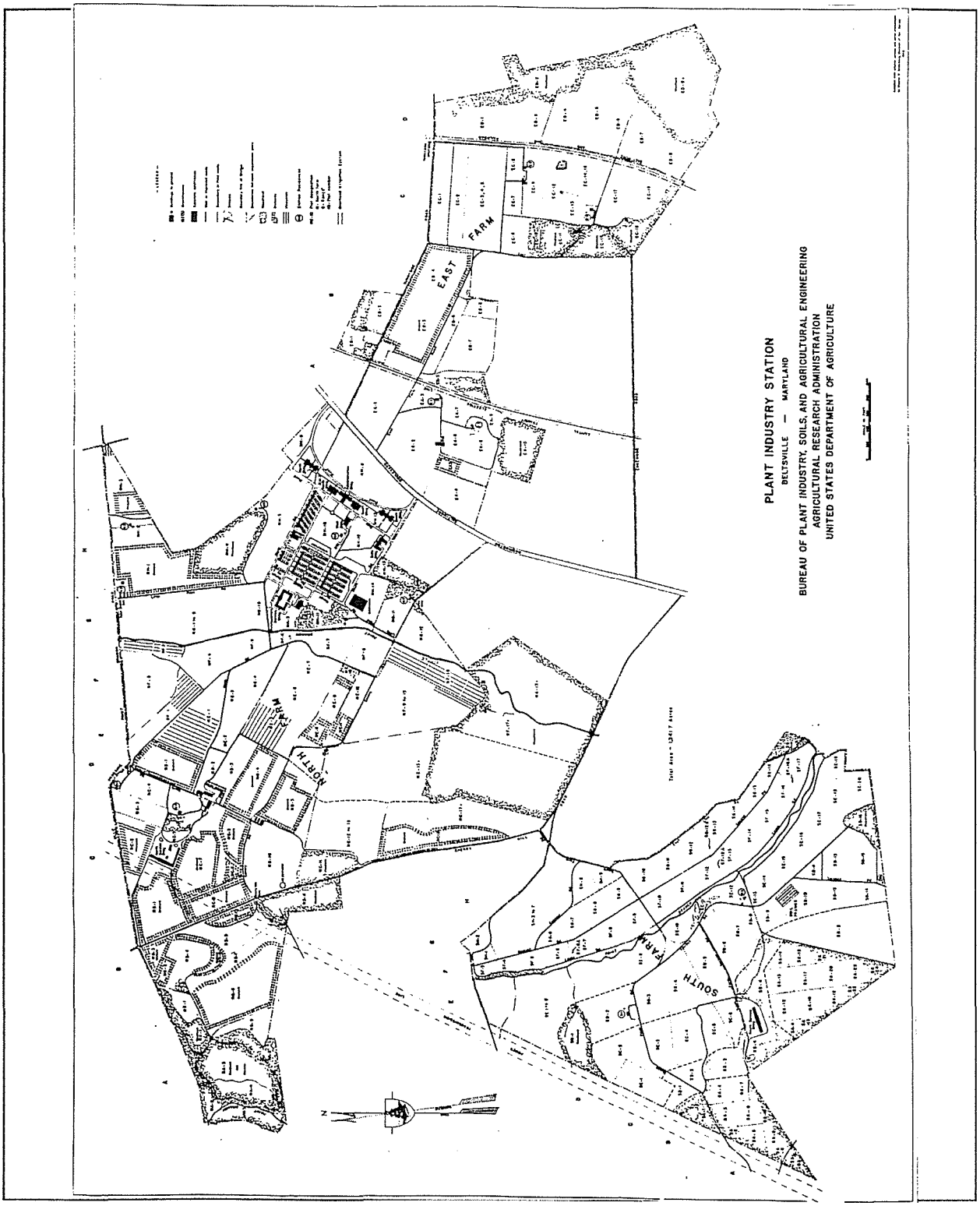


Figure 35 - Bureau of Plant Industry land (North, South, and Linkage Farms), site plan, 1943

Construction of both the major and minor buildings proceeded as fast as possible given wartime shortages, and on January 30, 1942, facilities were close enough to completion that jurisdiction of the Arlington Farm site was turned over to the War Department. (Portions of the site had been released earlier.) With the construction of the Arlington Farm replacement buildings, all of the Divisions of the Bureau of Plant Industry were moved to Beltsville (Figure 35). Work on cereal crops, tobacco, forage crops, and fertilizer joined the existing cold-storage, fruit-breeding, pharmacological, and nematology work already being conducted at the site. Six months later, the Plant Industry Station became an independent financial unit on a Division basis. By 1944, when all of the construction was completed, there were a total of 135 employees at the station, and the Plant Industry Station's budget was $48,550,000 with $349,400 in reimbursable work for other Divisions.

4.3.2 Architectural Development of the Bureau of Plant Industry Sites

Architecturally, the research and office buildings of the North Farm, the dominant buildings on the Bureau of Plant Industry sites, represent an unusually cohesive collection of Georgian Revival buildings spanning the years from 1935 to 1950. The endurance of both the Georgian Revival stylistic vocabulary and the accompanying palette of materials (brick walls, slate roofs, stone detailing) for a variety of types of buildings over the years is unusual.

Service buildings on what are now the North and South Farms, however, followed a different architectural line. Most of the early service buildings were small wood structures with gabled roofs. Exceptions were the bank storage buildings (the Potato House, Bulb House and Fruit storage/nursery stock house). Because of their partially subterranean design, they were constructed of rock-faced concrete block. Later service buildings, in particular those located at the North and South Service areas, were architecturally related. Most of the larger buildings at both sites, constructed c. 1942, were completed in an expedited fashion using utilitarian concrete-block construction. However, they too carried over a few minor classical decorative elements that do provide a tie to the other Georgian Revival buildings on the North Farm.

In terms of the design of the buildings, plans for most major buildings were designed by the Department of Agriculture's Bureau of Agricultural Engineering, Division of Plans and Service. The Division of Plans and Services, in addition to preparing plans for all buildings, also prepared specifications and cost estimates. The Coordinator of the BRC Construction Program acted as a intermediary between the Division of Plans and Services and the program offices. Designated individuals from each of the Bureaus determined program and budget for each of the new buildings.

Minor buildings on the North Farm, including all of the early small service buildings (garages, storage buildings, etc.) were designed by personnel from the Bureau of Plant Industry. In this category also was one of the most unique structures on the North Farm, a log cabin located on the far west end of the North Farm now close to, or on, the Capital Beltway. This vernacular structure (Figure 36), which is no longer standing, was designed by Bureau of Plant Industry scientist J. A. Beattie. It apparently was used for recreational purposes by employees.

In general, the North and South Farms remain largely intact to their early (1930s to 1940s) character.

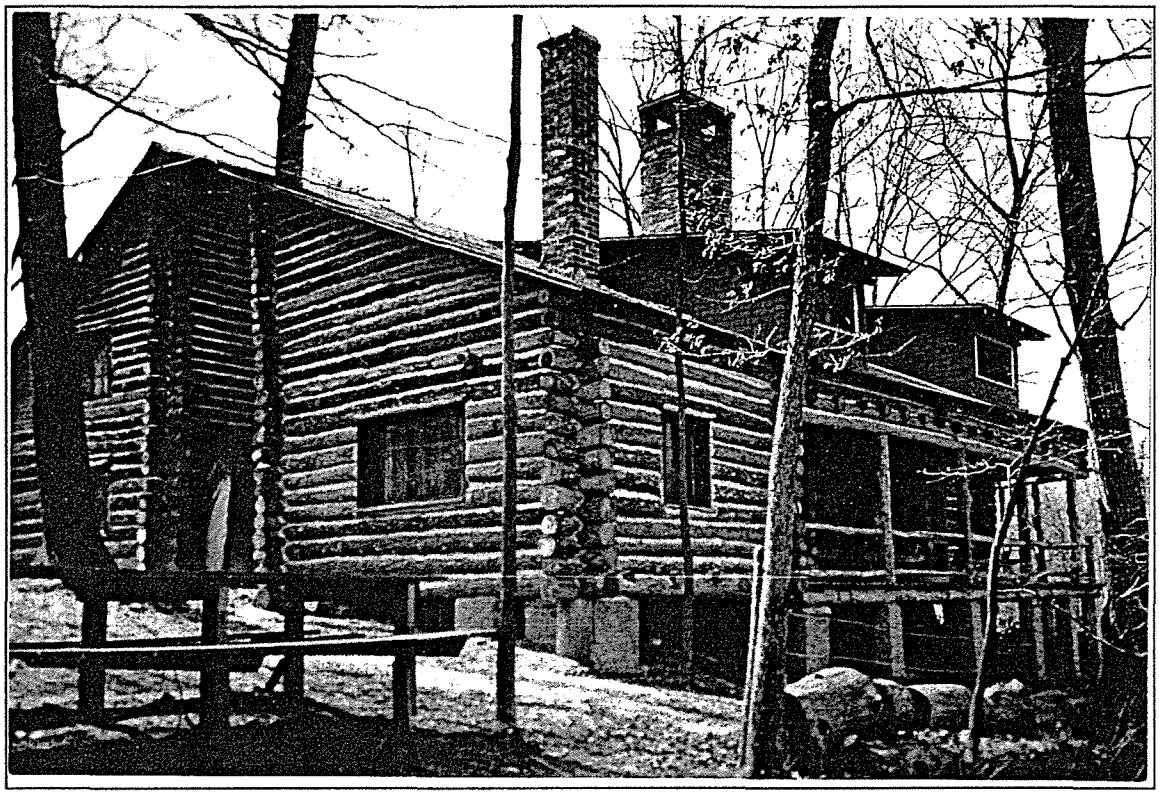


Figure 36 - Log building on North Farm, no date

4.3.3 The Work of the Bureau of Plant Industry

The work of the Bureau is best summarized by a Bureau of Plant Industry scientist who is quoted in a 1953 *National Geographic* article as saying, "In any research, a scientist must ask three questions: How can it be made better? How can it be made cheaper? Can something new be made?"[341] The Bureau's work, spanning over 50 years, brought agricultural research from science based largely on observation into the world of modern science. The Bureau's research over this period was voluminous and much of it represented important stepping stones for agriculture and/or scientific research in general.

One example of the Bureau's formative early research, dating to the turn of the century, is research on cotton plants raised in wilt-infested soil. This work involved selecting individual plants that resisted the wilt, and was one of the first scientific applications of Darwin's principle of the survival of the fittest. Another example of the Bureau's early (1920) research was the discovery of the effect that photoperiod (the time a plant is exposed to light) has on fruiting and flowering. Prior to this research, the relationship between plant development (including flowering) and the relative length of day and night was not known.

Another rather romantic aspect of the Bureau's early research was the work of the plant explorers. From

[341]Matthews, "Beltsville Brings Science to the Farm," p. 200.

the earliest days of the Bureau, researchers traveled to remote parts of the earth seeking out new plants. A number of these plant explorers, such as Frank N. Meyer who died mysteriously in China, became famous through magazine articles and books.

Both of these formative types of research were picked up in later years in the work of the Bureau. For instance, the work related to photoperiodism was picked up in the seminal work of Harry Borthwick whose work at Beltsville led to the discovery and isolation in 1959 of phytochrome. Phytochrome is the light-absorbing pigment in plants that triggers development. The groundbreaking work related to the effect that various amounts and colors of light has on plant growth. Similarly, the work of the early plant explorers had its modern-day counterpart in, for instance, the development of a world-wide collection of small grain germplasm which was housed for many years at the Beltsville facility.

Throughout its history, much of the Bureau's research related in some respect to improving growing stock. Qualities sought out included disease resistance, eating quality, high yield, and keeping and shipping qualities. Many of the varieties of soy beans in commercial use today, modern commercial blueberries, many currently used varieties of potatoes, Easter lilies, and zoysia turf, as well as the important forage crop lespedeza, to name a few, all had their origin in research conducted by the Bureau of Plant Industry much of which was conducted at the North Farm. Illustrative of this research is the Bureau's blueberry work. The blueberry was one of the last major fruit crops to be domesticated; Bureau scientists first from Arlington, and later from Beltsville, were responsible for not only developing the modern commercial varieties of blueberries, but also for extending the range and soil types in which blueberries could be grown. Some of the experimental crossing of blueberry plants was conducted in Beltsville.

During World War II, much of the Department's work turned towards the war effort. Its major goal was to decrease the United States' dependence on imports from Europe and Asia. Research by the Bureau of Plant Industry produced the first American Easter lily bulbs, which had previously been imported from Japan. Chemists of the Bureau developed a method by which an American magnesium compound could be substituted for the magnesium used in fertilizer, which was imported from Germany. Similarly, domestic muriate of potash was found to be a good substitute for the imported potassium sulfate used for potato crops. Bureau scientists also worked to prevent a reoccurrence of a World War I shortage of sugar-beet seeds by encouraging the production of American sugar-beet seeds. Other efforts related to the production of tung oil (which had previously been imported exclusively from China), and rubber (which was the subject of experiments in Florida and South America).

After the war, new emphases in research were on plant growth regulators (such as 2-4-D, which was developed at Beltsville), and the use of radioactive tracers to conduct plant nutrition studies. Beltsville housed a unique research laboratory (Building 008), paid for by the Atomic Energy Commission, which was designed for the study of radioisotopes. With the new facility, Beltsville was to become a center for the production of fertilizers incorporating radioactive trace elements, which were used by research agencies throughout the country. It also became a center of expertise on the proper use and handling of radioisotopes for soil-related research. Work made possible by the Beltsville facility resulted in important discoveries relating to how plants take up various nutrients in different soils.

4.4 BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

4.4.1 History of the Bureau of Entomology and Plant Quarantine

The Bureau of Entomology and Plant Quarantine facilities at Beltsville were established in the mid-1930s, during the public works-funded expansion of the Department of Agriculture's activities at the site. The collection of buildings constructed to house the Bureau contained offices and research areas for six different divisions that had been conducting research at leased facilities in a number of locations around the mid-Atlantic area: cereal and forage insect studies at Arlington Farms in Virginia, and also in Carlisle, Pennsylvania; basic studies on insects in Takoma Park, Maryland; bee culture in Somerset (Chevy Chase), Maryland; and investigations on insects injurious to greenhouse plants downtown on the Mall in the greenhouses, shops, and Temporary Building "C." The new area at Beltsville, located on a 60-acre tract to the east of the Zoology Area, brought the work of these several different divisions of the bureau together.

While the work at Beltsville concerned both actual research and the supervision of activities of entomology research laboratories located throughout the United States, only a small percent of federal research in entomology was actually conducted at BARC. By the mid-1940s, the Bureau was conducting research in some 115 field laboratories in 33 states, Hawaii, Mexico, the Canal Zone, and Uruguay, and carrying out control and regulatory activities related to plant quarantines and restrictive orders at 331 field offices located in 42 states and the District of Columbia, Alaska, Hawaii, Puerto Rico, and Mexico.[342] The most significant research conducted at Beltsville by this Bureau concerned the Division of Bee Culture, which had its national headquarters at this new complex of buildings.

The master planning efforts underway at Beltsville in the early and mid-1930s had resulted in ongoing meetings among the directors of the various bureaus, to discuss issues of planning and development in general at the site. Of the items discussed, that of primary concern to the Bureau of Entomology was the placement/siting of buildings in close proximity to one another—to maximize the possible cooperation amidst research initiatives.[343] The Entomology bureau chief specifically requested that the buildings to be used by the Bureaus of Entomology, Chemistry and Soils, and Food and Drug Administration be grouped together, a proposal that was not ultimately adopted—despite the fact that these departments did work together on a number of important initiatives (Figure 37).

