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Dairy Herd Improvement Letter

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NATIONAL COOPERATIVE
DAIRY HERD IMPROVEMENT
PROGRAM

A dairy recordkeeping plan
for every herd

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Dairy Herd Improvement Letter

July-August-September 1973

THE NATIONAL COOPERATIVE DAIRY HERD IMPROVEMENT PROGRAM

History, Purpose, and Organization

By Gerald J. King 1/, 2/

Many summaries of the National Cooperative Dairy Herd Improvement Program (NCDHIP) have been written in the past, but additions to the program and changes in name and organization make it desirable to publish this updated history, statement of purpose, and description of organization.

General authority for this program is included in the act that established the Department of Agriculture in 1862, the Department of Agriculture Organic Act of 1944, and the annual appropriation acts. In 1952, respective responsibilities were first documented in a Memorandum of Understanding. Since 1965, the Coordinating Group for the NCDHIP has governed the conduct of the program.

1/ King is an Animal Husbandman with the Animal Improvement Programs Laboratory, Animal Physiology and Genetics Institute, ARS, USDA.

2/ With the technical assistance of Maureen K. Dixon, Patricia M. Faulkner, Anna H. Kienast, and Rebecca A. Norris, all of the above Laboratory.

EARLY COW TESTING IN THE UNITED STATES

One of the first recorded instances of cow testing in the United States is the 511 pounds and 2 ounces of churned butter produced in 350 days by the Jersey cow, Flora 13 A.J.C.C., in 1854. This and many other private records, including 12,681 pounds of annual milk production, recorded for the Holstein-Friesian cow, Dowager, in 1871 were collected by individual breeders.

Private collection of records gradually became more organized, and many early records were included in various publications. These records aided in managing, feeding, and breeding, as well as in the sale of livestock. By 1895, the Dairy Division was established in the Bureau of Animal Industry, United States Department of Agriculture (USDA) to investigate, collect, and disseminate information and to demonstrate improved practices to benefit the dairy industry.

One of the important activities from the beginning was to develop and promote dairy recordkeeping and to utilize the information obtained to improve individual cow, herd, and dairy farm performance. Milk and butter or butterfat recording by the Breed Associations began between 1880 and 1905. Before 1900, Division dairy specialists worked with individual farmers in obtaining records of milk and fat production of single cows. They found that this information was essential in obtaining material for dairy demonstration work.

In 1905, a Dairy Farming Investigations Section was established in the Division to advance this and related work. Several USDA dairy specialists were assigned to State colleges in the Southern States to pursue dairy improvement work. In 1917, the title was changed to Dairy Extension. This group was discontinued in 1920, several years after the State Cooperative Extension Services were developed, and many of the people in the States transferred to State extension work.

Also in 1905, Helmer Rabild, inspector for the Michigan Dairy and Food Commission, organized the first dairy cow testing association in the United States in Newaygo County, Michigan. The first meeting was held September 26, with only six to eight dairymen attending. The important

features were the cooperation of several dairymen in production testing, the inclusion of all cows in the herd, and the inclusion of cows' dry periods in the herd record.

The first herd average production records were reported from this association for 1906. At that time, the association included 31 herds with 239 cows that produced an average of 5,300 pounds of milk and 315 pounds of fat annually.

The early cow-testing associations were dairy farmer cooperative organizations with 15 to 30 or more dairymen cooperating. Each association employed one or more testers (later called supervisors) to weigh the milk, take samples for butterfat, conduct the butterfat test, and calculate monthly, cumulative lactation, and annual production. The tester calculated all individual cow records and herd averages (including feed weights and costs when they were collected) by hand or with the help of a desk calculator.

In 1908, the Dairy Division employed Mr. Rabild to take charge of a cow-testing program on a national scale.

With the passage of the Smith-Lever Act in 1914, which established the Cooperative Extension Service, dairy recordkeeping associations were included in State and Federal extension programs to provide demonstrations of the good results of proper production recordkeeping. The Federal extension role was to advise, to serve as liaison between the parties involved in the testing program, and to be responsible for educational programs, teaching methods, and information.

As expected, the testing organizations in different States evolved somewhat independently. In 1922, the Dairy Extension Section of the American Dairy Science Association (ADSA) recommended changes in the herd book as they attempted to standardize cow-testing association information.

The Office of Cooperative Extension Work was established in USDA in 1923. It was directed by the Director of Extension Work and Extension Service.

