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NPS Form 10-900
(Oct. 1990)

NPS/William C. Page, Public Historian, Word Processor Format

OMB No. 1024-0018

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INTERAGENCY RESOURCES DIVISION
NATIONAL PARK SERVICE

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" on the appropriate line or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name THE BYAL ORCHARD HISTORIC DISTRICT

other names/site number

2. Location

street & number Rural Route #1, Box 168 N/A not for publication

city or town Mingo X vicinity

state Iowa code IA county Jasper code 099 zip code 50168

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this (X nomination _ request for determination of eligibility) meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property (X meets _ does not meet) the National Register criteria. I recommend that this property be considered significant (_ nationally X statewide _ locally). (_ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 9/20/94

State or Federal agency and bureau

In my opinion, the property (_ meets _ does not meet) the National Register criteria. (_ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is :

X entered in the National Register.
_ See continuation sheet.
_ determined eligible for the National Register
_ See continuation sheet
_ determined not eligible for the National Register
_ removed from the National Register.
_ Other, (Explain)

for Edson H. Beall — Signature of Keeper

Entered in the National Register — Date of Action 10.28.94

5. Classification

Ownership of Property
(Check as many lines as apply)

- X private
- _ public-local
- _ public-State
- _ public-Federal

Category of Property
(Check only one line)

- _ building(s)
- X district
- _ site
- _ structure
- _ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
2		sites
1		structures
		objects
3	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing)

N/A

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

AGRICULTURE/SUBSISTENCE,
agricultural field

Current Functions
(Enter categories from instructions)

AGRICULTURE/SUBSISTENCE,
agricultural field

7. Description

Architectural Classification
(Enter categories from instructions)

N/A

Materials
(Enter categories from instructions)

foundation N/A
walls N/A
roof N/A
other N/A

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" on one or more lines for the criteria qualifying the property for National Register listing)

X **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_ **B** Property is associated with the lives of persons significant in our past.

_ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

_ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" on all the lines that apply)
Property is:

_ **A** owned by a religious institution or used for religious purposes.

_ **B** removed from its original location.

_ **C** a birthplace or grave.

_ **D** a cemetery.

_ **E** a reconstructed building, object, or structure.

_ **F** a commemorative property.

_ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

AGRICULTURE

Period of Significance

1933-1944

Significant Dates

1933, 1934, 1936, 1940

Significant Person
(Complete if Criterion B is marked above)

N/A

Cultural Affiliation

N/A

Architect/Builder

N/A

Narrative Statement of Significance - (Explain the significance of the property on one or more continuation sheets)

9. Major Bibliography References

Bibliography
(Cite the books, articles and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

_ previous determination of individual listing (36 CFR 67) has been requested
_ previously listed in the National Register
_ previously determined eligible by the National Record
_ designated a National Historic Landmark
_ recorded by American Buildings Survey # _____
_ recorded by Historic American Engineering Record # _____

Primary location of additional data:

X State Historical Preservation Office
_ Other State agency
_ Federal agency
_ Local government
_ University
_ Other

Name of repository

_____

The Byal Orchard Historic District
Name of Property

Jasper County, Iowa
County and State

10. Geographical Data

Acreage of Property 13 acres +/-

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	15	479220	4627220
2	15	480180	4627220
3	15	479360	4730280
4	__	_ __ ___	__ __ ___

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet)

11. Form Prepared By

name/title William C. Page, Public Historian

organization _____ date September 24, 1993

street & number 520 East Sheridan Avenue telephone 515-243-5740; FAX 515-243-7285

city or town Des Moines state Iowa zip code 50313

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs - Representative **black and white photographs** of the property.

Additional items - (Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name Byal Orchards, Attn: Hugh Byal

street & number Rural Route #1, Box 168 telephone 515-363-4210

city or town Mingo state Iowa zip code 50168

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section number 7 Page 1

The Byal Orchard Historic District, Jasper County, Iowa.

GENERAL DESCRIPTION

Located within the rolling countryside of Jasper County near Clear and Indian Creeks, the Byal Orchard Historic District comprises an historic apple orchard containing approximately 13 acres of land. There are six resources within this historic district—four stands of top-worked apple trees, planted in 1933-1934; a network of traffic corridors, also established in 1933-1934; and a windbreak of Ash and Mulberry trees planted in 1936. Four additional land use areas adjacent to the Byal Orchard Historic District are excluded from this nomination at the present time because their significance has not yet met the 50-year requirement.

THE BYAL ORCHARD HISTORIC DISTRICT

Boundaries

The Byal Orchard Historic District contains approximately 13 acres of land. The edges of this rural landscape are demarcated by natural features and by long-standing vegetation.

The natural feature of a ridge, which runs east and west, defines the north edge of this historic district. Long-standing vegetation—a windbreak of trees running along this ridge—further defines the north edge. The southern edge is defined by another natural feature—the beginning of a swale. This swale runs to the south beyond the historic district. The southern edge is further defined by the most southern stand of apple trees. The east and west edges of the historic district are also defined by long-standing vegetation—in this case the ends of the stands of apple trees.

These boundaries contain the entire orchard planted in 1933 and 1934 by Hugh and Roscoe Byal.

Resources

The Byal Orchard Historic District features four stands of apple trees laid out in grid fashion in ten rows running east to west. Each row measures 80 rods in length. The following apple varieties are represented: Jonathan (the first, second, third, eighth, ninth, and tenth rows from the north), Yellow Delicious (the fourth row from the north), and Red Delicious (the fifth, sixth, and seventh rows from the north). All these apple trees feature top-worked, Hibernal root stock, whose significance is described in Section 8 of this nomination. A windbreak, 69 rods in length, runs along the northern edge of the orchard.

The historic district consists of three resources. These resources include two sites and one structure:

1. ORCHARD

   This site is counted as one contributing resource to the historic district.

The orchard contains of the following four stands of apple trees:

Stand of Jonathan Apple Trees (Rows 1, 2, and 3)

This stand comprises approximately 100 top-worked Jonathan apple trees, laid out in three rows.