---

[342] *The Agricultural Research Center of the United States Department of Agriculture, Agricultural Handbook No. 43*, p. 22, n.d. [c. 1949 or 1950]; "United States Department of Agriculture, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine," a pamphlet prepared for distribution to 4-H Club members visiting the Agricultural Research Center at Beltsville, June 12, 1946," National Agricultural Library.

[343] Avery S. Hoyt, Acting Chief of Bureau, to Mr. W.A. Jump, Director of Finance, February 12, 1935. NARA, RG 7, Entry 8, Box 115.

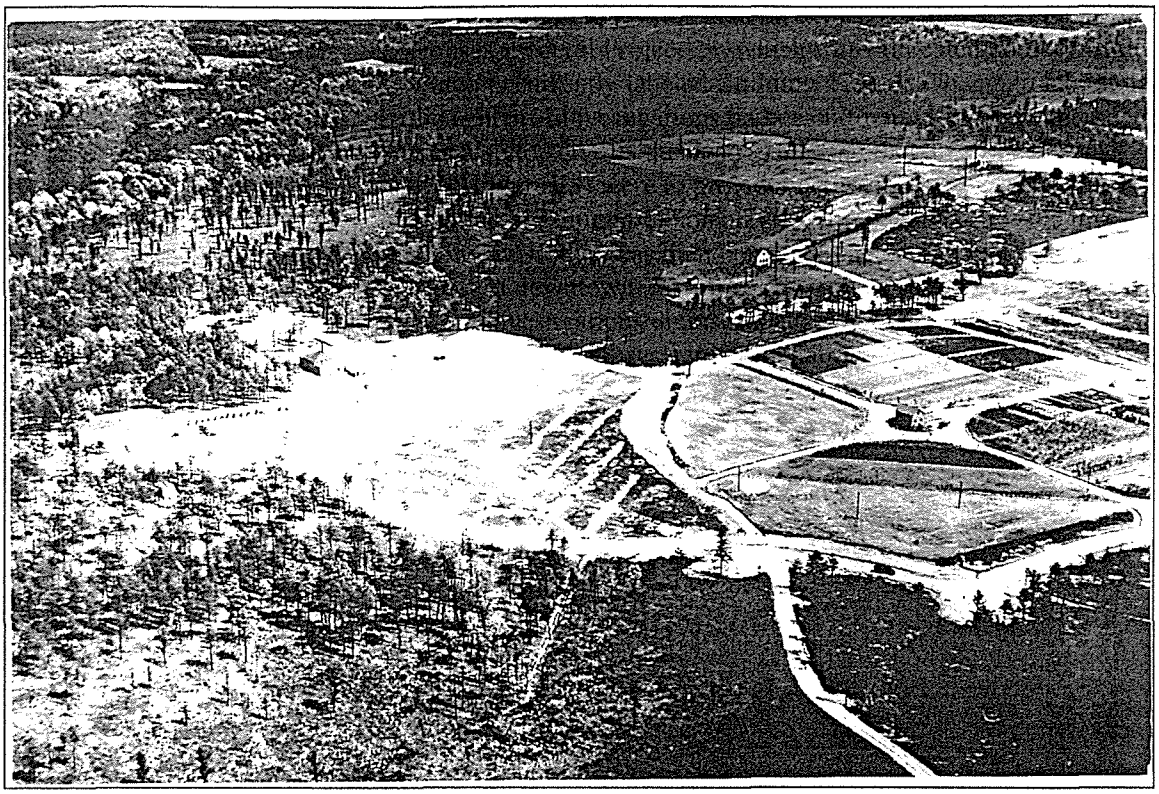


Figure 37 - Entomology area (left center) and CCC Nursery (right center), aerial view, 1936

The initial building program for the new Entomology complex at Beltsville was ambitious. It called for a main laboratory building, five insectaries, a greenhouse and headhouse, a garage, an animal barn, a poultry house, and a fumigation house. For all these buildings, and also for roads, walks, and utility connections, an appropriation of $132,000 was requested. The main laboratory building, which was to set the stylistic precedent for the other structures of the complex, was initially conceived to be of concrete-block construction with a stucco finish and a tile roof, similar to the buildings of the Dairy Industry section. This design style, however, was not ultimately followed, as the final building complex was faced in brick and Georgian in its detailing.[344]

Three buildings were funded by the P.W.A. emergency relief program for the initial phase of construction, which continued through 1934 and into 1935. Sketch plans for the buildings were initially drawn up by staff from the Bureau of Entomology, and from those, plans and specifications were prepared by the Bureau of Agricultural Engineering. J.E. Miller was the Architect in Charge of the P.W.A. Projects within the Bureau of Agricultural Engineering. The three projects were the Main Laboratory Building (Laboratory A), which was Federal Project 20A, allocated at $85,000 (Building 476); the Headhouse and

[344]S.A. Rohwer, "Memorandum Re Funds Allotted to the Bureau of Entomology for Buildings at Beltsville, Md.," n.d. (c. 1933), NARA, RG 7, Entry 8, Box 115, USDA, BEPQ Newsletter for August 1935, Vol. II, No. 10, October 1, 1935, NARA, RG 7, Entry 7, Box 3.

Greenhouses, which was Federal Project 22, allocated at $44,000 (Building 470); and the Mushroom Houses, Federal Project 23, which were allocated $6,000 (Buildings 473 and 474, connected by a hyphen, which is currently labeled Building 475).[345] The main laboratory building (Building 476) was to serve as the center of investigations on bee culture, which were then being carried out at Somerset, Maryland; it was also to serve as the headquarters of that division. The headhouse and greenhouses (Building 470)(Figure 38) were to provide facilities for the basic studies on insects that were then being conducted in a rented building in Takoma Park, Maryland, and for the investigations on insects injurious to greenhouse plants, work that was then being conducted on the department grounds at Constitution Avenue and 12th Street in downtown Washington. The Mushroom Houses (Buildings 473 through 475) were designed to house investigations on insects attacking mushrooms, work that had previously been conducted primarily in commercial houses across the nation.

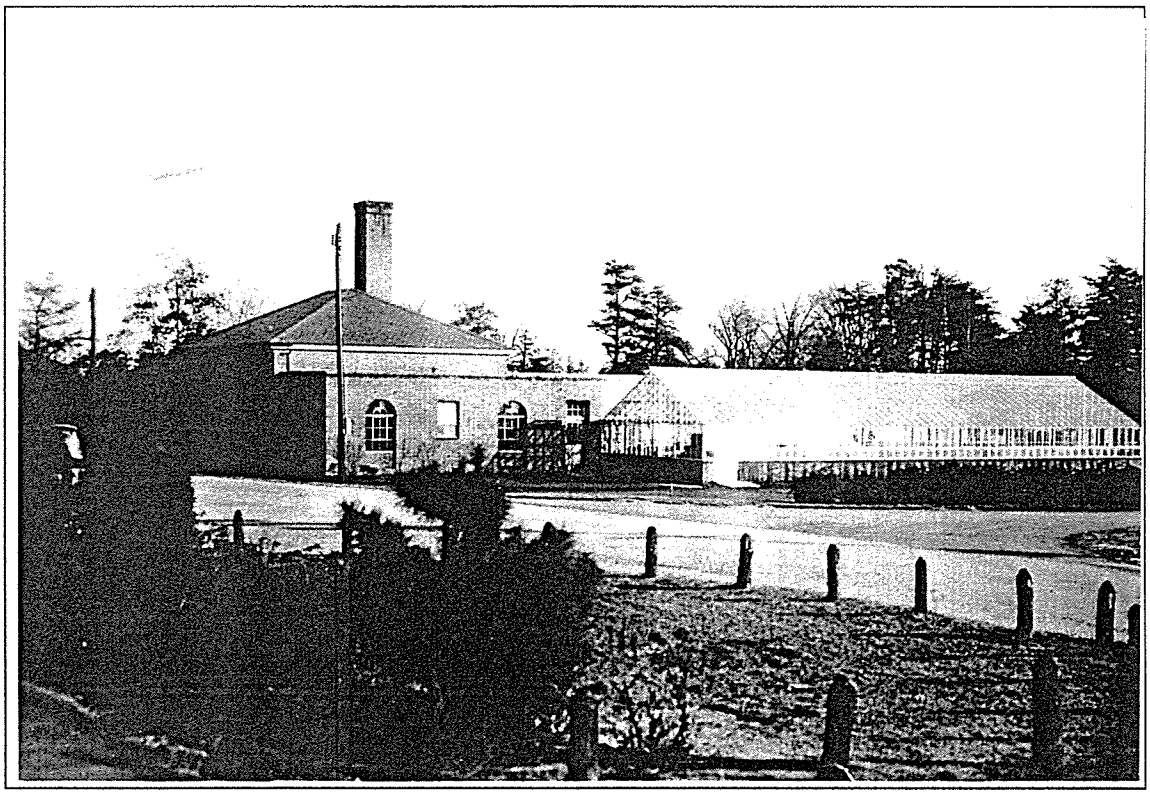


Figure 38 - Building 470, 1939

Similar to the design efforts for other areas of the Beltsville Agricultural Research Center, the architectural design plan for the Entomology area was carefully orchestrated to create a uniform aesthetic. This attention to detail applied especially to color; specific requests were made of the contractor to provide particular colors for the brickwork, the asphalt roof tiles, and the wood and metal trim of the buildings.

---

[345]Lee A. Strong, Chief of Bureau of Entomology, to S.H. McCrory, Chief of Bureau of Agricultural Engineering, May 2, 1934, NARA, RG 8, Entry 19, Box 308.

Requests were made, for example, for two shades of "dark mottled olive green" asphalt tile samples in the specifications for the Entomology buildings.[346]

The 60-acre site allotted to the department featured a natural lake at the north east corner of the site, around which the buildings were grouped. On January 1, 1935, the main laboratory, the greenhouses and headhouse, and the mushroom houses were all under construction.[347] Completion was planned for July 1, 1935, when the first personnel from the Bureau, totaling about 26 men, would be stationed at Beltsville; the buildings were not ultimately ready for occupation until the fall.[348] Since all of the divisions had space in the Main Laboratory Building (Building 476), additional space for supplies was in high demand. The Bee Culture research section's bee keeping equipment and supplies were stored in two wooden structures and a tin garage that had been transported from the Somerset location. A number of temporary, wood structures dotted the site during the first decades of its use.

As the buildings were being erected at Beltsville, the Civilian Conservation Corps stationed at the site began to prepare the area for Entomology's use. This work entailed creating about one mile of road to connect the project with the East-West Road (now Powder Mill Road) of the Beltsville Research Center; placing about 1 1/4 miles of woven wire fencing, four feet high, on steel posts with gates around the tract; and laying about 4,500 feet of pipe trench to connect the buildings to the water supply system of the Research Center. The CCC also began preparing about three acres of experimental nursery plots, and an extensive landscaping plan, which included fine grading, soil preparation, seeding or sodding, and moving or planting trees or shrubs.[349] By 1936, the CCC had completed clearing the underbrush from the area, and Hambleton was already discussing the possibility of establishing an arboretum on a major portion of the land, to include a "wide variety of coniferous and deciduous trees, shrubs, etc."[350] There was no money for planting the land in either case, but Hambleton was hopeful that help could be found from CCC, Forest Service, BPI, and from others without much cost.

> *The question to be decided, of course, is whether or not a laboratory arboretum of this kind would be an asset to the Bureau. The area contains a lake and several streams and it is quite conceivable that some other research unit might want the natural facilities existing here, particularly if they were not being utilized by the Bureau. The starting of a project such as an arboretum, or having such a project in view would help the Bureau to retain its hold upon the*

---

[346]J.E. Miller to North-Eastern Construction Company, November 30, 1934, NARA, RG 8, Entry 19, Box 317.

[347]S.A. Rohwer, Acting Chief of Bureau, to Secretary of Agriculture, October 25, 1934, NARA, RG 7, Entry 8, Box 115.

[348]Avery S. Hoyt, Acting Chief of Bureau, to Mr. W.A. Jump, Director of Finance, February 12, 1935, NARA, RG 7, Entry 8, Box 115.

[349]S.A. Rohwer, Acting Chief of Bureau to Mr. E.C. Butterfield, Director, Beltsville Research Center, December 14, 1934, NARA, RG 7, Entry 8, Box 115.

[350]James I. Hambleton, Chairman, Bureau's Committee, National Agricultural Research Center to Mr. Lee A. Strong, Chief of Bureau, April 4, 1936, NARA, RG 7, Entry 31, Box 593.

trips out to visit the site.[355] Because the Beltsville site focused principally on serving those customers who requested information, there was no specific program of research or activity outlined for each year.

Prior to the move to Beltsville, research activities related to bees had been located since the early 1920s in Somerset (Chevy Chase), Maryland; the Somerset laboratory had also served as the administrative headquarters of the Division of Bee Culture, which had regional laboratories in a couple of other areas of the country. Among the research problems studied in Somerset were the habits and diseases of bees, methods of handling honey, its floral sources, and the breeding of desirable strains of bees by controlled mating.[356] Although the Somerset facilities were considered inadequate by the staff, the employees were not excited about moving to Beltsville; they considered the location a poor one in terms of "availability of nectar and pollen in the vicinity of Washington."[357] There were practically no native honey plants in the Beltsville area; the wooded areas consisted largely of oaks, hickories, pines, and blighted chestnuts—not the tulip poplars, maples, and willows better suited to supporting bee colonies. The distance from the Potomac was also cited as a reason for the poor pasturage. The head of the division did concede that:

> *It might be possible to overcome some of the difficulties by planting an area of from 50 to 100 acres in nectar-producing plants. In actual practice, however, pasturage is never planted especially for honeybees. In a case of this kind it would be done only as a dire necessity and the doing of such in itself would constitute an experiment.*[358]

The lack of adequate pasturage for the bees was noted also by Eleanor Roosevelt in one of her newspaper columns, after a visit to Beltsville (Figure 39):

---

[355]Annual Report, 1940, NARA, RG 7, Entry 21, Box 193.

[356]S.A. Rohwer, "Memorandum Re Funds Allotted to the Bureau of Entomology for Buildings at Beltsville, Md.," n.d. (c. 1933), NARA, RG 7, Entry 8, Box 115.

[357]James I. Hambleton, Senior Apiculturist, to S.A. Rohwer, Assistant Chief, Bureau of Entomology, September 28, 1933, NARA, RG 7, Entry 8, Box 115.

[358]James I. Hambleton, Senior Apiculturist, to Lee A. Strong, Chief, Bureau of Entomology, November 2, 1933, NARA, RG 7, Entry 8, Box 115.

Left to right, Mrs. Morgenthau, Mrs. Roosevelt and Mrs. Wallace don nets to view the prize bees at Beltsville, under guidance of James J. Hambleton, principal agriculturist. The bees, according to Mrs. Roosevelt's column, were cross.

Figure 39 - Eleanor Roosevelt visiting the Bureau of Entomology and Plant Quarantine Facilities at Beltsville, no date

> *... I learned something I never knew before, namely, that the lack of wild flowers is a great detriment to the bees' diet. At Beltsville, they have not as yet produced enough fields of clover and wild flowers, so the bees are hungry and cross in consequence.*[359]

By the mid-1930s, when it was established in its new Beltsville location, the Bee Culture Investigations division served principally as a national clearing house for information on beekeeping. The division was also charged with conducting research devoted to breeding and disease problems. Breeding investigations focused on determining desirable characteristics in honeybees, the possibility of combining such characteristics, and the maintenance of a "reservoir of desired breeding stock." Work on bee disease included studies of the contagious diseases American and European foulbrood, a fatal bee infection that annually destroyed thousands of colonies. Disease samples submitted from all over the United States were given thorough diagnoses in the laboratory. Under the Honeybee Inspection Act of 1922, the department also conducted the rigid inspection of all overseas importation of adult honeybees.[360]

---

[359]Eleanor Roosevelt, "My Day: The Bees are Hungry and Cross," NARA, RG 16, Entry 32, Box 1.