In 1924, the Bureau of Dairying was established; the Dairy Division was abolished; and the Dairy Introduction Section was given responsibility for cow-testing association work in the new Bureau.

In the spring of 1925, Joseph B. Parker of the Dairy Introduction Section was appointed Bureau fieldman for cow-testing association work. Sidney L. Thompson headed the section at this time.

The Cow-Testing Association Letter was first published by this section in May 1925 and included proposed rules and regulations governing cow-testing associations. These rules were adopted by the Cow-Testing Association Committee of the Extension Section of the ADSA at the meeting in Chicago, February 23-25, 1925, and by the ADSA in the fall of 1925.

Centering the test day was included in the first rules for test adopted in 1925. It was called the McDowell Method for Centering the Testing Day, and the first paragraph reads as follows:

"The testing period has the same number of days as the calendar month in which the testing day occurs. Considering the testing day as the middle of the testing period gives each herd a different testing period. If the testing day of a certain herd is on the first day of the month, the monthly testing period for that herd extends from the middle of the preceding month to the middle of the current month, the monthly testing period and the calendar month coincide. If the testing day is the last day of the month, the monthly testing period extends from the middle of that month to the middle of the following month."

This procedure was not changed as long as the centering date method remained the method for calculating monthly production. The centering date method was an improvement over the original in which the production of the testing day was used as the average yield for the calendar month of the test day.

One of the first interstate conferences of cow-testing association workers was held at the Bureau of Dairying, Washington, D.C. April 20, 1925, to discuss methods of standardizing work, tabulating records, and locating outstanding dairy sires. Charles R. Gearhart representing Pennsylvania, J. A. Conover representing Maryland, Enos J. Perry representing New Jersey, and L. P. Emmerick and George Carey representing Virginia participated.

On July 1, 1925, following the death of Mr. Thompson, John H. McLain was appointed to take charge of the Dairy Introduction Section.

By September 1925, the Bureau had installed an electric punch machine, an electric sorter, and an electric tabulating machine. These machines enabled the Bureau to make herd and association summaries and to summarize the relationship of milk and fat to other factors, the influence of season of freshening on milk production, and comparison of purebred and grade cows.

Early in the program, the USDA began supplying forms to the States for recordkeeping. This continued until the mid- 1960's when the dairy record processing centers began producing their own forms, and very few herds remained on hand-processing. USDA continues to provide Form 1057, "Lifetime History of Individual Cow", for States that do not receive computer-printed individual cow pages from the processing centers. On July 1, 1926, the Bureau of Dairying was renamed the Bureau of Dairy Industry (BDI).

DEVELOPING ORGANIZATION FOR TESTING

In 1926, the Standard DHIA Plan for herd testing was adopted. Under the Standard DHIA Plan, data on production (and often feed, costs, and value of production) were collected by an impartial person (the cow tester), and the members followed the rules adopted for the plan. The records from this plan were the only ones used for sire-proving. The cow-tester's routine was the same as that described earlier.

The Owner-Sampler Plan was also introduced in 1926 as an unofficial plan in which the dairymen need not follow a set of rules, but it received relatively little attention for many years. The Owner-Sampler Plan requires the supervisor to leave sample bottles and record sheets at the farm each month. The farmer weighs the milk from each cow and saves a sample for butterfat testing. In the early years, the supervisor determined the butterfat percent in milk samples and calculated the records by hand, afterwards leaving them with the dairyman. The use of Owner-Sampler records was and is limited to the owner's herd. However, these records were fully as valuable for herd management as were Standard DHIA Plan records, and the cost was less than that of the Standard DHIA Plan.

Supervisors could augment their income by including Owner-Sampler herds in their daily run. They would simply leave sample jars for the milk samples and then pick them up the next day.

In 1927, the ADSA resolved that cow-testing associations be called "Dairy Herd Improvement Associations" because of the broadening scope and influence of their work. The ADSA also recommended the adoption of more uniform testing and recordkeeping systems. In August, the name of the Cow-Testing Association Letter was changed to "Dairy-Herd-Improvement-Association Letter". A nearly complete file of the Letter--now the Dairy Herd Improvement Letter--is maintained at the Animal Improvement Programs Laboratory, Building 263, BARC-East, Beltsville, Maryland 20705.