Stand of Yellow Delicious Apple Trees (Row 4)

This stand comprises approximately three dozen top-worked Yellow Delicious apple trees, laid out in one row.

Stand of Red Delicious Apple Trees (Rows 5, 6, and 7)

This stand comprises approximately 100 top-worked Red Delicious apple trees, laid out in three rows.

Stand of Jonathan Apple Trees (Rows 8, 9, and 10)

This stand comprises approximately 100 top-worked Jonathan apple trees, laid out in three rows.

2. WINDBREAK

This site is counted as one contributing resource to the historic district.

This windbreak, consisting of one row of Ash and Mulberry trees, runs 69 rods along the north edge of the historic district. It provides the orchard protection against the weather. This windbreak was planted in 1936 by Hugh and Roscoe Byal. The choice of Ash and Mulberry for the windbreak is credited to William Byal, their father.

3. TRAFFIC CIRCULATION NETWORK

This structure is counted as one contributing resource to the historic district.

The traffic circulation network consists of eleven corridors within the orchard. Each of these corridors is 36 feet in width and running east and west 80 rods. These corridors are situated between the rows of apple trees and also the windbreak.

Each row of apple trees described above was planted using the top-work method. According to the Iowa State Extension Service:

> Whenever the top of the tree is completely replaced by a new top of another variety, the process is called top-working. The customary manner of top-working is to plant the grafted trees of the hardy varieties and grow them 1 or 2 years in the orchard. Then onto the main limbs of these trees are budded or grafted the variety or varieties which will form the bearing top. (Iowa State Extension Service 1937:3)

Continuation Page 10 illustrates a contemporary photograph of a young top-worked tree.

Evolution and Present Condition

The present visual impression of the orchard is considerably different than when it was first planted. The Byal Orchard Historic District now presents the image of a mature, top-worked apple orchard. Most trees stand approximately 50 feet tall and have a branch-spread diameter of approximately 15 feet. Each tree features a central trunk of Hibernal root stock with top-worked varietal branches (also known as "scaffold limbs") situated approximately 24 inches from grade. These trees show good uniformity in growth, a characteristic already noted in 1936 one characteristic of top-worked apple varieties on hardy stocks ("Annual Report" 1936:167).

The trees are situated 36 feet on center apart from one another in each row. The width of the traffic corridors is also 36 feet on center. This configuration forms a grid, the integrity of which remains intact. When first planted, the Byal Orchard contained 360 trees. Few trees have died and the minimal losses that have occurred are in random fashion scattered throughout the orchard. No new plantings have taken place within the orchard since its original planting. No structure or building has been added within the historic district boundaries. The corridors between the rows of trees have been well-maintained over the years. They continue to function as pedestrian and farm-implement corridors.

The present condition of the windbreak is very good. Although the great Central Iowa ice storm of March 1991 took out the tops of some of these trees, few have died.

EXCLUDED LAND USE AREAS

The Byal Orchard Historic District is abutted by four other land use areas: the West Orchard, South Orchard, Upper Farm, and Lower Farm. As discussed in Section 8, the nomination of this historic district might, at a future time, be amended by the addition of these four areas. At the present, however, they are excluded from the district's boundaries because their historical significance postdates the National Register's 50-year age requirement and they do not obtain exceptional significance under Criterion Consideration G.

These excluded land use areas are described below as background information.

West Orchard

The West Orchard contains approximately 14 acres of land. It was planted by Hugh and Roscoe Byal between 1953 and 1954. This orchard features semi-dwarf apple trees, regularly laid out, and running east to west. Each row measures 80 rods in length. The West Orchard contains three varieties of apples: Jonathan, Yellow Delicious, and Red Delicious.

South Orchard

The South Orchard contains approximately seven acres of land. It was planted by Hugh Byal between 1956 and 1957. Previous to this time, the land provided grazing for Byal's cattle and hog operation.

The South Orchard features semi-dwarf apple trees, regularly laid out in rows running north to south. This orchard contains four varieties. They include Rome Beauty, Early Blaze, Jonathan, and Red Delicious. A pond of water stands on the south edge of the South Orchard and separates it from the Lower Farm. A windbreak is situated on the northern edge of the South Orchard between it and the West Orchard.

Upper Farm

The Upper Farm stands along a ridge, which runs north and south. Farm buildings are situated in a linear fashion along this ridge, beginning with the farmhouse at the south and with other farm buildings running along the spine of the ridge to the north.

The Upper Farm functions today as headquarters for operations associated with the orchards. These operations include the processing, storing, and marketing of apples, shelter for equipment, and a residential section for the orchard's owner. For this reason, the Upper Farm has been developed to a greater extent than other areas of the historic district, and more modern structures are located here than in any other.

The Upper Farm contains the following eight resources: the Plumb-Byal House, a modern automobile garage, a barn now converted to apple sales, a chicken house, a shed, a modern packing shed, a modern windmill, and an historic windbreak.

Lower Farm

The Lower Farm is situated at the foot of the ridge mentioned above and below the Upper Farm. The Lower Farm evolved as the location for structures associated with the livestock and crop operations on the farm and continued in this use until 1956 when the South Orchard was planted. This orchard

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reduced the acreage in the Lower Farm and livestock operations were thereafter somewhat curtailed. A stand of timber is situated in the eastern portion of the Lower Farm and separates it from another farm.

The Lower Farm contains five structures including a livestock barn, hog house, corn crib, shop, and corrugated metal grain bins.