[360]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936," NARA, RG 16, Entry 32, Box 1.

During World War II, the demands of the division were greatly increased, as the need for technical information to safeguard and regulate the industry became crucial. Many individuals enrolling in military service had to abandon their bees, others were forced out of beekeeping because of limited supplies. Because of the critical need for food production to be maintained at full capacity, the government felt it essential to keep seed and fruit production at its maximums—and in conjunction to mobilize the beekeeping industry for pollination of essential crops and for wartime honey production (to help alleviate the sugar shortage). James Hambleton was the head of the Bee Culture division, headquartered at Somerset and then subsequently at Beltsville (Figure 40). In 1943, he lectured to the Entomology Society of America and also to the Washington Entomology Society on the significance of apiculture in the war effort.[361] Author of a 1935 article on bees for *National Geographic*, Hambleton continued to write and speak about the importance of bee culture.

Figure 40 - Bee Yard at Entomology area, no date

The wartime increase in inquiries and correspondence necessitated maintaining a good reference library close at hand to the department headquarters. In March of 1942, the library of the Bureau of Entomology and Plant Quarantine was consolidated with that of the USDA, becoming a branch of the Beltsville Research Center library. Complete sets of the *Journal of Agricultural Research* and the *Experimental*

[361]Division of Bee Culture Quarterly Report, October - December 1943, NARA, RG 7, Entry 21, Box 198.

Station Record were placed in the Bee Culture Library.[362] The library was located on the second floor of the main building, equipped with glass mezzanine floors and 800 feet of metal stacks, as well as a special locked room for rare books.

By the beginning of the 1940s, the Division operated four stations, including the central headquarters at Beltsville. The headquarters at Beltsville had a larger staff than at the other stations. The others were located at Laramie, Wyoming; Davis, California; and the Southern States Bee Culture Field Lab at Baton Rouge, Louisiana. Each was operated cooperatively with an agricultural college: Louisiana State University, U.C. Davis, and University of Wyoming. At the end of the decade, additional stations had been established in Madison, Wisconsin; College Station, Texas; Logan, Utah; Columbus, Ohio; and Tucson, Arizona.

Research at Beltsville during the 1940s included work by visiting fellows, such as Professor F.B. Meacham, from North Carolina State College, who studied natural matings of queen bees at Beltsville. He found that the bees ventured at least three miles from their hives over the wooded terrain. Despite the added work of wartime, the essential work conducted by the division during a sample year 1946 remained typical of that which had been undertaken throughout the previous decade at the Beltsville site:[363]

- the Library of the Bee Culture Division was critical to the principal mission of responding to public inquiry, supplying the entire country (for beekeepers, orchardists, teachers, research workers, etc.) with information on all phases of beekeeping and pollinating insects.

- the Division performed routine technical service, which "provides the only means available to the beekeepers and inspectors of most states for obtaining a laboratory diagnosis of bee disease, arsenic determination when poisoning is suspected, or the grade or floral origin of honey."

- the Division disseminated information to the general public and also to beekeepers, through talks, radio broadcasts, exhibits, movies, etc.

- the Division conducted extensive research to understanding the antibiotic properties of B. larvae (an antibiotic active against a large number of bacteria pathogenic to humans and farm animals is produced by B. larvae). A complete knowledge of its physical and chemical properties was necessary as the groundwork for studying its therapeutic value. This research was done in informal cooperation with the Bureau of Animal Industry, the Bureau of Plant Industry, and the Division of Insecticides. In subsequent years, this research was expanded to include such apiary products as pollen and propolis, as agents antibiotically active against tuberculosis.[364]

---

[362]Annual Report for 1942 (Division of Bee Culture), NARA, RG 7, Entry 21, Box 193.

[363]1946 Program of Work, NARA, RG 7, Entry 21, Box 202.

[364]Bee Culture Quarterly Report, January 1-March 31, 1949, NARA, RG 7, Entry 21, Box 194.

- the Division was also responsible for the inspection of imported bees (with the exception of those from Canada and Mexico), to prevent the entry into the U.S. of the parasitic mite Acarapis woodi. This responsibility had been shouldered by the Division since 1922, when the Honeybee Inspection Act had been passed.

4.4.2.2 Division of Control Investigations

This division was dedicated to the development of new insecticides and the improvement of methods for their application. It conducted research on the initial development of new insecticides, on the toxicity and application of insecticides then in use, and on the physiology of insects:

> *Work now underway at Beltsville includes the standardization of liquid household insecticides, the fumigation of dried beans, the action of nicotine and other insecticides as ovicide, the physiological action of nicotine on insects, and the toxicity of arsenates of calcium made under controlled conditions.*[365]

Prior to the establishment of the Beltsville center, this work had been conducted at rented facilities in Takoma Park, MD. At Takoma Park, basic problems on insect physiology and toxicology had been studied, as well as investigations on insects affecting apple, households, stored products, and poultry, and also research on the development and improvement of insecticides through the study of effects of repellents and attractants. Chemical insecticides were developed by the Bureau of Chemistry and Soils and given their preliminary tests at this laboratory.[366] The division was devoted to discovering insecticides and to increasing knowledge of the way insecticides, repellents, and attractants affect insects.

4.4.2.3 Division of Fruit Insect Investigations

The research of this particular division at Beltsville was devoted to combating the codling moth, by creating chemically treated codling-moth tree bands and by testing organic compounds that could be effective against the moth but harmless to man (a substitute for lead arsenate).[367] The codling moth was considered the most significant insect enemy of the apple. Much of the research conducted in the laboratory building was dedicated to controlling this insect. Two main methods were developed to stem the losses incurred by this insect: chemically treated bands for trees and the use of insecticides. Department chemists worked out thousands of formulas for insecticidal materials and conducted small-scale tests at Beltsville; only about a dozen of these formulas out of a thousand different ones were considered eligible for additional, larger-scale testing under commercial orchard conditions outside of Beltsville. A special method of testing, called the "apple plug" method, was devised at Beltsville for

---

[365]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936," NARA, RG 16, Entry 32, Box 1.

[366]S.A. Rohwer, "Memorandum Re Funds Allotted to the Bureau of Entomology for Buildings at Beltsville, Md.," n.d. (c. 1933), NARA, RG 7, Entry 8, Box 115, USDA BEPQ Newsletter for August 1935, Vol. II, No. 10, October 1, 1935, NARA, RG 7, Entry 7, Box 3.

[367]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936." NARA, RG 16, Entry 32, Box 1.

determining the merits of these new insecticide formulas:

> *Glass vials, each open at either end, are plugged with discs of apple. Then, in long rows in wooden racks, they are passed on an endless chain conveyor beneath a spray gun that sprays each plug uniformly with the material under test. A codling moth egg, just about ready to hatch, is attached to the under side of a cork, which is placed over the mouth of each vial. Then the whole test tube orchard is set away long enough to give the apple worms that hatch from the eggs time to feed on the sprayed surface. The condition of the worms at the end of a day or two indicates the possibilities in that material as a poison for them.*[368]

4.4.2.4 Insecticide Investigations

"This work consists of chemical investigations of plants containing the insecticide rotenone and studies of the properties of nicotine-containing dusting materials. Derris and cube roots are finding increased use as substitutes for arsenical insecticides as an almost direct result of the intensive chemical work done in the Division of Insecticide Investigations."[369]

DDT Aerosol

After the discovery of DDT in Switzerland, the toxin was studied extensively at Beltsville. The Bureau of Entomology and Plant Quarantine was busy at work to develop substitutes for the limited supplies of pyrethrum and Freon 12 that were available during World War II. Throughout the 1940s, DDT was being intensively investigated, and the Division of Insecticide Investigations was heavily involved in the development of DDT and furthering its manufacture in the United States. The armed forces were using it to control body lice; the Army and Navy both also placed great demand on the "aerosol bombs" that had been developed at Beltsville, for use in controlling malarial mosquitoes and houseflies.[370] During the war, more than 35 million aerosol bombs were used to protect the armed forces from insect-borne diseases. The bomb, considered one of the more outstanding achievements of the agency, was made by dissolving an insecticide in a liquefied gas held under pressure in a container; the container had a valve, which when opened released the insecticide as a vapor in the air.[371]

---

[368]"The National Agricultural Research Center at Beltsville, Md." n.d. [c. 1940], NARA, RG 16, Entry 32, Box 1.

[369]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936," NARA, RG 16, Entry 32, Box 1.

[370]Annual Report for 1944, p. 149.

[371]Opportunities for Career Service in the Department of Agriculture, USDA Miscellaneous Publication No. 675, NARA, RG 152, Entry 6, Box 10.

After the war, investigations into the use of DDT continued, with efforts focused on controlling forest insects. An outbreak of spruce budworm in Canada, which was spreading into New England, caused a shortage of newsprint paper. To test methods for spraying large forested areas to control the epidemic, a laboratory was established at Beltsville to studies results achieved by scientists there at a laboratory in Toledo, Ohio. Further tests were conducted with other state agencies and timber owners. Scientists at Beltsville studied the proper physical properties of DDT in various combinations and concentrations; the best type of atomizing device to be installed in a plane; the effect of different flight procedures (Figure 41) on the distribution of the insecticide; and the effect of different spray deposits on insects. An area near the Beltsville airfield, located in the East Farm, was used for the experiments. By 1947, 157 spraying test flights had been executed. The results showed that hollow-cone type nozzles mounted on a boom beneath the lower wing were the most effective atomizers, and that no change in altitude between 50 and 200 feet or change in spray output above 18 gallons a minute made any appreciable difference in the findings. [372]

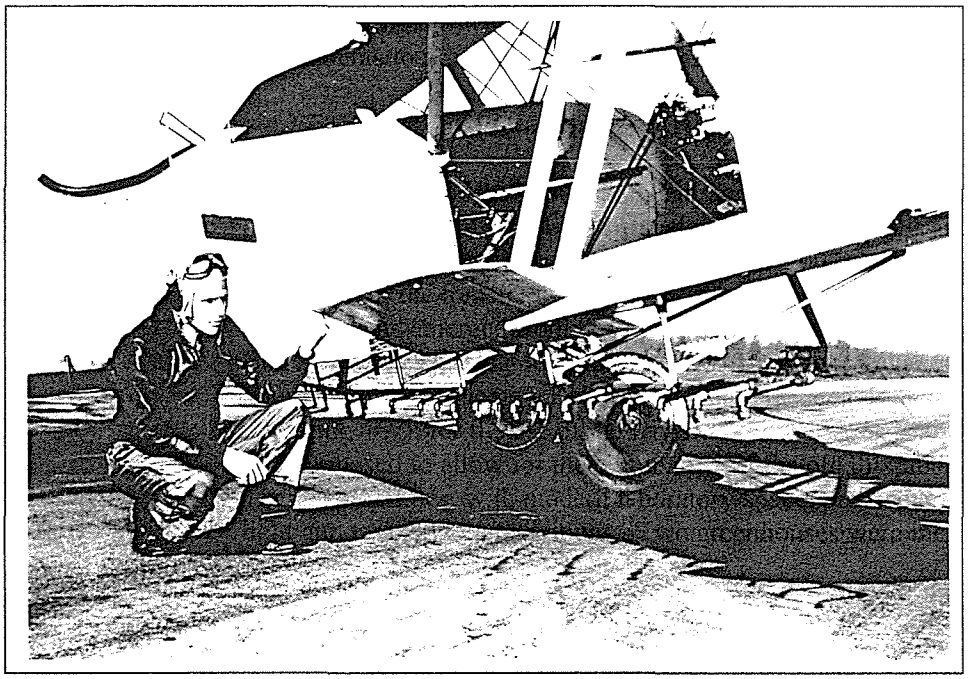


Figure 41 - Testing methods of aerial spraying of pesticides at BARC, 1947

4.4.2.5 Truck Crops and Garden Insects

This division conducted research on insects affecting flowering and ornamental plants grown under glass and out of doors, as well as on those insects affecting mushrooms. The division focused, for example, on the cyclamen mite, a pest "particularly injurious" to cyclamen, gerbera, and African violets. Laboratory workers developed a hot water treatment, successful in combating insects on cyclamens, delphiniums, gerbers, and chrysanthemums, which resulted in a net annual saving commercially of $372,000.

[372] "Aerial Spraying with DDT Promises Control of Costly Forest Insect Pest," USDA Office of Information, Press Release, June 8, 1947.

Researchers controlled the gladiolus thrips, which had since 1931 threatened to wipe out that entire industry. They were also actively involved in research on controlling the iris thrip, mushroom insects, and insects affecting the tuberose and other bulbs, as well as the red spider on tomatoes and cucumbers.[373] Treatments in the Mushroom Houses (Buildings 473 through 475) included burning sulphur and dusting mushroom beds with pyrethrum powder.[374]

4.4.2.6 Insects Affecting Man and Animals

This division was devoted to improving methods to control household insects, such as clothes moths and carpet beetles.[375] The headquarters of the division was located in Orlando, Florida.[376] Some supporting research was conducted at Beltsville. In 1939, to enable further experiments on ticks and other insects, this division sought the construction of an animal building to provide laboratory and storage space; the building was never built, however. This 1939 new construction proposal also included an underground termite testing pit, with light-tight doors, for testing materials for termite resistance, allowing for experiments to protect buildings; this also does not seem to have been built.[377]

4.4.2.7 BEPQ During WWII

At the beginning of the 1940s, the quadrangle of buildings at Beltsville was enlarged with the monies provided in the Arlington Farms transfer. In October 1940, the Bureau of Entomology and Plant Quarantine received a large sum of money ($72,000) from the $3.2 million appropriation allotted by Congress for the transfer of activities from Arlington Farms to Beltsville.[378] Two significant new developments emerged from this allocation: the construction of Laboratory Building "C" to the west of Building 470 (Building 467), and the establishment of a laboratory in the South Laboratory Building (Building 306) of the new Beltsville Research Center complex. The erection of Laboratory Building "C" (Building 467), for the use of the Division of Fruit Insects and for the Division of Control Investigations, was supposed to allow for the elimination of the old dilapidated frame insectaries still in use at the time. The new facilities, with modern laboratory space, provided for special studies on insects under controlled light and temperature conditions. Two greenhouses were included in the plan, enabling the transfer of the

---

[373]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936," NARA, RG 16, Entry 32, Box 1.

[374]"Information, USDA Beltsville Research Center, Beltsville, Maryland," 1941, National Agricultural Library.

[375]Memorandum, "Activities of the Bureau of Entomology and Plant Quarantine at the National Agricultural Research Center, Beltsville, Md., January 1936," NARA, RG 16, Entry 32, Box 1.

[376]Annual Report for 1948.

[377]R.W. Trullinger, Acting Chief, Office of Experiment Stations, to Mr. A.S. Hoyt, Acting Chief, Bureau of Entomology and Plant Quarantine, August 5, 1939, NARA, RG 7, Entry 28, Box 1488.

[378]Memorandum, "Removal and Reestablishment of Arlington Farms," May 4, 1945, NARA, RG 54, Entry 151A, Box 1.

Division of Cereal and Forage Insect Investigations from Arlington Farm to Beltsville.