Also in 1927, an ADSA Dairy Records Committee was established. It developed rules (with periodic changes) that were then adopted as official by the ADSA and accepted by the groups cooperating in Standard DHIA Plan testing. This procedure continued until 1965, when the National DHI Coordinating Group was formed. Thus, the ADSA served in an advisory capacity to the Federal agencies charged with responsibilities for the program.

In the spring of 1929, as part of a reorganization of the Bureau, the Dairy Introduction Section of the Bureau of Dairy Industry was abolished, and the Section's work was included in a new Division of Dairy Herd Improvement Investigations (DHII) headed by Dr. John C. McDowell as chief. At this time, Mr. Parker became dairy extension specialist for the Eastern States, and Mr. McLain became dairy extension specialist for the Southern States. Records are not available to indicate which States were included or the assignment of specialists to the other regions of the country.

In 1935, the Office of Cooperative Extension work in the USDA became the Division of Cooperative Extension.

FURTHER DEVELOPMENT OF TESTING PLANS

The Standard DHIA Plan and the Owner-Sampler Plan were the only testing plans used by DHIA's until 1956. They were retained in the same form until the 1940's when central laboratories for butterfat testing came into wide use (see p.10).

In 1956, Owner-Sampler participation was first tabulated by USDA, and a publicity campaign undertaken to encourage the use of the plan. New project outlines and recordkeeping forms in blue were distributed to State extension diarmen. Participation in this plan increased greatly over the next few years. The current cost of Owner-Sampler testing is approximately 35 cents per cow per month, plus 10 to 13 cents per cow per month for computer processing.

In August 1956, the Weigh-a-Day-a-Month (WADAM) Plan was inaugurated as a second unofficial plan, and yellow project outlines and forms were distributed for WADAM. The WADAM Plan was designed as an inexpensive (5 cents per cow per month when records were calculated by hand), simple plan for herd management that required as little time and effort as is consistent with helpful recordkeeping. In it, the herd owner weighs the milk for each cow once a month and sends these weights either to the county agent or to the computing center. He may include a plant butterfat test as well as feed and cost information if he wishes. The WADAM Plan was intended to supplement the Standard DHIA and Owner-Sampler Plans.

For several years during the 1950's, discussions were held among the ADSA Records Committee, the ADSA Breed Relations Committee, the Purebred Dairy Cattle Association (PDCA) Testing Committee, and the breed registry organizations to determine whether the electronically calculated Standard DHIA record of a registered cow could be used as the official record for the breed registry organizations. At the 1959 meeting of the ADSA at the University of Illinois, Urbana, this type of record was approved and called Dairy Herd Improvement Registry (DHIR). A set of DHIR rules was established to meet the particular requirements of the breed registry organizations. By spring 1966, the Advanced Registry and Herd Improvement Registry programs of the breeds had disappeared, and DHIR remained as the testing program for breed registry organizations.

In 1969, the Standard DHIA Plan was designated "Official DHI" emphasizing that it was the only plan other than DHIR from which records were to be used to evaluate dairy bulls and cows. The current cost is approximately 50 cents per cow per month, plus 10 to 13 cents per cow per month for computer processing. The cost varies with State and regional computing centers.

In recent years, many dairymen have become more interested in unofficial recordkeeping because of simplicity and low cost, and many States have included one or more of these plans in their programs in addition to Owner-Sampler and WADAM. Other unofficial plans were first summarized as a part of the NCDHIP by the Animal Improvement Programs Laboratory in 1970. The plans vary among States in information collected and furnished.

On January 1, 1973, 1,635 herds and 116,151 cows were enrolled in the various other unofficial plans in 19 states throughout the country. Some of these plans are Owner-Record, Management Only, Commercial, AM-PM, Milk-Only Record, and Tester-Sampled. As with Owner-Sampler and Weigh-a-Day-a-Month testing, these plans have no rules and are conducted by the dairyman and/or the DHIA supervisor for management only. Most records are calculated by computer. For enrollment figures, the reader may refer to the annual DHIA Participation Report that usually appears in the April or May DHI Letter.

THE NATIONAL SIRE-EVALUATION PROGRAM

Proving sires is mentioned as continuing work in DHI Associations in the Cow-Testing Association Letter No. 2, June 1925. In 1935, as a result of a recommendation by the ADSA Sire Committee, the National Sire Proving Program (the terms "proving" and "proved-sire" were used until 1960) was initiated by the Division of DHII in cooperation with State Cooperative Extension Services. Dr. J. Frank Kendrick, assistant chief of the Division, organized the sire-proving work, using records from the Standard DHIA Plan.