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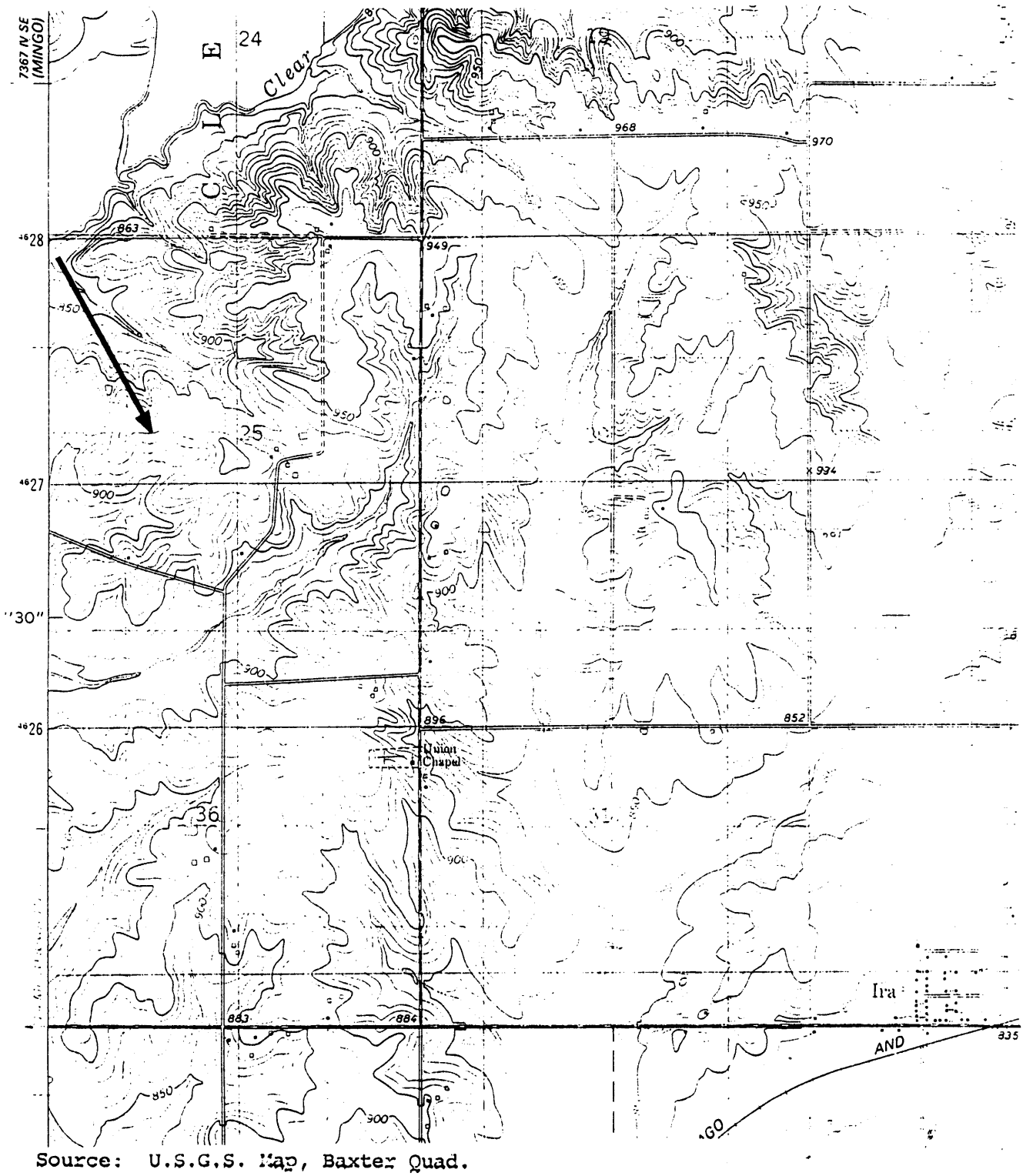
Byal Orchards Historic District, Jasper County, Iowa.

VICINITY MAP ARROW INDICATES SITE



Source: U.S.G.S. Map, Baxter Quad.

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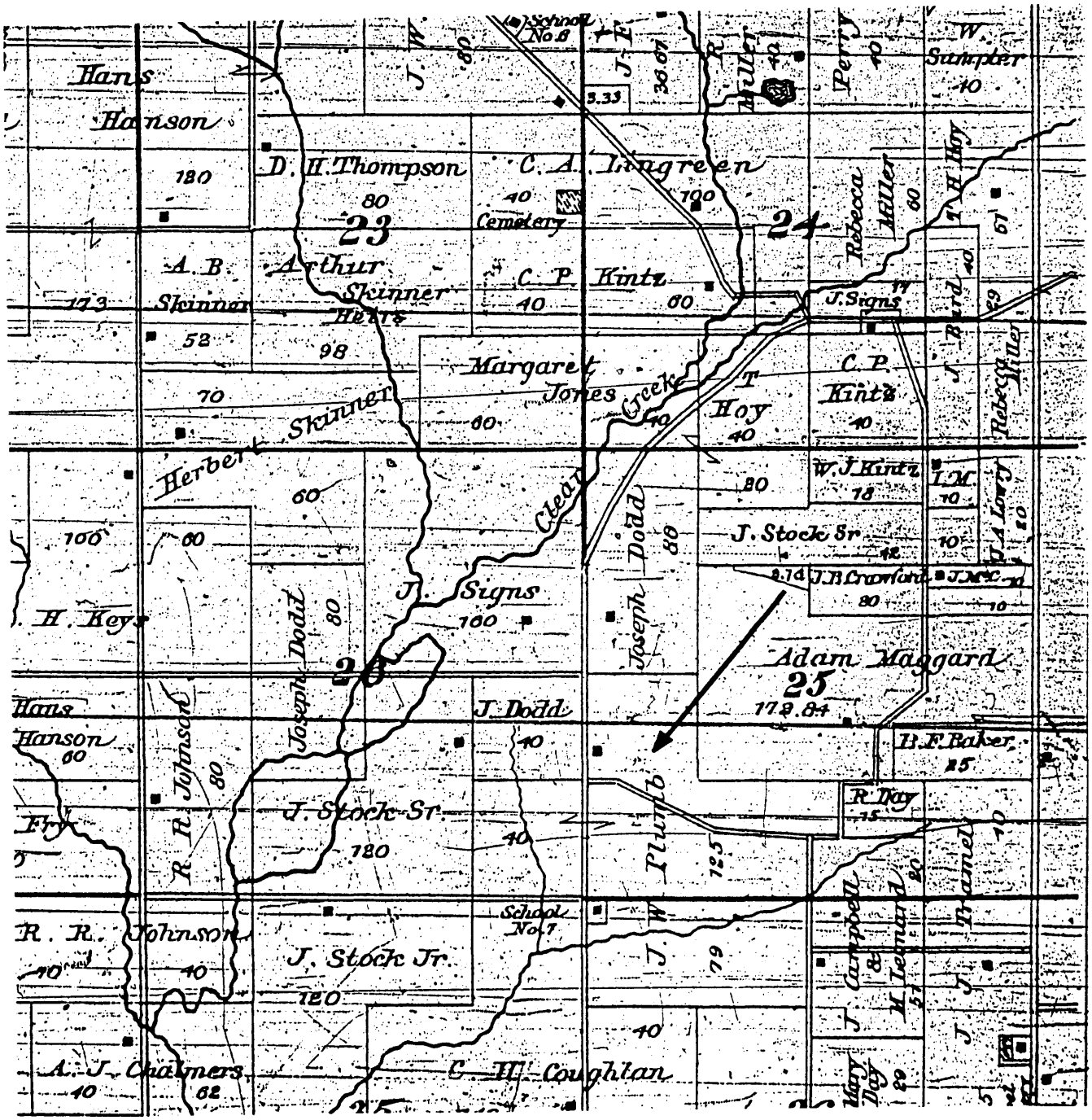
Byal Orchards Historic District, Jasper County, Iowa.