Cooperative research continued during the war. In conjunction with wheat breeders at state experiment stations, such as Kearneysville, West Virginia, and Pennsylvania State College, the Bureau developed a number of varieties of wheat resistant to the Hessian Fly, considered the insect most harmful to wheat in the United States:

> *Greenhouse tests were given on 421 selections of wheat, discarding those of less promise, and furthering development of those which show most resistance and agronomic promise. [In the outdoor nursery, 295 selections were made, and the nursery was] sufficiently infested with flies to give significant data.*[379]

4.4.2.8 Conclusion

The cluster of buildings related to the Bureau of Entomology and Plant Quarantine erected at BARC were representative of the careful design efforts given to the Beltsville station as a whole, as a showpiece for Congressionally-funded research. The buildings of the Entomology cluster were laid out in a formal axial design around the natural lake extant at the site. Of the sections of BEPQ at BARC, the Division of Bee Research, which had its national headquarters at Beltsville, was the largest and most important. It served as a clearinghouse of information, a regulator and enforcer of importation of honey bees, and a coordinator of research efforts around the country. The single most significant accomplishment within the Bureau concerned another division, that of Insecticide Investigations. The development during wartime of the DDT aerosol bomb, and the continued research after the war into aerial spraying to control forest insects, was one of the most important research endeavors to be undertaken anywhere at Beltsville.

4.5 FOOD AND DRUG ADMINISTRATION

The Food and Drug Administration (FDA), originally as part of the Department of Agriculture, maintained some presence at Beltsville from approximately 1933 to 1996. In general, the FDA work at Beltsville, as elsewhere, has been to perform scientific and regulatory work relating to food products, human and animal drugs, medical devices, cosmetics, and animal feed.[380] Most of the duties of the predecessor of what today is the Food and Drug Administration came out of the Federal Food and Drugs Act of 1906. Under the Act, the Bureau of Chemistry of the Department of Agriculture became responsible for ensuring that improperly labeled drugs and foods were kept out of interstate commerce. The Insecticide Act of 1910 (prohibiting improperly labeled insecticides) gave the agency new duties, and in 1927 the Bureau became the Food, Drug, and Insecticide Administration. In 1931, the agency again acquired a number of new responsibilities and was renamed the Food and Drug Administration. The Food, Drug, and Cosmetic Act of 1938 again greatly expanded the power of the FDA. It required pre-market approval of new drugs, established limits for certain substances in food, authorized factory inspections, and

---

[379]BEPQ, Memorandum on Hessian Fly, Project No. n-4-1, July 1, 1945, NARA, RG 7, Entry 20, Box 1492.

[380]John Swann, "The U.S. Food and Drug Administration," in George Kurian, ed., *The Historical Guide to American Government*, (New York: Oxford University Press, forthcoming).

expanded the jurisdiction of the FDA to cosmetics and medical devices. In 1940, the FDA was transferred out of the Department of Agriculture to become part of the Federal Security Agency (it later came under the Department of Health Education and Welfare). It at the same time lost its responsibility for insecticides.

The work of the FDA at Beltsville can be loosely broken down into three categories: the testing of the effect of human pharmacological products (and vitamins) on animals, the testing of veterinary products, and insecticide testing.

4.5.1 Pharmacological Work

In 1929, the Food, Drug, and Insecticide Administration was urgently seeking space at Beltsville for the pharmacological work that was then housed in the main building in Washington (216 13th St., SW). This research consisted primarily of testing medicinal products intended for man on various animals such as guinea pigs, rats, rabbits, cats, dogs, and roosters.[381] However, the immediate need for establishing FDA space within one of the Bureau of Animal Industry buildings at Beltsville was partially eliminated when FDA was given space in one of the new wings of the main Agriculture Department building on 12th Street. [382]

However, the match was never a good one, and within a few years the agency was once more looking to move its animal work to Beltsville. The FDA requested an appropriation of $700,000 for the construction of a laboratory building and garage at Beltsville which was to be part of the Departmental Laboratories grouping. In 1938, $650,000 in PWA funds and $65,000 in WPA funds were approved under Project 752-01-8 for the facility.[383] However, although the FDA made significant input into the design of the building throughout much of the construction process, it never occupied the building. Sometime between April and August 1940, the occupants of the building changed, and alterations were made to the (at the time) partially completed building to meet the needs of different tenants. The FDA pharmacological work instead went elsewhere, and no documentation has been found about what prompted the last-minute change in plans.

---

[381]Chief, Food and Drug Administration, to Dr. John R. Mohler, Chief, Bureau of Animal Industry, November 26, 1929, NARA, RG 17, Entry 5, Box 54.

[382]It is interesting that the FDA chose to remain in Washington at this time, declining the opportunity to move to Beltsville (which had been approved), given their great interest in moving to Beltsville; in arguing for the joint venture, the FDA had explained that the work was difficult to conduct in Washington, as "the Department continually receives complaints from people who live in the neighborhood, regarding the barking of dogs, the crowing of cocks, and other noises that necessarily accompany this work." W.G. Campbell, Director of Regulatory Work, Food, Drug, and Insecticide Administration, to Dr. W.W. Stockberger, Director of Personnel and Business Administration, December 10, 1929, NARA, RG 17, Entry 5, Box 54.

[383]"Projects under Title II of the Work Relief and Public Works Appropriation Act of 1938, Beltsville, Maryland," Memorandum, July 26, 1938, NARA, RG 8, Box 297.

4.5.2 Animal Testing/Veterinary Remedies

FDA work relating to the testing of drugs and remedies for animal diseases and to residues of chemical substances in animal products came to Beltsville in the 1930s. Because some of the work involved parasites and was closely associated with ongoing research conducted by the Zoological Division, the work gravitated towards the Zoology unit. Initially space was shared in existing buildings and later, by the end of 1931, buildings were being constructed at the Zoology area just for the FDA work (Figure 42). Much of the early work was conducted in coordination with that of Dr. Maurice Hall, who headed up the Zoology Division of the Bureau of Animal Industry in the 1910s and 1920s. Hall requested an appropriation of $11,000 from the PWA to erect a storage and laboratory building for the FDA work (likely Building 328), six animal shelters, and one dipping vat. FDA work relating to veterinary remedies and chemical residues in animal products apparently continued in some form until the 1990s at BARC. Significant additional buildings for the FDA were constructed in the area in 1940, 1961, 1976. Beginning in the 1980s, much of the work conducted by the FDA in the Zoology area was transferred to the FDA facility on Muirkirk Road in Beltsville. The last FDA employees moved out of BARC in 1996.

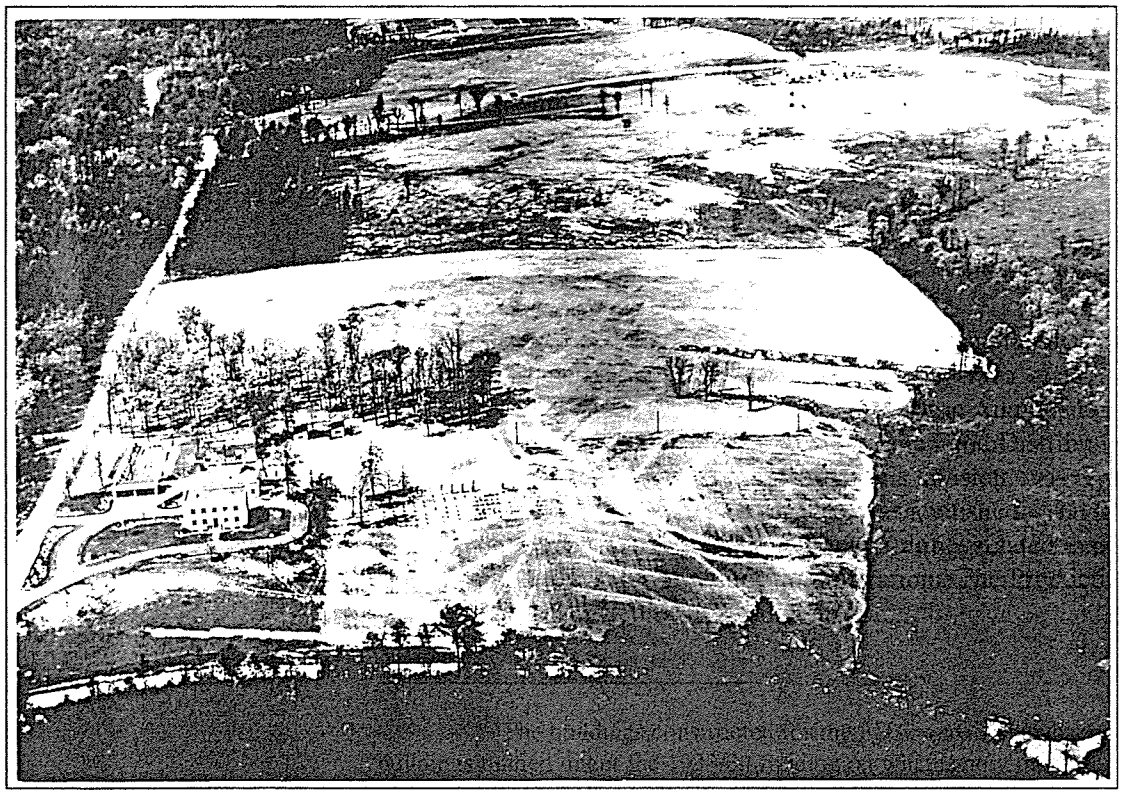


Figure 42 - FDA area, aerial view, 1936

4.5.3 Insecticide Work

In the early 1930s, plans began to be made to transfer FDA work relating to insecticides from a rented property in Silver Spring to facilities at Beltsville. To fund the new buildings, $34,000 was allocated for the buildings and $3,000 was allocated to the landscaping. In July 1934, staff moved into the new facility.[384] In addition, extensive plantings were made to insure that they had a representative stock of insects upon which to test the pesticides. Within a few years there were five acres of orchard and vineyard land used for flower and vegetable gardens, ornamental trees, and shrubs.

The general purpose of the facility was to carry out the provisions of the Insecticide Act of 1919 which regulated interstate shipment of insecticides and fungicides. The Act was designed to protect farmers, fruit growers, and other users of insecticides and fungicides by requiring that they be truthfully labeled and that they be safe. If the FDA determined that a particular product did not perform as advertised they would take steps to have the item "removed from the channels of trade, until the labels [were] amended to tell the truth or the preparations [were] changed into something that [would] meet the label statements."[385]

Early on, the facility had a staff of five entomologists who investigated the products. Samples of commercial insecticides, germicides, and disinfectants were tested on household insects, farm and garden insects, and insect parasites found on dogs, cats, and poultry. An early problem was how to secure enough insects. The problem was solved by the FDA researchers breeding their own flies, fleas, lice, cockroaches, and by keeping dogs for the breeding of lice and mites. Three greenhouses were stocked with insects for winter testing.[386] The products were tested using a variety of techniques geared to the type of substance. For instance, to test a fly spray, a small room of known cubic content would be filled with a set number of flies. The insecticide vapor would then be piped in and if it failed to kill 80 to 90 percent of the insect, the spray would be labeled unfit.

In 1940, the FDA's duties relating to insecticides, and the insecticide testing facilities at Beltsville, were transferred to the Agricultural Marketing Service. Two years later, in 1942, the Agricultural Marketing Service became part of the Agricultural Marketing Administration and then (also in 1942) part of the Food Distribution Administration. In 1943, the Food Distribution Administration became part of the War Food Administration (WFA), and in 1944 this division was renamed the Office of Distribution of the War Food Administration. In 1945, the WFA was abolished. The functions of the WFA reverted back to the Department of Agriculture and the particular duties related to pesticides rested with the Livestock Branch of the Production and Marketing Administration. The Production and Marketing Administration also conducted work at Beltsville in other areas.

---

[384]The buildings constructed for the FDA were somewhat unusual in that they were some of the few buildings funded under the 1933/34 funding on what is now the Central Farm that were completed under a contract rather than by force account. The building was one of those singled out by acting Director of the Center in 1934 as an example of "inefficiency and unsatisfactory performance." He stated that the contractor had been "very dilatory and slow." E.T. Davis, Associate Construction Engineer, Bureau of Agricultural Engineering, Memorandum on Construction at the Animal Husbandry Farm, Beltsville, Md., July 2, 1934, NARA, RG 8, Entry 19, Box 314.

[385]The National Agricultural Research Center at Beltsville, Md, n.d. [c. 1940], NARA, RG 16, Entry 32, Box 1.

[386]*National Agricultural Research Center Light*, March 23, 1939, No. 5.

4.6 BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS

4.6.1 History of the Bureau of Human Nutrition and Home Economics

Research in the field of home economics has a long history in the United States. Although the Bureau of Home Economics conducted some of its most important research at the Beltsville Agricultural Research Center, the origins of the Bureau predate BARC. In 1894, Congress authorized the Office of Experiment Stations, located in Middletown, Connecticut, to conduct human nutrition investigations. The headquarters of the office were moved to the United States Department of Agriculture in Washington, D.C., in 1906, and in 1915, the Office of Home Economics was established as part of the USDA. Human nutrition investigations were absorbed into the newly formed office. The mission of the Office of Home Economics subsequently expanded to include other areas of research in addition to human nutrition investigations. In 1923, the Bureau of Home Economics was formed and charged with investigating the utility and economy of food, textiles, and other agricultural products used in the home. The interests of the Bureau fell into several broad fields including: (1) food and nutrition facts needed by homemakers, dieticians, nutrition workers, and planning agencies; (2) family economic information consisting of family buying habits and needs as a basis for developing diet plans and other aids for the management of family income; (3) textile and clothing information for effective use of fabrics for clothing and household purposes; (4) requirements for household equipment and housing facilities; and (5) publishing and disseminating information to the public and to other government agencies.[387] In 1938, individual divisions were established within the Bureau to pursue these interests: Food and Nutrition, Family Economics, Textiles and Clothing, Housing and Household Equipment, and Information. Although these divisions were distinct, they often worked in conjunction with each other on experiments that encompassed more than one area. This structure, with its five divisions, remained stable until 1954, when the Bureau changed its name to the Bureau of Human Nutrition and Home Economics Research. Since 1954, portions of the Bureau's work have been absorbed by the Agricultural Research Service. Consequently, the Bureau of Home Economics has changed its name several more times and is today known as the Human Nutrition Center.[388]

The laboratories of the Bureau of Home Economics of the Department of Agriculture gradually moved their laboratories from downtown Washington to the Beltsville Experimental Farm in Maryland in 1940 and 1941 due to the space shortage downtown caused by added defense activities during World War II. The Bureau worked partially in Washington, D.C., and partially in Beltsville, Maryland. The Divisions of Family Economics and Information and business administration offices were located in Washington, while the Divisions of Food and Nutrition, Textiles and Clothing, and Housing and Housing Equipment were at Beltsville.[389] Perhaps the most amusing story of the move involves white rats used in vitamin

---

[387]The Agricultural Research Center of the USDA at Beltsville, Md., 1948.

[388]NARA, RG 310, Entry 1001, Box 1.

[389]Research for Better Farming and Farm Living: Activities at the Agricultural Research Center Beltsville, Md., Agricultural Research Administration, USDA, August 1945, NARA, RG 310, Entry 1001, Box 2.

experiments. The rats were moved to BARC in heated ambulances provided by Walter Reed Hospital because they were in crucial stages of experimentation and needed to maintain constant body temperatures. Since speed was also an important factor in the move, the police department provided a motorcycle escort.[390]

4.6.2 Buildings Occupied by the the Bureau of Human Nutrition and Home Economics

The Bureau of Home Economics was headquartered in a single laboratory building in 1941 at BARC, equipped with experimental kitchens, test laboratories, animal research rooms, and offices. The Bureau of Agricultural Engineering designed the Center Laboratory (Building 307), acknowledging their work order with a memo reading, "We have now to design one job to cost about $100,000 completely air conditioned for the Bureau of Home Economics. A colonial residence type design."[391] This initial design concept was executed with W.P.A. funds.[392]

This building is one of a cluster of three laboratory buildings that were constructed at the same time in the center of the BARC property.[393] The buildings are all Georgian Revival in style with similar massing and scale. During the design process, engineers desired a degree of consistency among the departmental laboratories.[394]

When the Bureau of Home Economics first moved to BARC, its offices occupied the second and third floors of the Center Laboratory Building according to a directory and map printed in July 1941.[395] By 1947 and during 1948, the Bureau had expanded and occupied at least part of both the Center and North Laboratories (Building 308), but by 1949, the Bureau was once again located in the center building only.