Not long after the national sire program began, Dr. McDowell retired--on December 31, 1937. A paragraph in the January 1938 Dairy Herd Improvement Association Letter reads: "The cow-testing movement was in its infancy when Dr. McDowell undertook the job of compiling single-handedly the statistical information on a nationwide basis. He has seen the movement grow from one in which the only purpose was to test the cows and weed out the low producers in individual herds to one that now provides information for proving herd sires and selecting outstanding breeding animals for improving the general level in production throughout the entire country." In January 1938, Dr. Kendrick was named chief of the Division by Dr. O. E. Reed, chief of the BDI.

The genetic evaluation of dairy bulls and research programs that support this effort became the primary responsibility of this Division. The Daughter-Dam Comparison was used from the time that sire proving began in the United States through 1961. In this comparison, the production of the daughters of a bull was compared with the production of their dams. The difference was assumed to be the value of the bull.

In 1962, the Daughter-Herdmate Comparison Method was adopted by the USDA. This compares each cow's record with the records of other cows that are milking in the same herd at the same time. This new method helped to overcome the generally incorrect assumptions about daughter-dam comparisons. These assumptions were: that daughters and dams had the same environment, that future mates of a bull were similar to the dams of the original daughters, and that first and future daughters had the same environment. In the daughter-herdmate comparison, the bull's transmitting ability is expressed as Predicted Difference (PD), a term first used in May 1965. Details of the Calculation of PD are included in the USDA-DHIA Sire Summary List.

Before January 1, 1933, all bulls were proved by using 12-month records. Between January 1, 1933, and November 1, 1935, complete lactation records of 12-months or less were used for all bull-proving. In 1935, the ADSA adopted the 305-day lactation record for use in proving bulls.

From November 1940 through December 1959, sire proofs were published monthly in the Dairy Herd Improvement Letter. All summaries were included in an annual publication from 1937 through 1951. From 1952 through 1959, there were no annual publications. In October 1959, DHII announced that the manual and accounting machine card system for proving sires was being converted to IBM 705-III magnetic-tape electronic data processing equipment. This transition was effectively completed with the publication of the DHIA Proved-Sire List in October 1960.

From that time to the present, sire summaries were computed quarterly and published annually. The title was changed twice, but the purpose remained the same. In 1962, the list was called the DHIA Sire Summary List, and it was at this time that the term "proved sire" was dropped from USDA terminology. In 1970, the list was first called the USDA-DHIA Sire Summary List.

In April 1964, the first DHIA Cow Index List was published. In June 1964, the second publication was called the DHIA Cow Performance Index List, and in 1970, "USDA" was added to the title. In 1968, DHIA began publishing the USDA-DHIA Sire Summary and USDA-DHIA Cow Performance Index Lists once a year after the May summary. Summaries for newly qualified bulls are computed in January and September of each year, and computer print-outs are sent to interested parties in the industry.

AREA OR COUNTY ASSOCIATIONS

The author understands that there were some county and/or area associations in Illinois in the 1920's, but it was during the 1940's that such associations began to develop in any number in the States of Ohio, Washington, Wisconsin, and several others. Many milk samples were tested and the records calculated in a central laboratory. In some associations, the supervisor would take the member's herd book to the central laboratory; as soon as the milk samples were tested and the records entered, the book was returned to the member by mail, or else the supervisor returned the book on his next trip to the farm.

In other associations, the herd book remained on the farm, and the supervisor sent the barn sheets to the testing laboratory with the milk samples or to the processing center, depending on the system established in the association. The testing laboratory sent the butterfat test results (and barn sheets, if appropriate) to the dairy records processing centers. The processing center, in turn, calculated the records and returned the monthly report to the dairyman. The supervisor entered the data in the herd book on his next visit to the farm.

The use of central laboratories has increased until now all butterfat testing for several States and much testing in other States is conducted in central or regional laboratories.

The advent of the county association and the central laboratory enabled the supervisor to add herds for additional income; it improved his working conditions, and it added stability to the association structure because the loss of one or a few members did not disrupt the program.

In the 1960's, automated procedures for butterfat testing came into use. Today four machines are widely used--the Infra-Red Milk Analyzer (IRMA) and the Foss

Mark II, III, and IV Milk-O-Testers. The use of central laboratories and electronic testers for determining butter-fat percentage has greatly increased testing efficiency.