FARM
CIRCA 1887



Source: *Atlas of Jasper County, Iowa*; 1887.

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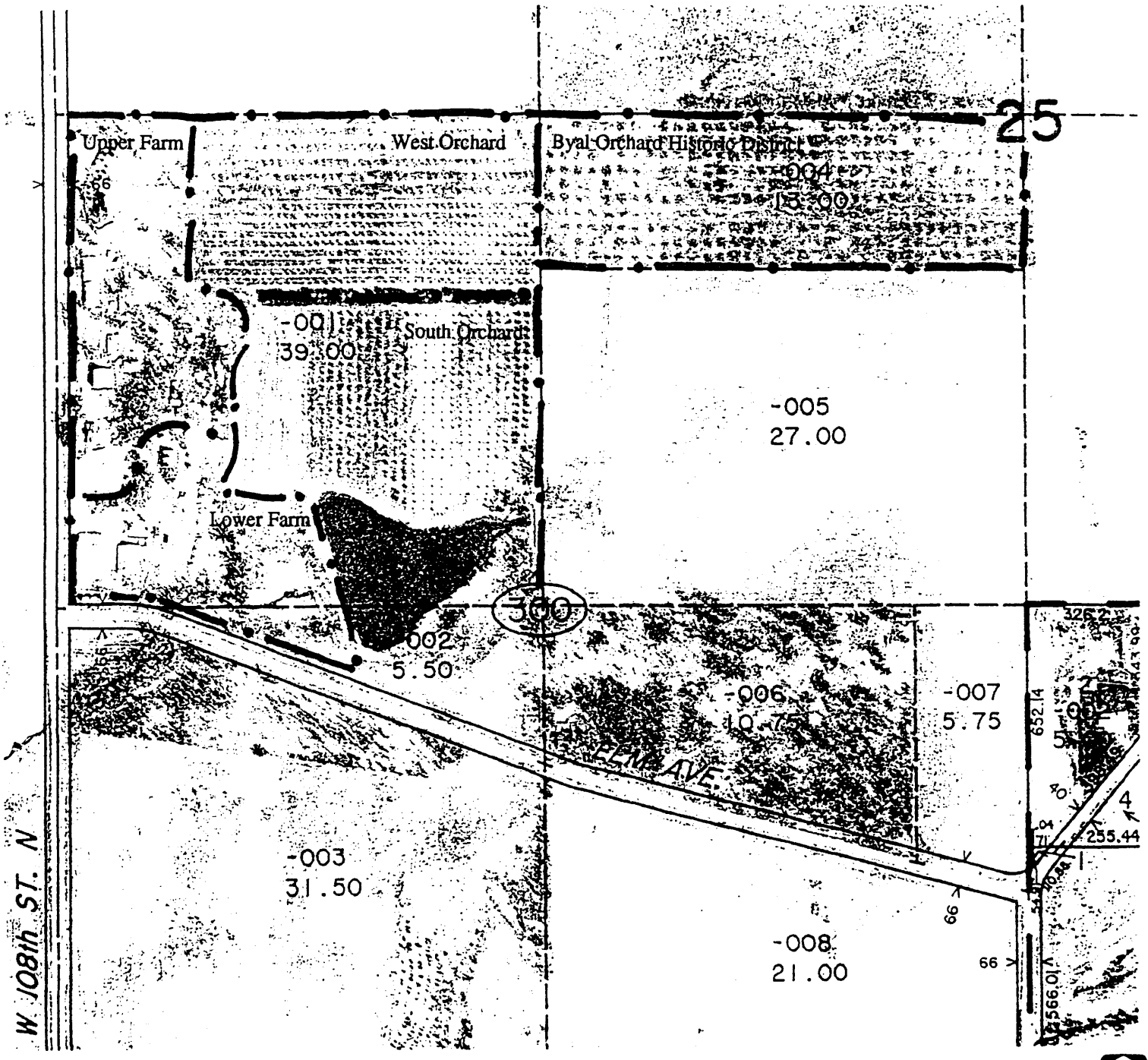
Byal Orchards Historic District, Jasper County, Iowa.

LAND USE AREAS



Source: Sidwell; 1990 Flight.