---

[390]"Pans, Pots, Soups, Socks," *Democratic Digest*, Volume 18, Number 4, April 1941, NARA, RG 310, Entry 1001, Box 2.

[391]Memo from J.A. Scott, Chief of the Division of Plans and Services of the Bureau of Agricultural Chemistry and Engineering, to several employees within his Bureau, April 4, 1939, NARA, RG 8, Entry 15, Box 4.

[392]NARA, RG 16, Entry 177, Box 4.

[393] The site selected for three central laboratory buildings, one of which would house the Bureau of Home Economics, was originally occupied by the swine section, which was scheduled for a new location. The site adjoined the area utilized for the dog kennel. To develop the laboratory site, the kennel was transferred to a new location. NARA, RG 16, Entry 177, Box 7.

[394]Memo from C.H. Trask, Resident Engineer, to Paul Stewart, Assistant Coordinator of the Secretary of Agriculture, NARA, RG 16, Entry 177, Box 4.

[395]Beltsville Research Center Information, USDA, 1941.

4.6.3 Research Conducted by the Bureau of Human Nutrition and Home Economics

After locating in Beltsville, research conducted by the Bureau of Home Economics played a particularly important role during World War II. Much of the research conducted at BARC was focused on obtaining results that would benefit the troops abroad, the civilian population, and the overall war effort, and much of the wartime research was a continuation of earlier research efforts by the Bureau.

4.6.3.1 Food and Nutrition

The field of nutrition offered challenges to the home economists over a long period of time, particularly during the World War II era. Studies conducted at BARC in the early 1940s showed that both the civilian and defense populations suffered from various deficiencies in nutrition due to food shortages and rationing. To remedy this situation, a program of feeding farm surpluses to children in a nationwide school lunch program was established by the Bureau, which developed methods and recipes for large-scale feedings in their experimental kitchens. The Bureau also maintained a state-of-the-art large-scale kitchen at BARC which was used to develop and improve large-quantity recipes. Used primarily to perfect school lunch recipes in the post-war years, the recipes were always tested on children before they were released to school cafeterias.[396]

Also during the War years, another Beltsville nutrition task was evaluating "quick soups" and other concentrated foods for their nutritional content. Originally formulated for light snacks or for use with invalids, the Red Cross began using concentrated food in relief shipments and also in feeding the armed forces. The Red Cross asked Dr. Louise Stanley, Chief of the Bureau, to evaluate various soups on the market, and she suggested new formulas to boost nutritional content. Common additives included soybean flour, grits, and powdered milk. Dr. Stanley appeared with Eleanor Roosevelt at a press conference where Stanley promoted powdered milk as an important food resource to be used in federal relief work and school lunch programs. Fortunately, manufacturers were quick to react to Dr. Stanley's suggestions for more widescale use, and many new fortified formulas of quick foods were developed. As a result of the Bureau's research, more than two hundred concentrated, dried, and dehydrated food products for war-time use were developed at Beltsville[397] (Figure 43). The Bureau had also developed recipes where soya products either replaced meat or served to supplement other dishes, such as soups, breads, and desserts.[398]

---

[396]"Pans, Pots, Soups, Socks," *Democratic Digest*, Volume 18, Number 4, April 1941, NARA, RG 310, Entry 1001, Box 2.

[397]Ibid.

[398]Research for Better Farming and Farm Living: Activities at the Agricultural Center Beltsville, Md. Agricultural Research Administration, USDA, August 1945, p. 31-32, NARA, RG 310, Entry 1001, Box 2.

Figure 43 - Dr. Louise Stanley and Harriet Elliott at Beltsville illustrating bread made from enriched flour, 1941

The Bureau also found new and innovative uses for foods that were in abundant supplies by developing new recipes or improving existing recipes. In the 1940s, the experimental kitchens at Beltsville developed recipes for compote, sauce, salad, pickles, muffins, egg casserole, and Dutch apple cake, which all used dried apples, an abundant food source during the war years. To evaluate recipes developed in the kitchens, judges rated the recipes in categories such as flavor, texture, and general acceptability. To supplement human judging, some objective tests were performed. For example, the tenderness of a berry was judged by measuring how much mercury was needed to crush it. The Bureau also performed tests to classify different types of the same food for suitability of use. For example, potatoes were judged by using different varieties from different places stored different ways in different recipes. These results helped homemakers choose the best potatoes and storage methods for specific uses.[399]

At intervals between 1924 and 1945, the Bureau carried out meat cooking experiments. Many of the samples of meat were obtained from the Bureau of Animal Industry at BARC, which cooperated in the research. Both before and after the Bureau of Home Economics laboratories were moved to BARC, fresh pork from the Bureau of Animal Industry was used in carrying out experiments in the cooking of pork products in connection with work on trichinosis. Other experiments were conducted for taste and economy. Beef carcasses and various portions of pork were used for study on the effects of precooking treatments on the quality of canned meat.[400] In similar cooking experiments, various cuts of meat were

[399]"Research for Better Living," Script of film produced by the Bureau of Home Economics and the USDA, May 28, 1941.

[400]Memo to Dr. Louise Stanley, Chief, Bureau of Home Economics, from J.R. Mohler, Chief, Bureau of Animal Industry, NARA, RG 17, Entry 3, Box 124.

cooked and rated by a panel of judges. The primary purpose of this research was to measure tenderness, flavor, and other table qualities of meat that were affected by different factors of production such as breed, age, and diet of the animal or bird. During these experiments, the Bureau discovered that cooking meat at moderate temperatures retained juices better than searing the outside of a cut, kept the protein tender, and saved considerable shrinkage of the cut, an important factor in wartime conservation.[401]

Also during the War years, scientists in the food and nutrition and equipment laboratories of the Bureau combined forces to help Americans preserve foods at home for increased value and flavor while making the processes as easy as possible. Home drying, freezing, and canning were studied. Beltsville designed new or improved portable home dryers, developing plans and working drawings for electric home dehydrators. Directions for the oven method of drying fruits and vegetables using simple home equipment were perfected. To learn how home dried foods held their flavor and nutritional value, the Bureau conducted experiments with positive results concerning both length of storage (up to a year for some fruits) and overall nutrition retention (almost all vitamins except for vitamin C were retained during dehydration).[402]

To measure nutritional factors, small animals, such as chicks, rats, and guinea pigs were used as experimental models to determine growth rates of animals fed different levels of essential vitamins. Chemistry was also employed in more conventional ways, with vitamin contents of various foods tested chemically. Research concerning the vitamin and mineral requirements of humans was conducted at BARC. Male and female volunteers were fed an experimental diet which contained every nutrient that the human body needs except vitamin A, which was almost completely absent from the meals. Since one of the early measurable effects of lack of vitamin A is nightblindness, the appearance of this condition was taken as a sign that the body had used up most of its stored vitamin A. As soon as volunteers showed unmistakable evidence of nightblindness, they were given doses of vitamin A to prevent permanent damage. This experiment yielded information regarding the minimum daily requirement of vitamin A, as well as identifying certain foods which are rich in vitamin A. This information was particularly useful during the World War II era since restricted food supplies caused civilians to be more dependent on plant products, such as green and yellow vegetables, rather than animal products, such as eggs, cheese, and milk, for their supplies of vitamin A.[403]

---

[401]Research for Better Farming and Farm Living: Activities at the Agricultural Center Beltsville, Md. Agricultural Research Administration, USDA, August 1945, pp. 31-32, NARA, RG 310, Entry 1001, Box 2.

[402]Research for Better Farming and Farm Living: Activities at the Agricultural Center Beltsville, Md. Agricultural Research Administration, USDA, August 1945, pp. 33-34, NARA, RG 310, Entry 1001, Box 2.

[403]Research for Better Farming and Farm Living: Activities at the Agricultural Research Center Beltsville, Md., USDA, August 1945, NARA, RG 310, Entry 1001, Box 2, pp. 31-32.

4.6.3.2 Textiles and Clothing

The Textiles and Clothing Division of the Bureau of Home Economics also proved valuable to civilians and troops during the war years. Research focused on making the most of scarce resources while providing information and technology for use at home and abroad.

Anticipating the War Production Board's call for a broad public program on consumer care of clothing and fabric to avoid clothes rationing, the Bureau studied the conservation of clothing and household textiles. Detailed instructions for professional mending techniques were available to the public. To prevent the possible waste of men's business suits as much of the male population went into uniform, the Bureau also drafted instructions for making these suits into garments for other members of the family.[404]

The clothing specialists also produced designs to meet the special needs of the war program. At the request of a large aircraft company, never named in records, the Bureau also designed three protective outfits and work aprons for women employed in aircraft construction. In cooperation with the Extension Service, the Bureau developed a uniform for the Women's Land Army.[405]

Other experiments in 1941 involved developing a compound to make canvas fabrics used for tents, tarpaulins, shower curtains, and sandbags resistant to mildew. Another process developed by the Bureau was a method for sterilizing wool without damaging the delicate fibers. This sterilization process offered a way to kill bacteria in the clothing of the men in the armed forces and to eliminate disease and germ hazards from blankets used in military hospitals.[406]

The Textile Division was charged with improving cotton stockings that would be longer lasting and more durable than their silk counterparts, which were rationed during the war years. David H. Young, a veteran stocking designer working at Beltsville, researched various designs and fabrications, studied thread combinations and permutations, and recorded the results. These combinations were then manufactured as test hose and subjected to laboratory and wear tests. Wearers of these stockings recorded their service history on charts and then sent the worn stockings back to the Bureau for analysis and possible improvements. Three nationally known hosiery companies, also never named in records, manufactured women's cotton hose following designs developed at Beltsville.[407]

In developing standards for garment construction, evaluations of ready-to-wear dresses were performed. This research helped the scientists determine how to sew garments for the greatest durability. Several methods for sewing buttonholes were compared by testing them in a machine made to abrade the fabric.

---

[404]"Research for Better Farming and Farm Living: Activities at the Agricultural Center Beltsville, Md.," Agricultural Research Administration, USDA, August 1945, p. 34, NARA, RG 310, Entry 1001, Box 2.

[405]Research for Better Farming and Farm Living: Activities at the Agricultural Center Beltsville, Md., Agricultural Research Administration, USDA, August 1945, p. 34, NARA, RG 310, Entry 1001, Box 2.

[406]"Pans, Pots, Soups, Socks," *Democratic Digest*, Volume 18, Number 4, April 1941, NARA, RG 310, Entry 1001, Box 2.

[407]Ibid.

Another experiment involved comparing seven ways to stitch a pocket corner. A machine simulating a fist was repeatedly inserted into each pocket to test for durability. Other experiments involved testing the elasticity of knit fabrics by applying tension with weights. Machines developed by the Bureau tested breaking strength, thermal transmission, air permeability, moisture absorption, and other properties of fabrics.[408]

Functional clothing for both women and children was developed at the BARC laboratories. A clothing specialist worked out ideas in muslin forms and tested the product on live models to rate the garment for comfort, convenience, and safety. After a trial garment was worn in real work, a pattern was cut and made in cloth. This dress was rated for appearance and durability. Many commercial patterns were developed from a number of Beltsville experiments. In 1948, results showed that the ideal housedress had a snap closure, bias cap sleeve, and a back pleat to allow for maximum reaching. Another design was more tailored, although the skirt was comfortably full, the pocket at hand level, and a roomy fit allowed for maximum movement. Research also produced an adjustable apron that would fit any member of the family and could be made from only one yard of fabric.[409]

During these same years, the unique needs of farm women were also included in the textile research. A type of coverall, called a protectall, could be worn outdoors over regular clothing to keep out cold or rain. In order to assist farm women and girls with comfortable, durable, safe, and efficient clothing, the Bureau designed a mechanic suit, field suit, and other functional clothes. These patterns and garments, designed for both indoor and outdoor chores, were the first of their kind to be designed specifically for female members of the farm family.[410]

In addition to researching many methods to make better clothing, scientists at BARC focused their attention on caring for clothing. Different types of soaps and synthetic detergents were compared in tests which simulated home laundering. Machines designed to evenly soil clothing with elements such as carbon or fat ensured consistency in the experiments. The soil was set with heat and tested for light reflectance, a measure of the amount of soil in the fabric. After washing and drying, the fabric samples were again measured for light reflectance in order to determine the efficiency of the detergent or soap used. Homemakers received assistance from buying guides published by the Bureau, as well as from informative labels in garments, as more was learned about fabrics and their suitability for different purposes.

Like the Division of Food and Nutrition, Textiles and Clothing performed experiments that aided the war effort, both at home and abroad. Both Divisions' attention to the needs of the civilian and military populations and to rural citizens was meant to enrich the quality of their lives, even if many Americans were unaware of the work conducted at BARC.

---

[408]"Research for Better Living," Script of film produced by the Bureau of Home Economics and the USDA. May 28, 1941.

[409]Research for Better Farming and Farm Living, Agricultural Research Administration, USDA, August 1945, p. 34, NARA, RG 310, Entry 1001, Box 2.

[410]Ibid.

4.6.3.3 Housing and Household Equipment

In 1934, prior to moving to BARC, the Bureau of Home Economics, in conjunction with the Bureau of Agricultural Engineering and the State Agricultural Colleges, conducted a survey on farm housing. The survey covered 352 counties in 46 states. The survey showed not only a widespread need for repairs and the installation of labor-saving equipment, but also for additional space and, in a large number of cases, for replacement of existing houses. As a result of this survey and of many appeals for assistance by homeowners, the three entities began to prepare plans for adequate yet economical farmhouses. These plans were interrupted by the World War II. However, when the program was reinstituted, the main goal of the rural housing project involved distributing information to rural residents. A series of fifteen brochures was produced by the Division of Farm Buildings and Rural Housing of the Bureau of Agricultural Engineering, in conjunction with the Division of Housing and Household Equipment of the Bureau of Home Economics in 1946. These publications addressed the problems of planning and remodeling farmhouses and were planned to be contemporary in style to copy popular magazines. Another useful item produced was a kit containing cutouts of rooms and furniture that was made available to Extension Services for use in house planning classes and also by individuals.[411]

Despite the efforts of the Bureaus involved, the 1950 census revealed that rural housing had not changed much since the 1934 study.[412] Farm housing was generally below the standards of either urban or rural non-farm housing. The percentage of dilapidated houses on farms was larger than in either urban or rural non-farm areas and farmhouses were particularly lacking in modern conveniences, such as running water, central heat, flush toilets, and hot running water. The USDA determined that special farmhouse plans were needed because a farmhouse served different functions than a city house, and a farm family usually did not have the luxury of moving to another house if one did not meet their needs. The USDA also recognized an important aspect relating to farm housing. By providing adequate housing for farm laborers, they would be less likely to leave farms in search of better living conditions, either at other farms or in urban areas.

The USDA conducted surveys to determine patterns of farm housing, household activities, and typical inventories of household possessions, equipment, and supplies in four main geographical regions of the United States. The surveys also determined the preferences of people in areas such as types of housing and preferred locations for doing household tasks. The results of these studies formed the basis for research projects addressing equipment needs, room arrangements, and overall design. Much effort was devoted to reducing the overall cost of the project by using concepts such as dual use of spaces.