MEMORANDUM OF UNDERSTANDING

In 1952, a document called "The Memorandum of Understanding" was signed among the Cooperative Extension Service in each State, the U. S. Extension Service, and the Agricultural Research Service. In this document, the State Cooperative Extension Service was given primary responsibility for the development and guidance of the NCDHIP and adaptation of the details of the program to fit State needs. Excerpts from the Memorandum (last revised in 1969) are included as Appendix A on page

REORGANIZATION OF AGRICULTURAL RESEARCH ADMINISTRATION

Congress authorized reorganization of the Department of Agriculture in 1953 to take effect January 2, 1954. The Agricultural Research Administration was renamed the Agricultural Research Service, and Directors of areas of research were named. For animal research, Branches were organized along species lines, so the Dairy Husbandry Research Branch was formed. According to ARS Memo 101.1, Supplement 1 of April 2, 1954, a Dairy Herd Improvement Sire-Proving Section was formed. An ARS Memo of February 21, 1957, established the Animal Husbandry Research Division, and by the spring of 1958, the Dairy Husbandry Research Branch had been renamed Dairy Cattle Research Branch, and the Dairy Herd Improvement Sire-Proving Section had had the words 'Sire-Proving' removed from the title. By 1961, Dr. Kendrick's title was changed to assistant to the chief for Dairy Herd Improvement.

STATE DHIA'S

By the early 1950's, the local and county associations in several States had formed statewide organizations or federations. These are usually financed by assessing member associations on a per-cow basis. The local and county associations elect a board of directors for the State association, usually through delegates at the annual meeting. A State organization, in cooperation with the State agricultural college or university, can render valuable service to the Dairy Herd Improvement Program in the following ways:

- (1) Represent dairymen in establishing State

and national policies and rules.

- (2) Coordinate the programs of local associations.
- (3) Bring about uniform enforcement of rules by serving as an appeals body.
- (4) Establish standards of performance for supervisors.
- (5) Arrange statewide for workman's compensation, retirement benefits, social security payments, and health and liability insurance for supervisors.
- (6) Purchase equipment.
- (7) Arrange laboratory testing plans.

By 1960, 18 State associations had been formed; by 1970, there were 36; and by 1973 there were 40.

DEVELOPMENT OF COMPUTER PROCESSING FOR DHIA RECORDS

In 1951, Lyman Rich and Bliss M. Crandall of Utah pioneered the use of electronic equipment (IBM-601) to calculate DHIA records. In the early 1950's, Dr. Kendrick worked with the following extension dairymen: J. D. Burke and H. W. Carter of New York, Floyd J. Arnold and Donald E. Voelker of Iowa, Marvin E. Senger of North Carolina, and Louis W. Jacquemin and Ralph A. Porterfield of Ohio to have feed, cost, and income values included in the computer-processed DHIA record.

In 1957, the Northeastern States, which were processing their records at the Cornell center, began using an IBM-650, the first mass-produced, stored-program computer. In September 1957, the USDA issued "Instructions for Reporting Individual Cow Records and Herd Data to be Processed on IBM-650 Electronic Data Processing Equipment (EDPM)."

In 1958, four more centers--Iowa, North Carolina, Ohio, and Oklahoma-- began using these procedures for individual cow and herd reports. By 1959, DHIA records were being calculated at 10 centers located in Illinois, Iowa, Michigan, New York, North Carolina, Ohio, Pennsylvania, Utah, Washington, and Wisconsin. Oklahoma operated a center briefly in 1958, then elected to send its records to Iowa.

In August 1959, a workshop was held at Ithaca, N.Y., for computer personnel and extension dairymen involved in diary records processing center operations. Seven centers were represented. Similar workshops, called National DHIA Computing Center Workshops, have been held annually since then at various locations around the country. The workshop was established to discuss the problems of processing DHIA records and to share or work out solutions. These problems include the machines' availability, their capabilities and cost, programming methods and routines, charging dairymen for costs, the role of the computer center personnel in national program decisionmaking, what items can be included in a record, submission of the data to the USDA, and others. Discussions at the workshops have helped to answer such questions. Action taken has resulted in better information for the dairymen and more uniform data for sire summaries, cow indexes, herd summaries, and research.

By 1964 Minnesota had begun processing its own records, and in 1965 Maryland opened its center.