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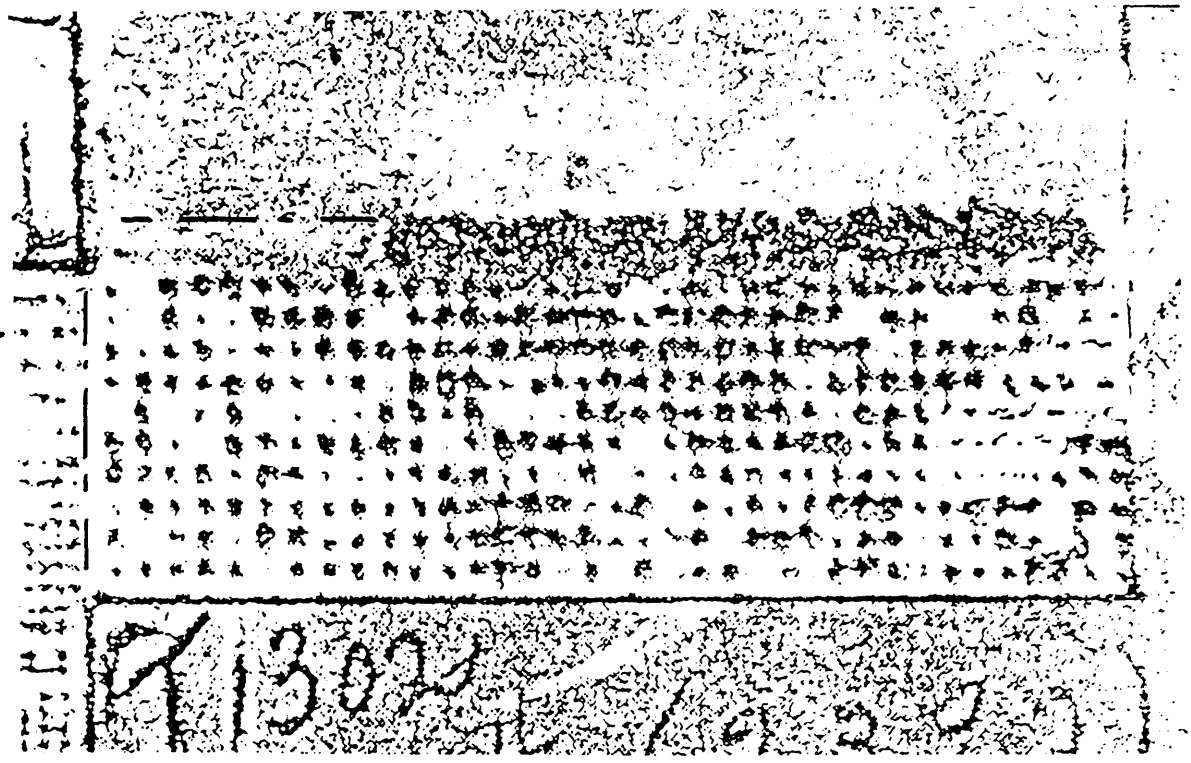
The Byal Orchard, Jasper County, Iowa.

BYAL ORCHARD HISTORIC DISTRICT



The traffic circulation network appears as open space between the trees.

Source: U. S. Department of Agriculture, Agricultural Stablization and Conservation Service; Aerial photograph; Clear Creek Quadrant, Jasper County, Iowa; 1982.

The Byal Orchard, Jasper County, Iowa.

H. E. NICHOLS AS AN EXTENSION HORTICULTURIST

Fig. 7. H. E. Nichols, extension horticulturist, is pictured here as he explains the fine points of black raspberry production to a group of Iowa farm people.

Source: "Annual Report," Agriculture and Home Economics Experiment Station; 1941; p. 19.

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The Byal Orchard, Jasper County, Iowa.

ILLUSTRATION OF YOUNG TOP-WORKED TREE

Scaffold Limbs of Young Topworked Tree. Lines Show Location of Grafts

Source: Hoffman; "Topworking the Apple Tree"; 1930; p. 1.

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The Byal Orchard Historic District, Jasper County, Iowa.

SUMMARY OF SIGNIFICANCE

Located in the vicinity of Mingo, Iowa, and planted in 1933-1934, the Byal Orchard Historic District is an historic rural landscape significant statewide and under National Register Criterion A because it calls attention to the symbiotic relationship between science and practice in Iowa agriculture and because it illustrates how "during the late [nineteen] thirties a strong new growth of apple orcharding occurred under the direction of competent growers" (Iowa State College:187). Such competence is illustrated in the historic district by employment of Hibernal root stock and top-work grafting, an historic method of orchard planting no longer in use.

The period of significance for the Byal Orchard Historic District, under Criterion A, embraces the years from 1933 to 1944, the time of its establishment and early maturation. Significant dates within this period include 1933 and 1934, when the orchard was planted; 1936, when the windbreak was planted; and 1940, when the Armistice Day Blizzard wiped out most of Iowa's apple orchards, validating planting techniques advocated by researchers at Iowa State College and implemented by progressive fruit growers, such as Hugh and Roscoe Byal at this orchard. Although the historical significance of this orchard continued after 1944, this cut-off date has been chosen because it reflects the standard 50-year age requirement for National Register eligibility and because exceptional significance under Criterion G does not obtain in this regard.

The Byal Orchard Historic District is significant statewide. This is warranted because it is one of the few apple orchards in Iowa to survive intact the Armistice Day Blizzard of 1940.

THE BYAL ORCHARD: A WIDE-AWAKE AND COMPETENT GROWER

Introduction

The Byal Orchard Historic District is historically significant because it calls attention to the commercial implementation in the 1930s of scientific methods to improve apple growing in Iowa. Originally planted in 1933 and 1934, the apple trees in this orchard employed Hibernal root stock and extensive top-work grafting. These state-of-the-art pomological techniques were researched and promoted by scientists at nearby Iowa State College to increase weather-resistance and productivity. During the 1930s, progressive fruit growers in Iowa began to implement these methods, and one ISC pomologist noted in 1936 that "some of the more wide-awake orchardists have taken their cue . . and have begun to use Hibernal and Virginia Crab quite freely as intermediate stocks" (Maney:61). The wisdom of these orchardists was confirmed by the Armistice Day Blizzard of 1940. Scientists at ISC later concluded that: "During the late [nineteen] thirties a strong new growth of apple orcharding occurred under the direction of competent growers" (Iowa State College:187). In this sense, the Byal Orchard Historic District provides a fine example of such "wide-awake" and "competent" orchardists. The district also calls attention to Iowa State College fulfilling its mission as a land grant university in the support and improvement of agriculture.

The Byal Orchard Historic District, Jasper County, Iowa.