In the early 1950s, the USDA developed a series of plans for small expansible homes, in the first stage of which the kitchen, living room, and bath formed a complete unit similar in concept to, but larger than, the city efficiency apartment (Figure 44). Dining space and laundry facilities were provided in the kitchen and a curtained sleeping space was located in the living room. When the houses reached the final phase of expansibility, they had either two or three bedrooms. Unconventional building materials, such as

---

[411]Wallace Ashby, "USDA Farm Buildings and Rural Housing Activities," *Agricultural Engineering,* October 1946, pp. 471-472.

[412]The Work of the Bureau of Agricultural Engineering Relating to Farm Housing, November 3, 1937, p. 3, NARA, RG 8, Entry 19, Box 364.

aluminum, which presented the possibility of economy, were tested. Records were kept of the time and material required to construct the various parts of each house, whether experimental or conventional, construction procedures, and construction ease in order to arrive at a basis for comparison. Home economists made studies of comfort, convenience, and adequacy of the houses for family living.[413] A group of these units (Building 193 series), differing in arrangement and materials, was constructed at Beltsville by the Bureaus of Home Economics, Agricultural Engineering, and Dairy Industry. Located north of the Dairy area, these homes served as experimental models for plans that were distributed nationwide.[414]

Although the Bureau of Home Economics conducted experiments on housing, the scientists were also concerned with household equipment. Tests were conducted to determine how different types of equipment performed and how each type could be best used and cared for. As new devices to make the homemaker's life easier were developed, the Bureau's laboratories tested the devices and passed their findings on to consumers. Prior to the move to Beltsville, the Bureau of Home Economics, in conjunction with the Bureau of Agricultural Engineering, conducted experiments on the efficiency of cooking with stoves using kerosene, gasoline, bottled gas, city gas, and electricity.[415] During World War II, when the country's aluminum supply was allocated for defense, the Bureau was ready with a list of aluminum substitutes. Suggestions included enamelware, cast iron, and flameproof glass for top-of the-stove, tin, earthenware, and heatproof glass for ovens, and plastics for use in the refrigerator.[416]

---

[413]Wallace Ashby, "Current Research and Development in Farm Structures," *Agricultural Engineering.* December 1952, p. 770.

[414]Wallace Ashby, "USDA Farm Buildings and Rural Housing Activities," *Agricultural Engineering,* October 1946, p. 472.

[415]The Work of the Bureau of Agricultural Engineering Relating to Farm Housing, November 3, 1937, p. 6. NARA, RG 8, Entry 19, Box 364.

[416]"Pans, Pots, Soups, Socks," *Democratic Digest*, vol.18, no. 4, April 1941, NARA, RG 310, Entry 1001, Box 2.

Figure 44 - Beltsville Kitchen-Workroom, plan and photograph, 1958

4.6.3.4 Conclusion

In 1937, Dr. Louise Stanley, then Chief of the Bureau, outlined the three main contributions of the Bureau of Home Economics and its research. First, agencies formulating public policy on home economics issues were able to plan effectively using information on family income and expenditure patterns gathered by the Bureau. Second, data gathered by the Bureau was shared with manufacturers seeking to gear their programs or products to consumer needs and desires. This information gave a comprehensive picture of how the American family spent their income, as well as regional differences in family spending. Third, homemakers, the chief purchasers of food, clothes, and household goods and services, were given information by the Bureau's Information Division. The Bureau translated its scientific findings into layman's language and published the information in helpful pamphlets for homemakers. Some topics discussed in the publications included meal plans to fit family income, buying guides for clothing and household textiles, and directions for choosing and using materials and equipment. The Bureau also responded to letters from citizens, either by sending one of their publications, or, if no appropriate publication was available, letters were answered individually.[417] Stanley's vision of the Bureau of Home Economics continued into the years after the Bureau moved to BARC. These contributions were perhaps even eclipsed in significance by the work that the Bureau contributed during World War II. This wartime research yielded practical knowledge which aided both the civilian and military populations. Although the importance of this research cannot be calculated, it no doubt contributed to the overall war effort, both at home and abroad.

4.7 SOIL CONSERVATION SERVICE

Agriculture Secretary Henry Wallace's concern over the erosion of farmland topsoil and its effects upon farmers led to the creation of the Soil Conservation Service (SCS). Like hundreds of conservationists around the country and in Roosevelt's own circle, Wallace greatly feared that the destruction caused by the drought beginning in 1933, "foretold of even wider soil erosion problems which threatened the nation."[418] A combination of topsoil loss through dying plant cover and the overgrazing of surviving plants created a "dusty ground." When these soil conditions were subjected to strong wind storms they created a large "dust bowl" which spanned the states of western Texas, Oklahoma, Colorado, Nebraska, and Wyoming.

In 1933, President Roosevelt appointed Department of Interior Secretary Harold Ickes to oversee the Public Works Administration (PWA) in the first hundred days of the New Deal program. In October 1933, using PWA monies, Ickes created a new Soil Erosion Service department within the Interior Department. The organization set out to demonstrate that the destruction of America's good agricultural land by erosion could be largely controlled, and to lay the foundation for a permanent national erosion-control program. Ickes soon had appropriated $5,000,000 for erosion control terracing projects.[419] Hugh Hammond Bennett was appointed to head the new Soil Erosion Service.

---

[417]USDA Press Release, December 21, 1937, NARA, RG 319, Entry 1001, Box 4.

[418] Secretary of Interior Harold Ickes; agricultural experts Henry Wallace and Rexford Tugwell; Henry Morgenthau, and Hugh Hammond Bennett.

[419]419 Joseph M. Petui, *American Environmental History*, San Francisco: Boyd & Fraser, 1977, p. 363-364.

Bennett was raised on an old farm in the Pee Dee Basin of North Carolina, attended the University of North Carolina, and began working for the Bureau of Soils in the U.S. Department of Agriculture around 1905. The Bureau sent him to Louisa County, Virginia, to perform a soil survey, and it was here that Bennett gained firsthand knowledge of soil erosion. In 1918, he secured an appropriation of $160,000 for soil erosion research. With the money Bennett set up ten erosion stations around the country. From information gathered at the stations, Bennett estimated that over 500,000 acres of topsoil were lost to erosion each year.[420] Farming practices were stripping the productive topsoil level, resulting in an immense loss of money and land. By the 1930s, over 9 million acres of U.S. farmland were no longer arable, and 80 million acres were seriously damaged, with approximately eighty percent of the country's farmland suffering from erosion at that time.[421]

When the effects of the dust storms became known in 1935, Congress was spurred to create and fund a permanent Soil Conservation Service in the Department of Agriculture under Bennett's guidance, thus eliminating the Department of Interior's Soil Erosion Service. All erosion-control experiment stations and organizations within the Bureau of Chemistry and Soils, the Bureau of Agricultural Engineering, the Bureau of Plant Industry, and the Emergency Conservation Work Camps administered by the Forest Service were consolidated under the newly-formed SCS.[422] "Within a year the service operated 147 demonstration projects with about 25,000 to 30,000 acres at each project; 48 soil-conservation nurseries; 23 research stations; 454 Civilian Conservation Camps. Over 50,000 farmers on 5,000,000 acres requested aid that year and Bennett's team taught them his techniques: terracing and contour-plowing hill lands; crop rotation; fertilizing; and soil-strengthening with enriching grasses and legumes."[423]

The SCS's objectives were to be achieved through two principal areas of effort: (1) demonstrating soil conservation measures through actual work on the land in cooperation with landowners, and (2) the development and improvement of such measures through research and investigation. The core of the program was a series of "watershed demonstration areas over the nation within which the Service [sic] applies a plan of soil and moisture conservation. Farmers within areas selected for these demonstration projects are invited to cooperate in carrying out completed plans."[424] Some two million acres in ten different regions around the country were involved, including two federal properties in the southwest (a Navajo Indian reservation and the Gila River watershed). By 1937, President Roosevelt "requested the states to assume the administrative details of the Soil Conservation Service through local soil conservation districts organized by farmers and ranchers so that the federal role could be confined to technical

---

[420]420 Bennett, Hugh H. Report of the Chief of the Soil Conservation Service, 1935. Annual Reports of the Department of Agriculture, 1935.

[421]421 Petui, *American Environmental History*, p. 365.

[422] Hugh H. Bennett, Report of the Chief of the Soil Conservation Service, 1935. Annual Reports of the Department of Agriculture, 1935.

[423] Ibid.

[424]Ibid.

assistance."[425]

The work of the Soil Conservation Service carried out at Beltsville was dedicated primarily to testing and improving erosion-resistant plants, particularly those that could bring economic return when grown on hilly topography (a field of research labeled *hillculture*). The February 2, 1936, *Map of Proposed Conservation Area at Beltsville Maryland*, indicates land plat, ownership of properties, proposed SCS acquisitions, and the assignment of research units. This map also identifies an existing trail, houses, permanent and intermittent streams, and the soil and erosion formulas of various parcels. The SCS research units included: Pasture Management; Woodlot Management; Lake-Hydrology Laboratory; Methodology; Natural Gully Healing; Studies of Tree, Shrub, and Grass Root Systems; Engineering and Agronomic Studies; and an Illustration Farm. In 1938, approximately 1,700 acres were assigned to the Soil Conservation Service. This included lands transferred to BARC from the Resettlement Administration under direction from the Secretary of Agriculture during the previous year.[426]

The Division of Nurseries, established in April 1935, administered erosion-control nurseries transferred from the Bureau of Plant Industry. Nursery propagation at BARC after 1938 included a limited number of improved varieties of black walnuts, wild plums, bush cherries, blueberries, hollies, and high bush cranberries. Studies and selection tests of different kinds of locusts were conducted, as well as searches for erosion-control plants (other than locusts) that were worthy of field tests.[427] SCS nurseries at BARC were located on a narrow area of fairly even terrain with suitable soil conditions south of Beaver Dam Road and west of the Beaver Dam Road/SCS Road intersection. In 1942, W.W. Stiener, Nursery Manager, requested the transfer or loan of land north of Beaver Dam Road to expand the SCS experimental crop production.[428] This request was denied, but in 1945, the SCS found a tract of 19.45 acres "on the south side of the Branchville-Glendale Road [also] to be used...for experimental purposes." The primary crop was kudzu, whose demand outstripped the SCS nurseries' production abilities.[429]

Soil Conservation Service research work at BARC was among the most important of the Department of Agriculture's initiatives:

> *But perhaps, in the end, no activity at Beltsville will be of greater importance to the*

---

[425] Ibid.

[426] H.A. Nelson Director to Dr. Hugh H. Bennett, Chief, Soil Conservation Service, April 15, 1937. BARC Facility Engineering Archives. H.A. Nelson Director to Dr. Hugh H. Bennett, Chief, Soil Conservation Service, April 18, 1938. ARC Facility Engineering Archives.

[427] The SCS Conservation Plan of November 1943 identifies the SCS Tract as containing 1,663 acres "bounded on the south by Branchville-Glendale and Goodluck Roads. It lies entirely south of the Beaver Dam Road and is intersected by the southern two-thirds of Swine Road. About 1,000 acres are maintained in woodland, 33 acres are used for an observational nursery, 261 acres are in permanent herbaceous vegetative cover, and the remainder is used for observational plots which are subject to various degrees of intensity of cultivation."

[428] Memo from W.W. Stiener, Nursery Manager, SCS, to C.A. Logan, Chief of Operations.

[429] Ibid.

> *country than that of the Soil Conservation Service, which is soon to be inaugurated. Its study will concern itself with erosion by wind and water and the development of preventive measures. It will conduct such research problems as terrace design and construction, interpretation of the charts of subsurface water levels, percolation and infiltration, root habits of plants as they affect and are affected by erosion, the relation of types of crops to water run-off and to the building up of eroded soils.*[430]

By 1939, about 500 acres of the land had been cleared of trees, prepared and planted with both soil-building and soil-holding vegetative covers. The hillculture research was conducted principally in cooperation with the Maryland Agricultural Experiment Station, but also with the agricultural experiment stations of the mid-Atlantic states. The SCS also participated in erosion-control plant research done by the Bureau of Plant Industry.[431]

By April 1941, some 213 positions were transferred from Washington, D.C. to Beltsville, constituting the transfer of the entire Cartographic Division. The Cartographic Division was housed in offices on the third floor of the South Laboratory Building (Building 306). This division concerned itself with constructing and reproducing maps, charts, mosaics, aerial and still photographs, and technical drawings. It supplied "such materials used by technicians and farmers in making over-all and detailed plans for applying conservation measures."[432]

A number of buildings were planned for the complex to support SCS research, including a cottage for the nurseryman, a utility building, a garage and storage building, a greenhouse and lathhouse, and a plant storage building. Funds were approved in 1938. Plans for the general utility building were prepared by employees of the Farm Security Administration during April 1939. These buildings were erected in a cluster located along the south side of Beaver Dam Road, near the intersection with Soil Conservation Service Road. Most are still extant, however the property is no longer part of the Beltsville Agricultural Research Center.

The initial plan for the Soil Conservation Service station was even grander than that actually built; the list of required buildings included, in addition to the above: offices and a laboratory, a stable, a machine shop, a district supervisor's residence, a superintendent's residence, a lodge for the bachelor staff, a foreman's cottage (included above, as the nurseryman's cottage), an assistant foreman's cottage, and an entrance gateway. The proposal as drawn up in 1936 for the cluster of buildings intended a "distinctive architectural style in harmony with its environment and indicative of its purpose."[433] Since the SCS

---

[430] "The National Agricultural Research Center at Beltsville, Md." n.d. [ca. 1940?] NARA. RG 16, Entry 32, Box 1.

[431] "The National Agricultural Research Center of the Department of Agriculture, Beltsville, Maryland," USDA, 1939, p.17.

[432] Hugh Bennett, Chief, Soil Conservation Service, to Charles McKinley, Executive Secretary to Administrative Council, December 6, 1941. NARA, RG 114, Entry 1001, Box 3.

[433] Extract from US government manual, quoted in "National Agricultural Summary Report: Three Experiment Stations," May 1936. NARA, RG 16, Entry 32, Box 1.

carried no particular attributes in its work that would suggest a distinct architectural treatment, it was determined that the controlling factor in design was an economy of means and a modern construction method. This meant cinder-block construction, covered with stucco finish outside, plaster finish inside; the roofs were to be covered in red shingle tile. The buildings as planned were designed in three minor groups: one technical, one housing the livestock and mechanical equipment, and one for the dwellings of the staff. The farm buildings that were extant on the identified land for acquisition were to be retained, and the approach road that the government designed was to be extended through the group as a central feature.

The planning role of the SCS at BARC exceeded its modest built elements. Under Secretary of Agriculture, Paul H. Appleby, observed erosion damage at BARC during an inspection in June 1941. Appleby requested that Hugh H. Bennett, Chief of the Soil Conservation Service, and a select committee develop a conservation plan which would bring BARC up to national standards. As BARC was intended as a model for common farmers, the existing bad examples of soil conservation practices required immediate correction. This conservation plan, as described in the master planning context statement, affected BARC as a complete demonstration unit, directing land use and erosion control practices, with many portions of the plan visible in extant land-use patterns at BARC.[434]

4.8 BUREAU OF AGRICULTURAL ENGINEERING

The Bureau of Agricultural Engineering was established in July 1931 as a result of the Agricultural Appropriation Act of February 1931. The Bureau developed from several late 19th- and early 20th-century predecessor agencies, including the Irrigation Investigations Division, the Drainage Investigations Division, the Bureau of Public Roads, and the Rural Engineering Investigations Division. In 1935, the headquarters of the Bureau of Agricultural Engineering was located at Arlington Farms; however, plans were underway to move the operation to the National Agricultural Research Center (NARC), as BARC was known during a portion of the 1930s, in order to get better coordination with other bureaus and divisions within the USDA.[435] Although the official relocation of the experimental portion of the Bureau did not occur until 1942, records indicate that experimental work was conducted at the Beltsville site during the 1930s, prior to the move. Also prior to the move, the Bureau of Agricultural Engineering served as a design and review agency for the BARC site.[436]

---

[434] Soil Conservation Service, USDA, Beltsville Research Center Conservation Plan, November, 1943.