However, in 1969, the Maryland center closed, and Maryland records were subsequently sent to Utah for processing. In 1968, the California Livestock Marketing Association in Visalia, Calif., began processing some of California's records. By early 1970, they had sold the computer programs for calculating dairy records to Dairyman's Cooperative Creamery Association, Tulare, Calif. Agri. Tech. Analytics, a division of Dairyman's, began processing these dairy records July 1, 1970. By 1972, the Ohio center had closed; Ohio records were then processed at the Utah center and Indiana records, at the North Carolina center.

Several centers are regional, while several serve only the State in which they are located. A list of the States served by each of the computing centers as of December 1972 and administrative control of the centers follows:

<u>Location of Center</u>	<u>Administration</u>	<u>States' records processed</u>
California (Tulare)	Dairyman's Cooperative Creamery Association	Part of California.
Illinois (Urbana)	University	Illinois.

<u>Location of Center</u>	<u>Administration</u>	<u>States records Processed</u>
Iowa (Ames)	University	Arkansas, Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, and South Dakota.
Michican (East Lansing)	Michigan DHIA, Inc.	Michigan.
Minnesota (St. Paul)	University	Minnesota.
New York (Ithaca)	N.Y. Dairy Herd Improvement Cooperative contracts with the Department of Animal Science, Cornell University, to do dairy record computing.	Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont and West Virginia.
North Carolina (Raleigh)	Regional Cooperative Extension Project; computer owned by project (member State Cooperative Extension Services)	Alabama, Florida, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Texas, and Virginia.
Pennsylvania (University Park)	University	Pennsylvania.
Utah (Provo)	DHI Computing Service	Arizona, part of California, Colorado, Hawaii, part of Idaho, Maryland, Montana, Nevada, New Mexico, Ohio, Utah, and Wyoming.
Washington (Pullman)	University	Alaska, part of Idaho, Oregon, and Washington.
Wisconsin (Madison)	Agriculture Records Cooperative	Wisconsin.

By 1973, records for 98 percent of the Official DHI herds and 92.8 percent of the Official DHI cows were being processed in State and regional computing centers. Similar figures for the other plans are:

Owner-Sampler--93.5 percent of herds and 92.9 percent of cows;

Weigh-a-Day-a-Month--85.9 percent of herds and 89.5 percent of cows;

Other Unofficial--96.5 percent of herds and 89.3 percent of cows;

Total--96.2 percent of herds and 92.6 percent of cows.

TESA BUTTERFAT TEST

In 1959, the TeSa Test for butterfat, developed by Technical Industries of Fort Lauderdale, Fla., was approved for use in dairy recordkeeping by ADSA and the Association of Official Agricultural Chemists. Thus, this test could be used in addition to the Babcock Test--official since the beginning of national production testing--or as its replacement. An advantage is the use by the TeSa Test of a detergent, rather than sulfuric acid, as one of the active agents. Details of both the Babcock Test and the TeSa Test are included in USDA's Agriculture Handbook 278.

HERD AVERAGE SUMMARIES

Statistics on herd size and average production have been compiled since 1906. As better tabulating machines became available, summaries became more complete. In 1932, a new tabulating machine made it possible to summarize feeds separately for the herds reporting them; however, it was decided to make the feed summaries on request by the States and to send them directly to the States. Throughout this period, the USDA was publishing feed cost figures on a cow-year basis for each State and for the United States as well.

In 1953, the State and national summaries included feed amounts for the first time because of a change in reporting methods. As noted earlier, the IBM-650 was first used to calculate DHIA records by one of the centers in 1957. The USDA first published herd and

association summaries compiled by the IBM-650 in 1958. In 1961, the herd-average system was converted to the IBM-705-III, and multiple tables of the herd averages were distributed to the States. The herd averages were summarized by milk, butterfat, level of each feed, value of product, and income over feed cost. Also in 1961, the national testing year was established to begin on May 1 and to end on April 30 of the following year. This period coincides with the feeding period for many dairymen.

Each year, the Animal Improvement Programs Laboratory, established under the ARS reorganization of 1972, summarizes all herd records whose year ends within the national testing year. Old herd records are received and added to the master file. This provision is necessary, because several States have testing years that differ from the national year. In late 1963 the system was moved to an IBM-7080, and the work was accomplished in 705-III mode.