Background

The Byal Orchard Historic District comprises one portion of farmland purchased by William Byal. General farming characterized this operation throughout the Nineteenth and early years of the Twentieth Century. Orchard operations began on a small scale in the 1920s. These operations have continued to evolve over the years as orchardists Hugh Byal (1910-present) and Roscoe Byal (1906-1991), sons of William Byal, planted additional orchards. The farm is now a specialized apple growing operation.

The brothers began their operations in the 1920s, when their father allowed them to work 20 apple trees on a home orchard on the farm. The brothers made a profit from their produce. "That set us afire," and the brothers soon resolved to expand their operations (Hugh Byal, personal communication).

Trial—Error—Progress

From the late 1920s through the 1930s, the brothers sought to establish commercial orchard operations. In these attempts, they solicited and followed professional advice. The subsequently mixed results call attention to the experimental nature of orcharding during the period.

In 1927, Hugh and Roscoe converted 18 acres of their father's crop land into an apple orchard by planting a series of trees in rows of 25 rods along a north-south grid. Almost immediately, these trees succumbed to fire blight, a disease of fruit trees that kills the branches and blackens the leaves.

The brothers decided to try again. In this effort, they sought advice from nurseryman Harry Merkle, owner and operator of Capital City Nurseries in Des Moines, Iowa. Merkle was an advocate of top-working apple trees and recommended that the brothers discuss this method with pomologists at nearby Iowa State College. Following this advice, the brothers contacted extension horticulturists at Iowa State. In 1933, they began planting a new orchard. Containing 13 acres of land, this orchard followed state-of-the-art methods for apple tree propagation as recommended by ISC. The brothers purchased Hibernal root stock from the Capital City Nurseries and top-worked three apple varieties onto it. Planting was completed in 1934. This orchard forms the Byal Orchard Historic District.

Several years later, in 1936, the brothers planted another orchard in association with a demonstration program at Iowa State College. For this four acre orchard, ISC pomologists recommended French Crab as the root stock. Any apple variety could be top-worked on this hardy stock. The brothers followed this advice. Within four years, however, the orchard showed signs of stress; at the end of eight years, the brothers pulled down the entire orchard. This nonextant orchard is now a corn field on an adjoining farm.

Iowa State College and the Byal Orchard

Although academic study promoted many new discoveries and fruit growing techniques, individual fruit growers also contributed to the development of modern apple growing practices. The costs of establishing research orchards limited the work that agricultural colleges' experimental stations could undertake. The time required for these orchards to mature also handicapped research. Given these restrictions, the private fruit grower could and did play an important partnership role in this study.

During the 1940s and 1950s, the Byal Orchard hosted numerous visits by faculty and students from ISC, who were attracted to the site because of its top-work grafting. Eldon Stange, head of the Horticultural Department, for example, brought his class to the orchard. As such a student, H. E. Nichols—later to become head of the Pomological Subsection of the Agricultural Experiment Station—was introduced to the site. Nichols continued to visit the Byal Orchard on a semi-regular basis as long as he remained at ISC, bringing classes from the college to observe the orchard (Hugh Byal personal communication).

Nichols visited the Byal Orchard off-and-on throughout his tenure in the Horticulture Department at Iowa State. Nichols' first visit occurred when Eldon Stange, head of the Horticultural Department, brought his class to the orchard. Nichols was later selected to choose the varieties of apples for the State Nursery.

Not all the advice given to the Byal brothers by ISC pomologists proved successful in the field. The failure of their recommended root stock of French Crab, mentioned above, is a case in point.

APPLE GROWING IN IOWA

Early settlers in Iowa introduced the various agricultural specialties to the state as practiced in the areas of the nation from which they had emigrated. The first apple orchard plantings in Iowa comprised varieties then common in the Eastern states, particularly in New England and New York (Ross:23). Early success of these orchards encouraged settlers to continue planting, until severe winters in 1842-43 and again in 1855-1856 destroyed most of them. A series of subsequent "test winters" challenged the life of apple orchards in Iowa. These winters included 1865-66, 1872-73, 1882-83, 1883-84, 1893-94, 1898-99, 1917-18, and 1935-36 (Maney:54-55). These were followed by the Armistice Day Blizzard of 1940, "the worst disaster in 75 years of Iowa fruit growing" ("Annual Report" 1941:19).

During the third quarter of the Nineteenth Century, the Iowa State Horticultural Society provided orchardists with information concerning apple growing. Through the observation of the weather's effects on apple trees, the society reported in 1869 that certain apple varieties enjoyed heartier life if grafted—also known as top-worked—onto certain root stock. Crab apple root stocks generally were regarded as the best and were commonly called "Siberians."

Subsequent observation concentrated on identification of apple varieties that would work best when top-worked onto these stocks. From this observation, the Virginia Crab emerged as a leading root stock for top-working in Iowa, having also been discovered here (Ibid.:56). By the 1870s, top-

working had become standard practice in Iowa apple orchards, having supplanted the planting of budded trees.

By 1910, Southwestern Iowa had supplanted Southeastern Iowa as the major apple producing region in the state (Iowa State College:187). The importance of Iowa for production of this crop is attested at the time by the state's rank as sixth highest producer in the nation (Ibid.).

Apple growing in Iowa declined in the 1920s and 1930s. The over-planting of orchards had resulted in overproduction and a subsequent fall in prices. The Great Depression forced many fruit growers out of business. During the same period, however, new scientific methods improved the bearing and winter-resistance capacity of apple trees. Some progressive fruit growers adopted these methods and achieved profitable results (Ibid.).

POMOLOGY AT IOWA STATE COLLEGE

Introduction

The Byal Orchard Historic District is historically significant because it calls attention to the symbiotic relationship between science and practice in Iowa fruit growing. Prior to World War II, the Agriculture and Home Economics Experiment Station at Iowa State College was limited in resources to test and evaluate research. Privately owned demonstration sites served an important function in the field-testing of new methods and techniques. Planted in 1933 and 1934 according to state-of-the-art pomological techniques, the establishment of the Byal Orchard provided Iowa State College with one such demonstration site for observation. Because of its proximity to Ames, faculty and students from the Pomology Subsection of the station visited the Byal Orchard regularly to observe and evaluate these techniques as the orchard matured. In this sense, the Byal Orchard Historic District illustrates the dependence of scientists on commercial fruit growers for field experimentation.