[435]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[436]NARA, RG 8, Entry 19, Box 364.

In 1938, the Bureau of Agricultural Engineering merged with the Bureau of Chemistry and Soils to form the Bureau of Agricultural Chemistry and Engineering. In 1943, the Bureau merged with the Bureau of Plant Industry and Soils to create the Bureau of Plant Industry, Soils, and Agricultural Engineering. This configuration remained stable until the Agricultural Research Administration (later Service) was established in 1952. Today, the duties of the Bureau of Agricultural Engineering have been assumed by ARS.[437]

4.8.1 Evolution of the Agricultural Engineering Site

The 12-acre tract of land allotted to the Bureau of Agricultural Chemistry and Engineering in late 1940 was located on land previously assigned to the Bureau of Animal Industry east of Insecticide Road. The area extended approximately 750 feet east from Insecticide Road and was bounded on the north by the present road through the Animal Industry Area. The south boundary line was a fence along the north edge of the area assigned to Insecticide Studies. The area was deemed to be a good building site and was close to existing utility lines, such as water, sewage, and electricity. Two years later, the Bureau required additional land to conduct work with experimental machines. An area north and west of the former radio building was selected. Use of the area, approximately three acres bounded on the west by the Bureau of Entomology and Plant Quarantine, was approved for use in late March 1942.[438]

Initially, the Bureau of Agricultural Engineering planned a complex of buildings at BARC. The complex was described in detail in the 1936 Summary Report of the National Agricultural Research Center. A preliminary requirement was that the buildings be large enough to house large equipment and machinery. Two workshops, one for woodworking, the other for metal working, were also planned. A shed and garage, with gates between, would complete the courtyard plan. Large skylights were to provide light on the top floors of each of the buildings. The office of the foreman in charge of the shops was placed in a central position between the shops. Other offices and drafting rooms were planned for the upper stories of the central unit. The central unit was to be of concrete, with exterior wall surfaces treated to expose the aggregate and leaving a natural sand finish to the quoins, lintels, and sills. The same concrete construction was to be used for all buildings in the area and all roofs were to be covered with red shingle tile. This group of buildings was to be located off of Powder Mill Road in a forested area. Agricultural engineers who designed the buildings felt that the expression of the buildings were harmonious with the natural surroundings.[439]

From these descriptions, it appears that these are the current Facility Engineering Buildings (Buildings 426, 427, and 429). It is unknown if the Bureau of Agricultural Engineering or any of its predecessor agencies ever occupied any of these buildings. Later, in 1942, Building 303, a brick equipment building, located on the border between the Central and East Farm areas, was constructed for the Bureau. Although its specific use is unknown, this building is much too small to house all of the large pieces of farm equipment necessary for the Bureau's experimental work. When the Bureau of Chemistry and

---

[437]Cultural Resources Report, Historic Overview, Beltsville Agricultural Research Center, Robinson & Associates, Inc.,1995, page 28.

[438]Archives, Facility Engineering Branch, Building 427, BARC.

[439]National Agricultural Research Center, Summary Report, May 1936, NARA, RG 16, Entry 32, Box 1.

Perhaps the most important function of the Bureau of Agricultural Engineering was designing plans for the majority of buildings at BARC. In 1938, a summary report by the Bureau of Agricultural Engineering described the Bureau's work completing construction plans of BARC. Drawings for laboratories, residences, a lodge, and garage and storage buildings were all completed by the Bureau. The Bureau was also responsible for drawing foundation plans for excavating building sites. Drawings for various special-use buildings and structures ranged from heating plants to observation towers, as well as several barns and a water reservoir for irrigation and fire protection. The wide variety of buildings and structures that were required by the bureaus of BARC were a testimony to the versatility of the agricultural engineers, who designed buildings for the Beltsville site from the 1910s through the 1952.[448]

Although the Bureau of Dairy Industry had employees designated as Dairy Engineers who were primarily responsible for designing buildings in that area during the 1910s and 1930s, records indicate that the Bureau of Agricultural Engineering was consulted on some dairy buildings. Similarly, records indicate that BARC personnel from specific bureaus designed smaller structures and special use laboratories; however, agricultural engineers made suggestions to improve the buildings and also were required to give approval on the final plans before construction could commence.[449]

The experimental research of the Bureau involved developing new building materials or using existing materials in new ways. At Beltsville in 1936, the Bureau tested canvas as a covering for building exteriors. The canvas was covered with products such as white lead, metallic zinc, oil, and aluminum powder with an asphaltic binder. These combinations gave excellent service and proved to last over two and one-half years, although frequent coats of paint were necessary to remedy cracks. This work was conducted under the supervision of Wallace Ashby, Chief of the Division of Structures of the Bureau of Agricultural Engineering. This work was thought to be so innovative that it was featured in the journal *The Architectural Record* in January 1934.[450]

Later, in the 1940s and 1950s, engineers in the Agricultural Research Division of ARS teamed up with other researchers from the Bureau of Home Economics to design five experimental houses (Buildings 193 A through E) at BARC. The bureaus' innovative uses of materials, construction techniques, and design showed American families how to use limited financial resources to plan efficient, pleasant homes.[451]

---

[448]NARA, RG 8, Entry 19, Box 297.

[449]Staff of the Zoology Division designed some of the buildings, such as laboratories, in the 1930s in the Zoology Division. Agricultural Engineers offered suggestions and gave final approval before construction commence. NARA, RG 8, Entry 19, Box 3.

[450]NARA, RG 8, Entry 19, Box 364.

[451]Wallace Ashby, "USDA Farm Buildings and Rural Housing Activities," *Agricultural Engineering*, October 1946, pp. 471-472.

To distribute experimental results, the Bureau developed a series of informational pamphlets, each discussing a separate topic, such as building materials and the results of equipment testing. These publications were extremely popular with farmers throughout the country; a 1934 pamphlet on the construction of farm houses was distributed to 219,000 farmers in the United States.[452]

4.8.3 Impact of the Work of the Bureau of Agricultural Engineering

Although tasks performed by Bureau of Agricultural Engineering may have differed from those performed by other bureaus at BARC, the divisions within the bureau were experts on a variety of areas relating to agriculture, such as irrigation, grading, fencing, equipment, and buildings. Serving in an advisory capacity, the Bureau guided many of the other bureaus and divisions of the USDA. Acting as a review agency, the Bureau of Agricultural Engineering had tremendous input into the overall appearance of BARC. By reviewing or developing building plans and landscape designs, the Bureau's imprint still remains highly visible today in areas such as Zoology where the combined work of the Zoological Division and the Bureau of Agricultural Engineering resulted in consistent building and landscaping styles, thus forming a cohesive unit within the larger confines of BARC.

4.9 OTHER AGENCIES WITH FACILITIES AT BELTSVILLE

4.9.1 Department of Commerce - National Bureau of Standards - Radio Section

Station WWV, operated by the Radio Section of the Commerce Department's Bureau of National Standards, was located north of the Shops area at Beltsville. It was established on the site in 1933. The site was dedicated to the study of radio transmissions—both audio and radio frequencies, signals marking standard time intervals, standard musical pitch (440 cycles per second), and transmissions for the study of radio wave propagation and the calibration of radio field intensity measuring sets. The standard frequency signals, transmitted on a regular schedule every day with an accuracy rate better than one part in five million, were received by radio laboratories and stations and scientists throughout the United States in need of standards of frequency or time rate.[453]

The station's equipment was housed in Building 452, a one-story, wood-frame building with basement, that was soon considered "ill adapted to the purpose of a radio transmitting station and [was] a serious fire hazard."[454] By the end of the 1930s, the National Bureau of Standards within the Department of Commerce found their facilities and equipment to be increasingly unsatisfactory and outdated. Having applied and received an appropriation from Congress enabling a move of the radio transmitting station, the Bureau was assigned a new location in 1941 by the Department of Agriculture. This area, encompassing nearly 25 acres, was located along the Branchville-Glenndale Roadway, in a parcel that formed at that

---

[452]National Agricultural Research Center, U.S. Resettlement Administration, 1935.

[453]The National Agricultural Research Center of the Department of Agriculture, p. 16.

[454]"Estimate for Replacing Radio Transmitting Station," June 5, 1940, Archives, Facility Engineering Branch, Building 427, BARC.

time a portion of the Soil Conservation Service area.[455] In the 1960s, Radio Station WWV at Greenbelt, Maryland, as it was known, was removed to Fort Collins, Colorado.[456]

In 1951, the National Bureau of Standards once again occupied the original Radio Station site, including Building 452, the wood-frame station building, for purposes of radio research. The Bureau installed four low-power radio transmitters and special antennas. In the mid-1950s, the area was used by the Technology Division of the Bureau of Standards to test fire extinguishers. By the late 1950s, the Bureau had no further use for the site and returned it to the USDA.[457]

4.9.2 Department of Commerce Airport Facility

A 1931 memorandum gave authorization to the Department of Commerce's Bureau of Air Commerce for the construction of a temporary airplane landing field upon the land formerly known as the Jenkins Farm, located in the northeast corner of the East Farm near the intersection of Powder Mill Road and Springfield Road.[458] This airport was constructed and operational by 1933; a plan from that year indicates an area marked as "Emergency Landing Field Site Number 57B." In the early 1940s, a major expansion and reconstruction of the airport was undertaken to prepare the site for use by the military. A total of 186 acres was acquired from the Forest Service Area around 1941.[459] A 1942 CCC memorandum mentions the use of 5,000 man days to perform trenching, backfill for water and sewer lines, sewage disposal, the construction of roads, walks, taxiways, and the clearing of land. The airport was used by the military during World War II. The Army Air Force utilized the property as part of the National Defense Program. After the war, it appears that the site was returned to the hands of BARC.[460] Today the area is abandoned.

4.9.3 National Youth Administration

The National Youth Administration (NYA) was created as part of the Works Progress Administration in 1935 to provide part-time work for high school, college, and out-of-school youth. It also provided vocational guidance. The agency became part of the Federal Security Agency in 1939 and was abolished

---

[455]C.A. Logan, Chief, Division of Management and Operations, to Arthur B. Thatcher, Chief, Office of Plant and Operations, August 27, 1941, Archives, Facility Engineering Branch, Building 427, BARC.

[456]David H. Andrews, Asst. Chief, Radio Broadcast Service, Radio Standards Laboratory, Boulder, Colorado, to Gentlemen, USDA, Agricultural Experiment Station, Beltsville, Maryland, November 20, 1962, Archives, Facility Engineering Branch, Building 427, BARC.

[457]Correspondence, Bureau of Standards, Archives, Facility Engineering Branch, Building 427, BARC.

[458]Memorandum from R.W. Dunlap, Acting Secretary, to the Secretary of Commerce, February 5, 1931, NARA.

[459]Memorandum from C.A. Logan, Chief, Division of Management & Operations, to Earle H. Clapp, Acting Forester, Forest Service, March 10, 1941, NARA.

[460]Memorandum 'Re: Army Use of Land at the Beltsville Research Center,' by P.V. Cardon, October 25, 1943, NARA.

in 1943.

On October 15, 1940, an agreement was reached to establish a youth training project under the aegis of the National Youth Administration at BARC. As a result of the agreement, a revocable permit terminable on 30 days notice was issued by USDA to the NYA which included a provision that when the facilities were vacated they would revert back to the USDA.[461] The NYA buildings at Beltsville were mostly completed by late 1941 when the facility opened. The facility originally consisted of approximately thirteen prefabricated buildings. Both the buildings and improvements necessary for the facility were constructed with NYA funds, with WPA and CCC labor providing minor additional support. CCC labor was specifically used on the construction of access roads and water system, and grading of the site. The buildings constructed for the NYA organization, Buildings 413 through 425, included dormitories, a hospital building, an administration building, a dining hall, a storage building, and residences.

Although practically no information has been located about the programs conducted at the short-lived facility, it is known that the facility included a metal shop building which was, apparently, used for training purposes.

The facility closed on November 30, 1942, and the buildings were formally returned to USDA on January 2, 1943. The buildings were used for a variety of purposes thereafter, including an "aerosol" lab for the Bureau of Entomology and Plant Quarantine, a technical office and cartographic facility for the Soil Conservation Service, a mineral deposits facility for Geological Survey, and a radio lab for the Forest Service. Although most of the NYA buildings at BARC have been demolished, Buildings 419 and 425 are still extant.

4.9.4 Production and Marketing Administration

The Production and Marketing Administration (PMA) was established in 1945 and operated until 1953 when its functions became part of the Agricultural Marketing Service and the Commodity Stabilization Service. The PMA combined the functions of a number of predecessor organizations. Amongst a number of others, these included the FDA's duties relating to insecticides and the Soil Conservation Service's aerial photographic work both of which were conducted at Beltsville. The PMA occupied three facilities at BARC: the insecticide testing facilities originally constructed for the FDA (Buildings 402 through 405), space in the Film Storage Vaults, (Building 312) and space in the South Departmental Laboratory (Building 306).

The main duties of the PMA related to the standardization and inspection of farm products. The Standardization Research and Testing Division of the Grain Products Branch performed a variety of types of tests of grain in order to improve on the standards and to create new and improved methods of inspection and evaluation. In addition to grains, studies were also conducted on rice, hops, beans, peas, hay, mustard seed, and buckwheat Examples of research conducted for this purpose was the testing of electric moisture meters, development of a method to determine the degree of soundness and deterioration in stored grains, and tests to determine the quality and quantity of oil in oil-bearing seeds. In addition,

[461]Inspection Memorandum, Fred B. Agee, Acting Chief , Office of CCC Activities, United States Department of Agriculture, December 10, 1941, NARA, RG 16, Entry 244, Box 26.

work was done on the development and standardization of equipment for use in grain inspection such as test-weight-per-bushel apparatus, and apparatus for kernel-sizing.

The Production and Marketing Administration was also responsible for insuring seed quality through the enforcement of the Federal Seed Act of 1939 which requires truthful labeling of seeds shipped in interstate commerce. To insure that seed companies comply with the law, the Production and Marketing Administration examined hundreds of samples of seeds in laboratories at Beltsville and, under their supervision, at a number of other field laboratories. Tests of the seeds were done to determine viability and purity.

During the World War II, the Grain Branch of the Production and Marketing Administration took on an additional task. It became responsible for testing commodities ranging from flours, to soaps and vegetable oils purchased by the government for export to other countries (under the lend-lease and other programs) and for the armed forces. The total value of products inspected under this program in the fiscal year ending June 30, 1945 amounted to approximately $170 million.[462]

4.9.5 United States Forest Service

New Deal funding gave the Forest Service the opportunity for a greater role in national conservation. This expansion began under the McSweeney-McNary Act of 1928, which enlarged the Forest Services' forest research program.[463] Under it, the Forest Service established tree growth experiment stations on private woodlands that offered instruction in "how to manage cut-over lands."[464] Twelve major experimental forests across the United States furthered development of "scientific forestry methods especially adapted to each area." At BARC, a 4,000-acre tract of oak and pine with mixed species of minor hardwood was designated for the study of Eastern forestry problems.[465] The Forest Service tract contained a small group of buildings which date to c. 1938.[466] Civilian Conservation Corps landscape architect R.T. Walker produced a planting plan for the Forest Service group in June 1940. The program of the tract included its use as a demonstration model for "combination grazing and forestry," specialized tree cultivation, and a "miniature of the great woodlands which once covered most of the middle Atlantic coastal plain."[467] The

---

[462]"Research for Better Farming and Farm Living," USDA, August 1945; NARA, RG 310, Entry 1001, Box 2.