When the system was converted to the IBM 360 in 1967, most tables were dropped, but tabulations of all herds for production levels and tabulations for those herds including production, feed cost, and income data for State and United States continue to be published. Herd-average breed averages by level of milk production for the United States are also published, and State averages by county are sent to each State.

The herd-average records are edited for missing information and against established levels of production and feeding before being accepted for summary. Production figures from the herd average system are quoted as the annual production of cows tested in a particular plan for any given year. A summary of complete herd records reported from 1939-40 to the present is included in the August 1972 Dairy Herd Improvement Letter, ARS-NE-5.

CHANGES IN THE SIXTIES

In the early sixties, important changes took place in the NCDHIP. In 1962, Dr. Kendrick resigned to develop and direct the Washington Data Processing Center for the USDA. Dr. Robert H. Miller directed the work of the unit on an interim basis until Dr. Ernest L. Corley was named head of the unit in April 1963. More and more people and organizations became involved either in the collection of data, in the operation of the program at the farm level, or in utilizing

the data after it has been collected. More State DHIA organizations of dairymen were formed and assumed the responsibilities of supervisor trainer and employer, rules arbiter, voice of the dairymen to State Extension and USDA, and cooperator with the State Cooperative Extension Service in extending production testing to additional dairymen.

The breed registry organizations were much more interested because of shifts from their Advanced Registry and Herd Improvement Registry programs to the DHIR program. The National Association of Animal Breeders had great interest in progeny test bulls that had been developed through the DHI program. Also, during the 1960's, many State Extension programs for dairy herd improvement were oriented more toward education and less toward service, and the Federal Extension Service assumed the role of liaison between State Cooperative Extension Services, assisted ARS in coordinating the program, and supported the State Cooperative Extension Services in conducting the program.

NATIONAL DAIRY HERD IMPROVEMENT ASSOCIATION, INC.

Early in 1965, the National DHIA, Inc., was founded to give dairymen of the United States direct representation at the national policy-making level in dairy recordkeeping programs. The charter State DHIA members included Michigan, New York, North Carolina, Pennsylvania, Vermont, Virginia, Washington, and Wisconsin. Within these States were 53 percent of the herds on test and 45 percent of the cows on test in 1965. Craig Beane of Fort Atkinson, Wis., was elected the first president. As of September 1973, 36 State DHIA's were members, and Fred Polinder, Jr., of Lynden, Washington was president. A map showing State DHIA's and membership in NDHIA, Inc., is included as Appendix B.

COORDINATING GROUP

On April 22, 1965, with the objective of strengthening the national testing program, the administrators of the Federal Extension Service and the Agricultural Research Service, USDA, established the National Dairy Herd Improvement Coordinating Group (the name has since been changed to The Coordinating Group for the NCDHIP).

They wrote:

"The National Cooperative Dairy Herd Improvement Program is a cooperative effort implemented by Memorandum of Understanding involving the Federal Extension Service and Animal Husbandry Research Division of USDA and the State Extension Services whereby participating dairymen, research and extension workers are provided the information needed for increasing the efficiency of the Nation's dairy herd. The program requires extensive teamwork to develop a desirable level of active cooperation between Federal and State Agencies and the dairy industry and to insure effective coordination of the overall effort. There is increasing need for more complete integration of the operational and administrative aspects of the program at the National, regional, State, and county levels, and for provisions whereby individual farmer members and other segments of the dairy industry which depend heavily upon the use of data produced, may have increased representation in the development of policy and decisions and in their implementation.

To provide a stronger base for formulating policy, rules, and regulations and to administer their effective coordination and application to this program, a National Dairy Herd Improvement Coordinating Group composed of representatives of USDA, State Extension Services and dairy industry organizations is being established."

On October 27, 1972, the two organizing Services within USDA revised the Coordinating Group to include a new position of NDHI Coordinator and redefined the objectives of the Coordinating Group as follows:

Objectives of the Coordinating Group:

- A. To provide more equitable representation in the formulation of policy, rules and regulations relating to the conduct of the program particularly dealing with records for sire and cow evaluations within the framework of the Federal-State Memorandum of Understanding.