In order to place this aspect of the orchard's historical significance in context, this portion of the nomination discusses the evolution of pomological research at Iowa State College, showing how pomologists depended on the private sector for field testing. The next portion of the nomination specifically discusses how the Byal Orchard Historic District served this purpose.

Background

The establishment and growth of Iowa State College in the latter years of the Nineteenth Century provided agriculture in Iowa with a center for research, experimentation, and dissemination of scientific information. By the early years of the Twentieth Century, this institution had become a chief promoter of progressive farming methods, a role the Iowa State Horticultural Society had played in the Nineteenth Century.

Scientists at the college and commercial fruit producers actively cooperated to improve fruit producing species. These efforts generally focused on extending their life, strengthening their resistance to severe weather and pests, and increasing their bearing capacity.

Already in the 1870s, Professor Joseph L. Budd (1835-1904), head of the Horticulture Department at Iowa State College, had become interested in Asiatic plants and traveled to Europe and Asia to investigate plantings and products non-native to Iowa but suitable to the state's climate (Page:Volume II, 135). Indeed, Budd imported Hibernal root stock from Siberia for experimentation. He also devised a method to graft varieties onto it to increase a tree's winter-resistance. This technique

> consisted of whip grafting long cions on short pieces of seedling roots. The grafts were then planted deeply to induce rooting on the cion. Not much rooting occurs in the nursery, but evidently does after the trees are planted in the orchard. Such roots formed are undoubtedly hardier than the roots of variable seedlings. At any rate, the practice was so satisfactory in the prevention of winter injury in the nursery and orchard that double working was largely abandoned even for semi-hardy varieties like Jonathan, Grimes, Delicious, Ben Davis and Winesap. (Maney:57)

Following Budd's discovery, the top-working method was later adopted throughout the Midwest.

Budd's research was undertaken without the advantage of sophisticated experimental orchards. For such testing in the field, scientists had to rely on private fruit growers. In this regard, the D. W. Lotspiech Orchard, near Woodbine, Iowa, provided a good example and shows the cooperation that arose between scientists and commercial fruit growers. Planted in 1893-1894, this private orchard was revisited and studied by Iowa State pomologists in 1914 and 1934. The mature orchard proved that the grafting of Jonathan, Grimes, and Gano apples onto the stocks of Virginia Crab, Haas, and Sheriff trees increased the life of these apple varieties (Maney:58).

Pomology Subsection of the Experiment Station

Following World War I, Iowa State College became involved again in pomology, a subject which had lain somewhat dormant since J. L. Budd's death. Under the leadership of T. J. Maney, Iowa State College through its Agriculture and Home Economics Experiment Station expanded its pomological research. The extension service of this station also increased dissemination of information to fruit growers concerning this research. From 1917 to his death in 1945, Maney supervised the Pomological Subsection of the Department of Horticulture and Forestry at Iowa State. As the result of this research and its implementation by progressive fruit growers, Iowa experienced a renaissance of its apple orchards during the second quarter of the Twentieth Century.

Much information emerged from a series of experiments undertaken by the Pomological Subsection. The faculty disseminated these findings nationally through publication in scientific journals and presentations at conferences. Among the faculty were B. S. Pickett, Research Professor, who headed the Horticulture and Forestry Department as well as its Pomology subsection; T. J. Maney, Research Professor; H. L. Lantz, Research Assistant Professor; and H. H. Plagge, Research Assistant Professor. H. E. Nichols later became a member of this faculty.

The wide range of topics researched by the Pomological Subsection is suggested by the 1928 Annual Report of the Agricultural Experiment Station, which included such topics as spraying investigations, vineyard investigations, crown gall, orchard management, blister canker, orchard fertilizer, orchard stocks, and cold storage for Iowa apples.

Project #268 illustrates one experiment undertaken by the Pomology Subsection. Entitled "Methods of Propagating Apples on their Own Roots," this project was begun in the 1920s under the lead of T. J. Maney and B. S. Pickett and continued until 1934. The mission of this project was to solve the following problem:

> Propagation of standard varieties on own-rooted stocks has been advocated as a method for eliminating the wide variability in production which occurs in orchard trees worked on miscellaneous seedling stocks.
>
> No practical method has been developed to date for the production of own-rooted stocks in quantities. (Agricultural Experiment Station 1933:125)

As part of this project, a ten-acre trial orchard was established in Ames in 1931 ("Annual Report" 1935:176). This orchard comprised own-rooted stock for the varieties Hibernal, Virginia Crab, and Dudley and top-worked for five standard varieties ("Annual Report" 1933:125). The Virginia Crab was initially viewed with great favor, but results showed "the unreliability of French Crab [and] has lead to others such as Hibernal" ("Annual Report" 1930:34). In 1934, funds for this project ceased. The trial-orchard remained in operation.

As a result of the cooperation between scientists and commercial growers, Iowa State could report in 1936 that "some of the more wide-awake orchardists have taken their cue . . . and have begun to use Hibernal and Virginia Crab quite freely as intermediate stocks" (Maney:61).

This research and site-testing was vital to progressive apple growers in the state. As researchers explained:

> Better stocks mean longer lived trees, and longer lived trees mean profit to the fruit grower. (Ibid.)

Following the death of T. J. Maney in 1945, Eldon Stange, as head of the Horticulture Department at Iowa State, continued support for pomological experimentation. H. E. Nichols emerged as a prime figure in Iowa State's Extension Service in this field. Nichols had entered the school as a student, served as Horticulturist for the Pomological Subsection of the Agriculture and Home Economics Experiment Station, and continued research and education within this subsection until his retirement in the 1960s.