[463]Joseph M. Petui, *American Environmental History*, San Francisco : Boyd & Fraser, 1977, p. 67.

[464]Petui, *American Environmental History*, p. 67.

[465]U.S. Resettlement Administration, *National Agricultural Research Center, 1937.*

[466]BARC Facility Engineering Archives. United States Department of Agriculture. *Grading For General Layout*, by R.B. McDonnell. Beltsville, MD, 1938. BARC Facility Engineering Archives. United States Department of Agriculture. *General Layout Plan, Forest Service Group, NARC.* Beltsville, MD, 1938. BARC Facility Engineering Archives. United States Department of Agriculture. *US Forest Service Group, Planting Plan*, by R.T. Walker. Beltsville, MD, June 1940.

[467]Ibid.

5.0 BIBLIOGRAPHY

Primary and Secondary Written Sources

"The Agricultural Research Center of the United States Department of Agriculture." Washington, D.C.: United States Department of Agriculture, 1949.

Arlington Relocation Documents, National Archives and Records Administration, Record Group 54, Entry 151A.

BARC Facility Engineering Archives. File folders labled "Land" and "Buildings" (Material, most from the 1940s onward, relating to landuse, operation of the physical plant, etc.)

Beall, Susie. "Birmingham Manor - The Snowden Grant." Undated manuscript.

Beattie, J.H. "Greenhouse Construction and Heating." *Farmers Bulletin.* 1318: 1-38 (1934).

"Beltsville Farm to be Expanded." *The Washington Star Sunday Magazine.* October 15, 1933.

Benard Johnson Young, Inc. *Beltsville Agricultural Research Center 1996 Master Plan Update.* September, 1996

Birnbaum, Charles, and Lisa E. Crowder. *Pioneers of American Design - An Annotated Bibliography,* Washington: U.S. Department of the Interior, 1993.

Bushong, William, Judith Robinson, and Julie Mueller. *A Centennial History of the Washington Chapter, The American Institute of Architects.* Washington: Washington Architectural Foundation Press, 1987.

Capitaine, Elizabeth. "New Bulb Industry is Assured." *The Washington Star*, March 24, 1940.

"Construction at Beltsville." *Science* 78 (1933): 525-6.

Cutler, Phoebe. *The Public Landscape of the New Deal.* New Haven: Yale University Press, 1985.

The Division of Fruit and Vegetable Crops and Diseases. *Newsletter.* National Archives Records Administration, Record Group 54, Entry 135B.

George, Alexander R. "Beltsville Scientists Seek New Ways to Boost Our Wartime Food Production." *The Washington Star*, March 18, 1945.

Houck, U.G. The Bureau of Animal Industry of the United States Department of Agriculture. Washington: Published by the Author, 1924.

"How Uncle Sam Runs World's Finest Farm." *Popular Mechanics* 47 (1927): 371-4.

Kennedy, George. "Beltsville Provides Beautiful Setting for Farm Research." *The Washington Star.* September 4, 1955.

Lease between Theodore Alexander Sellman and Robert Lee Sellman and the United States of America, December 18, 1931. National Archives Records Administration, Record Group 54, "Deed & Title Records."

Leonard, John. "Frontiers of Agriculture." *The Washington Star Sunday Magazine*, November 11, 1956.

Logan, C.A. "Brief History of the Agricultural Research Center." Unpublished manuscript, September 1962.

Matthews, Samuel W. "Beltsville Brings Science to the Farm." *National Geographic* 104 (August 1953): 199-218.

National Archives and Records Administration, Record Groups 7, 8, 16, 17, 31, 54, 66, 83, 88, 96, 114, 152,164, 176, 207, 310, 328, 429.

Olmert, Michael. "Genes and Viruses are Harnessed on a Farm Tended by Scientists." *Smithsonian*, March 1982.

Petui, Joseph M. *American Environmental History.* San Francisco: Boyd and Fraser, 1977.

Pevsner, Nikolaus. *A History of Building Types.* Princeton: Princeton University Press, 1976.

"Plant Science After Fifty Years." *Science* 113 (June 19, 1951): Sup. 3.

Powell, Fred Wilbur. *The Bureau of Plant Industry; Its History, Activities.* New York: AMS Press, 1974.

Robinson and Associates, Inc. *Final Phase III Cultural Resources Report.* December 1995.

Short, C.W. and R. Stanley-Brown. *Public Buildings A Survey of Architecture.* 1939.

Stokes, Dillard. "Beltsville Agricultural Research Center Does Well a Multitude of Duties." *The Washington Post,* February 20, 1938.

True, Alfred Charles. *A History of Agricultural Experimentation and Research.* Washington, D.C.: U.S. Government Printing Office, 1904.

U.S. Department of Agriculture, Agricultural Research Administration. Directory of *Activities of the Bureau of Plant Industry, Soils, and Agricultural Engineering.* Washington, D.C.: United States Government Printing Office, 1952.

U.S. Department of Agriculture, T*he National Agricultural Research Center of the Department of Agriculture, Beltsville, Maryland,* USDA, 1939. (NARA RG 16)

U.S. Department of Agriculture, *The National Agricultural Research Center at Beltsville, Md.* n.d. [c. 1940] (NARA, RG 16, Entry 32, Box 1).

U.S. Department of Agriculture. Soil Conservation Service. *Annual Report of 1935*, by Hugh H. Bennet. Annual Reports of the Department of Agriculture. Washington, D.C., 1935.

U.S. Department of Agriculture. Soil Conservation Service. *Beltsville Research Center Conservation Plan, November, 1943.* Washington, D.C., 1943.

U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. *Directory of Activities*. Washington, D.C.: U.S. Government Printing Office, (ND).

U.S. Resettlement Administration. "National Agricultural Research Center, Beltsville, MD" (1937)

U.S.Resettlement Administration, *National Agricultural Summary Report: Three Experiment Stations*, May 1936 (NARA, RG 16, Entry 32, Box 1).

"U.S. Self-Dependence Stressed in Plant Industry Report." *Science* 93 (1941): 10.

Wiser, Vivian and Wayne D. Rasmussen. "Background for Plenty: A National Center for Agricultural Research," *Maryland Historical Magazine*, Vol. 61, No. 4 (December 1966), p. 292.

Oral Interviews

Telephone and/or in-person interviews conducted by Carol Hooper with the following ARS/Beltsville/North Farm employees or former employees:

Dr. Miklos Faust 6/8/95
Joseph Graham 6/5/95
Harold Winters 6/12/95
Jim Elgin 6/5/95
Dr. L.W. Briggle 6/5/95
Howard Hruska 6/4/95
Dr. R.A. Kilpatrick 6/3/95
William Bailey 6/3/95
Mrs. J.O. Moseman 6/6/95
Mr. Robert Walker 6/22/95 (CCC landscape architect/supervisor)

Plans/Maps

Site Plans (all available at BARC Facility Engineering Branch)

1926 *Beltsville Experimental Farm & Vicinity.*
1928 *Key Map U.S. Animal Husbandry Experiment Farm.*
1932 *U.S. Animal Husbandry Experiment Farm, Beltsville, MD.*
1933 *U.S. Animal Husbandry Farm, Cooperating and Adjoining Units.*
1934 *U.S. Experiment Station, Sketch Study for Proposed Development of Property,* A.D.Taylor and Delos Smith.
1934 *Locations of PWA Projects.*
1934 *Project Locations, U.S. Experimental Station.*
1934 *U.S. Experiment Station, Sketch Study for Proposed Development of Property,* Revised Version (Showing sites of PWA projects).
1935 *Preliminary Plat - Berwyn Area*
1935 *Relative Locations & Approximate Acreages of Property*
1936 *Resettlement Administration - Property Acquired in Berwyn Area*
1936/37 *A Pictorial Map of the National Agricultural Research Center.*
1938 *Location of P.W.A. and W.P.A. Projects, National Agricultural Research Center.*
1939 *U.S. Department of Agriculture National Agricultural Research Center.* (Updated to 1956).
1943 *National Agricultural Research Center* (Soil Conservation Tract).
1943 *Plant Industry Station, Beltsville, Maryland.*
1949 *U.S. Department of Agriculture Beltsville Research Center.*

Site-Specific Plans

BARC Facility Engineering Archives. Architectural Plans for Buildings at BARC (BARC Building 426).

BARC Facility Engineering Archives. United States Department of Agriculture. *US Poultry Farm* (layout

plan), S.K. Haynes. Beltsville, MD, Jan. 1932.

BARC Facility Engineering Archives. United States Department of Agriculture. *Cattle and Swine Lots, Paddocks, and Adjacent Fields. Animal Husbandry Farm,* H.F. Sehorn. Beltsville, MD, April, 1932.

BARC Facility Engineering Archives. United States Department of Agriculture. *Drainage SystemGatti Farm. US Experimental Station.* Beltsville, MD, Dec. 19, 1932.

BARC Facility Engineering Archives. United States Department of Agriculture. Bureau of Agriculutural Engineering. Division of Plans and *Service.Grading Control Map of BAI Poultry Buildings.* Sheet 2 of 2. Beltsville, MD, Jan. 3, 1934.

BARC Facility Engineering Archives.United States Department of Agriculture. *North Portion Plan of Sheep Area*, F. Tilp. Beltsville, MD, Feb. 24, 1934.

BARC Facility Engineering Archives. United States Department of Agriculture. U.S. Experimental Farm Beltsville, MD. *Animal Husbandry Laboratory. Cross Sections for Grading Plan,* A.D. Taylor Landscape Architect. Beltsville, MD, May 16, 1934.

BARC Facility Engineering Archives. United States Department of Agriculture. *Biological Survey Wildlife Demonstration Area.* Beltsville, MD, June 1934.

BARC Facility Engineering Archives. United States Department of Agriculture. Bureau of Animal Industry. *Poultry,* A.D. Taylor and Robert T. Walker. Beltsville, MD,1934.

BARC Facility Engineering Archives. United States Department of Agriculture. Bureau of Animal Industry. *Pathological Unit (Qurantine Farm)*, A.D. Taylor (and Delos Smith). Beltsville, MD, 1934.

BARC Facility Engineering Archives. United States Department of Agriculture. Bureau of Animal Industry. *Drainage*, JD Desch. Beltsville, MD, Jan. 17, 1935.

BARC Facility Engineering Archives. United States Department of Agriculture. Plan of Sheep Area. *Animal Husbandry Experimental Farm*, H.F. Sehorn. Beltsville, MD, April 5, 1935

BARC Facility Engineering Archives. United States Department of Agriculture. Animal Husbandry Lab. *Planting Plan,* R.T. Walker. Beltsville, MD, Aug. 15, 1935.

BARC Facility Engineering Archives. United States Department of Agriculture. *Sketch Plan of Proposed Sheep Area adjacent to Dog Area*, H.F. Sehorn. Beltsville, MD, Sept. 8, 1936.

BARC Facility Engineering Archives. United States Department of Agriculture. *Plan for Layout of Swine Paddocks Area South of "Radio Road."* Beltsville, MD, July 15, 1936.

BARC Facility Engineering Archives. United States Department of Agriculture. Division of Animal Husbandry. *Main Laboratory. Revised Grading Plan*, R.T. Walker. Beltsville, MD, Aug. 25, 1937.

BARC Facility Engineering Archives. U.S. Department of Agriculture. Untitled Map by Bureau of Plant Industry, Soils, and Agriculture Engineering. Washington, D.C., 1943.

BARC Facility Engineering Archives. United States Department of Agriculture. *"Sketch Layout for Dairy Quaratine Unit,"* A.D. Taylor (and Delos Smith). Beltsville, MD, N.D.

Maryland Board of Forestry. *Map of Prince George's Co. and District of Columbia Forest Areas by Commercial Type*, prepared by F. W. Besley. 1912.

Maryland Geological Survey, Map of Prince George's Co. and District of Columbia showing Topography and Election Districts: 1903.

Maryland Geological Survey, Map of Prince George's Co. and District of Columbia showing Topography and Election Districts: 1914.

Maryland Geological Survey, Map of Prince George's Co. and District of Columbia showing Topography and Election Districts: 1927.

Maryland Geological Survey, Map of Prince George's Co. and District of Columbia showing Topography and Election Districts: 1936.

U.S. Department of Agriculture. Soil Conservation Service. *Aerial Mosaic/USDA Agricultural Research Center*, compiled by Cartographic Division, Soil Conservation Service, 1957.

NARA Cartographic Division, RG 145 Can 2070 Frames FG-132-177, FG-132-178, FG-135-17 thru 19.

Maryland Department of Geology, Mines, and Water Resources: 1946.

Sources of Illustrations

[Note: NARA refers to the National Archives and Records Administration. RG refers to Record Group. All National Archives material cited below was located at the College Park facility.]

Figure 1 - NARA, Still Pictures Division, RG 17 HDA Album 15.
Figure 2 - Courtesy of Tom Streets (BARC).
Figure 3 - Base Map, Facility Engineering Plan Room. Overlay - Robinson & Associates, Inc.
Figure 4 - C.A. Logan, "Brief History of the Agricultural Research Center," 1962 .
Figure 5 - Farm Operations Branch BARC.
Figure 6 - Facility Engineering Plan Room (BARC Building 426).
Figure 7 - Facility Engineering Plan Room (BARC Building 426).
Figure 8 - NARA, RG 328, Entry 7, Box 91.
Figure 9 - *Landscape Architecture*, Appears in Phoebe Cutler, *Public Landscape of the New Deal*, New Haven: Yale University Press, 1985.
Figure 10 - National Agricultural Library, Special Collections Division.
Figure 11 - NARA, Still Pictures Division, RG 35G Box 9.
Figure 12 - NARA, Still Pictures Division, RG 35G Box 9.
Figure 13 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 14 - Facility Engineering Plan Room (BARC Building 426).
Figure 15 - Facility Engineering Archives (BARC Building 427).
Figure 16 - Facility Engineering Plan Room (BARC Building 426).
Figure 17 - Robinson & Associates.
Figure 18 - Courtesy of Michael Thies (Former BARC Employee).
Figure 19 - Courtesy of Tom Streets (BARC).
Figure 20 - Facility Engineering Plan Room (BARC Building 426).
Figure 21 - NARA, Still Pictures Division, RG8D, Box 16/17.
Figure 22 - Facility Engineering Archives (BARC Building 427).
Figure 23 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 24 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 25 - NARA, Still Pictures Division, RG 17, HDA Album 15.
Figure 26 - NARA, Still Pictures Division, RG 17, HDA Album 15.
Figure 27 - NARA, Still Pictures Division, RG 17, HDA Album 15.
Figure 28 - Courtesy of Bobby Benfield.
Figure 29 - Facility Engineering Archives (BARC Building 427).
Figure 30 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 31 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 32 - Facility Engineering Archives (BARC Building 427).
Figure 33 - NARA, Textual Records Division, RG 16, Entry 177, Box 8.
Figure 34 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 35 - Facility Engineering Plan Room (BARC Building 426).
Figure 36 - National Agricultural Library, Special Collections, Scrapbook.
Figure 37 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 38 - Courtesy of Tom Streets (BARC).
Figure 39 - NARA, Textual Records Division, RG 16, Entry 32, Box 1.
Figure 40 - Courtesy of Tom Streets (BARC).

Figure 41 - NARA, Still Pictures Division, RG 208-LU, Box 4.
Figure 42 - NARA, Textual Records Division, RG 16, Entry 17, Box 2278.
Figure 43 - Bess Furman, "Pans, Pots, Soups, Socks," *The Democratic Digest*, Volume 18, No. 4, April 1941 (NARA, Textual Records Division, RG 310, Entry 1001, Box 2).
Figure 44 - *The Beltsville Kitchen-Workroom*, U.S. Department of Agriculture, Home and Garden Bulletin No. 60, November 1958.