Top-Working

As discussed above, the benefits of top-working had been discovered in the Nineteenth Century. Its employment in the field, however, had declined in the years leading up to World War I. As Maney reported in 1936:

> For the past 40 years very little topworking has been carried on. Only a few of the more observing growers have consistently followed the practice. In fact, it is now very difficult to find a supply of trees of these better stock varieties in Midwest nurseries. (Ibid.:57)

Then, in the years following World War I, top-working again received wide endorsement advocated by pomologists at Iowa State College and throughout the apple producing sections of the nation during the 1930s. The College of Agriculture at West Virginia University, for example, published a monograph on the subject in 1930. Scientific conferences on the topic were also held. In 1936 at the 52nd convention of the American Pomological Society, T. J. Maney of Iowa State discussed top-working on hardy resistant apple stocks (Maney:62). He noted that, although top-working had first been discovered in the Nineteenth Century, its practice had declined:

> For the past 40 years very little topworking has been carried on. Only a few of the more observing growers have consistently followed the practice. In fact, it is now very difficult to find a supply of trees of these better stock varieties in Midwest nurseries. (Maney:57)

By the 1940s, orchards planted using top-working were maturing. Commercial fruit growers realized that top-working presented problems as well as benefits. In this regard, the great height of top-worked apple trees proved difficult to harvest. For this reason, the introduction of semi-dwarf apple varieties was readily accepted by fruit growers when they became available. Top-working soon declined and ceased altogether.

Utility of Top-Working Confirmed

A natural disaster occurred in the Upper Midwest in 1940. The Armistice Day Blizzard proved beyond doubt the validity of top-working hardy root stocks as advocated by pomologists at Iowa State College and implemented by progressive orchardists in the state.

> The morning of November 11, 1940, was comparatively warm, but by nightfall the temperature had dropped 50 degrees, down to temperatures varying from zero in the southeast part of the state to 15 below in the northwest. The cold spell lasted four days, with below-zero temperatures on November 13, 14, and 15. Orchards throughout southern Iowa, west of Cedar Rapids, were severely damaged and many trees were killed outright. Only two sizable orchards in the west half of Iowa completely survived the 1940 freeze, one at Mitchellville and a twenty-acre experimental orchard at Iowa State College. Both of these had been developed by top-working desirable varieties of apples on hardy, winterproof stocks under the supervision of T. J. Maney, head of the Pomology Subsection from 1917 until his death in 1945. (Iowa State College:188.)

As will be seen below, the Armistice Day Blizzard also validated the time, expense, and labor, which the propagators of the Byal Orchard had incurred in the establishment of their orchard under the advice of pomologists at Iowa State College.

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NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

The Byal Orchard Historic District, Jasper County, Iowa.

RESOURCE COUNT JUSTIFICATION

As indicated in Section 7, the Byal Orchard Historic District contains three resources.

The orchard is counted as one contributing site. Each of the four stands of apple trees within it features one of three apple variety—Jonathan, Yellow Delicious, and Red Delicious. Each of these varieties calls attention to Hugh and Roscoe Byal's gauging of the commercial market. The planting of two separate stands of Jonathans is also historically significant because it indicates the widespread popularity of this variety.

The windbreak is counted as one contributing site. Constructed of Ash and Mulberry trees, the windbreak provides protection against the elements to the orchard. In this regard, the windbreak serves a distinct and different purpose.

The traffic circulation network is counted as one contributing structure. This network features wide corridors between rows of apple trees and calls attention to a progressive method of orchard planting. Scientists at Iowa State College have noted, for example, that the close planting of commercial apple trees became a problem for commercial apple growing in Iowa and contributed to its decline after 1910 (Iowa State College:187). The introduction of wide corridors was designed to alleviate this problem.

The windbreak is counted as one contributing resource because it calls attention to an important method in the reduction of weather-related damage to the orchard.

REPRESENTATION IN OTHER CULTURAL RESOURCES SURVEYS

The Byal Orchard has never been included in a cultural resources survey. The Central Iowa Regional Association of Local Governments (CIRALG) surveyed portions of Jasper County in the late 1970s and early 1980s. These surveys excluded historic apple orchards in the study area, including the Byal Orchard.

POTENTIAL FOR HISTORICAL ARCHAEOLOGY

Although the site's potential for archaeological research is, as yet, unevaluated, there appears to be little if any in this regard.

RECOMMENDATIONS FOR FURTHER RESEARCH AND REGISTRATION

The Byal Orchard Historic District and the adjacent land use areas discussed above obtained additional historical significance through the 1950s. For this reason, the boundaries of the district have potential for expansion. Only the 13 acre orchard planted in 1933 and 1934 is included in the present district boundaries because it alone meets the 50-year National Register rule. Although insufficient to meet Criterion Exception G requirements at the present time, the West Orchard, South Orchard, Upper

United States Department of the Interior
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Farm, and Lower Farm might also become eligible for nomination to the National Register within the framework of an expanded district.

It is recommended, therefore, that this historic district and adjacent land use areas be reevaluated when they reach 50-years of age. Such evaluation might determine that an extension of the district boundaries is appropriate. At such a time, further research should analyze and evaluate the orchard's significance under Criterion A during the 1950s. Specific, in this regard, is the idea that the Byal Orchard might call attention to the evolution of agriculture in Iowa from general to specialized farming. During the late Nineteenth and early Twentieth Century, the owners of this property farmed crops and livestock. During the 1920s and 1930s, they began diversification of their operations with the introduction of apple growing. Diversification accelerated in the 1950s, when the West and South Orchards were planted. The establishment of these orchards, coupled with continued production in the East Orchard, supplanted much of the livestock operation on this farm and effectively shifted the balance of operations to fruit growing as a full-time specialization, a practice which continues today.

It is also recommended that further research should analyze and evaluate the Byal Orchard's significance in calling attention to the movement among fruit growers in Iowa from the tall, top-worked grafts to the shorter, semi-dwarf varieties in the years following World War II. The West Orchard was planted in 1953 and 1954, and the South Orchard was planted in 1956 and 1957. Both orchards feature semi-dwarf apple trees. Although semi-dwarfs were extensively planted in Iowa during the 1950s, the Byal Orchards are thought to be one of the few sites in the state where the historic top-work grafting technique can be seen alongside this later development.

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