- B. To formulate policy, establish rules and regulations, and promote their effective coordination, administration, and application to the performance recording programs that will assure production records of high integrity and accuracy to serve individual farmer's needs and be useful in evaluation of cows and sires for breeding improvements.
- C. To explore and develop ways to increase the effectiveness of the Cooperative Dairy Herd Improvement Program.
- D. To coordinate the State Dairy Herd Improvement Programs through National DHIA, and with coordinating assistance from ARS, as necessary to provide uniformity in the application of established rules and procedures.
- E. To provide for effective communications whereby all agencies and groups concerned may be fully informed as to current problems and developments in the administration and operation of the program.
- F. To consider and take appropriate action on those problems and ideas relating to the program requiring technical, administrative, and policy evaluation.
- G. To establish Technical Consultant groups as needed to provide, or otherwise develop through research, information needed in the effective implementation of the National program.
- H. To encourage development of DHIA cooperatives of participating dairymen to assume responsibilities relating to the business, supervisory and service activities of the program as well as enforcement of rules.

The following material on the Coordinating Group is adapted from a paper given by Dr. R. Dean Plowman at the annual meeting of the American Dairy Science Association in Blacksburg, Va., in July 1972:

The concept of the Coordinating Group was a

great innovation for the DHI program. It gave every concerned and involved organization a voice in the formulation of policy and procedures. It centralized the authority for implementation of rules and regulations. Of particular significance, it gave dairy farmers an input into the program that would reflect their needs and wishes.

There is a wide range among States as to the conduct of the program. In those States where a strong DHIA is functioning, the State Cooperative Extension Service has delegated responsibility for the business aspects of the program to the State organization. In other States where no State organization exists or where it is newly formed, the Extension Service may still be largely responsible for all phases of the program. In either case, however, it is the responsibility of the State Cooperative Extension Service to insure that the program is carried out within the framework outlined by the Memorandum of Understanding and the Coordinating Group.

If, for example, a State organization of dairymen decided to operate a program according to a set of standards other than those adopted for the nationally accepted program, it would be the responsibility of the State Cooperative Extension Service to organize another group of dairymen to carry out the National DHI Program. There is certainly no need for such a situation to develop, especially when it is fully realized that every group, whether it be educational or industry, has a voice in the policy, procedures, rules, and regulations of the program. It should be remembered that the National Cooperative DHI Program is just that--a national program with authority for it vested in the two Federal agencies, ARS-USDA and ES-USDA, and implemented in each State through the State Cooperative Extension Service. It is not owned by farmers, farm groups, or industry, nor by a State or State Cooperative Extension Service. Because of its great implications regarding the economic well-being of dairymen and the future progress of the Nation's dairy cattle, it is operated for a common good of the dairy industry.

Significant Accomplishments of the Coordinating Group

The early activities of the Coordinating Group were primarily concerned with a multitude of hardware and housekeeping items that were necessary for the effective conduct of the program but that were not too

well-defined and organized. The Coordinating Group works primarily through committees that are established to accomplish certain tasks. Committees are composed of Coordinating Group members as well as of other competent people in industry, research, and extension organizations. Some committees are rather permanent, while others complete their assignments and are disbanded. One of the first committees appointed was the Rules Committee. It is chaired by the ADSA representative and is composed of dairymen and PDCA, Extension, and USDA personnel. Rule changes may be suggested at any time and are acted upon at each meeting. It is a policy, however, that rule changes are not implemented at less than 2-year intervals.

Another standing committee is the one concerned with weighing, sampling, and testing devices. When the Coordinating Group was established, the industry was extremely limited in the number of devices on the market that could be used to take official milk weights. After some research and study, this committee established tolerances of accuracy that various devices would have to meet to be approved. The industry then had guidelines for developing equipment. As a result, we now have numerous devices for weighing milk and testing for butterfat.

Until mid-1972, a third standing committee was charged with studies on methods for computing records. This committee was responsible for recommending the change from the centering date method to the test interval method of computing records.

An ad hoc committee was assigned the task of developing a guide to the availability and use of dairy production records (originally called code of ethics on availability and use of dairy production records). This document has had great value in standardizing all kinds of production data used by the entire industry. Records are more properly labeled, summarized, and used than at any time previously.

One committee was established to develop standards for computing centers. A few years ago, several commercial organizations were interested in processing DHI records. The Coordinating Group was concerned that service might be offered and accepted that would not be of as good quality as then existed. This committee developed a detailed outline of requirements for computing centers;

as a result, only one new organization has entered this field.

Another committee was charged with developing a package of sample by-laws and agreements to use in the entire DHI program. The source of some past and present problems is lack of appropriate documents or agreements that outline responsibilities of various parties in the program. For example, every member of a DHIA should sign a membership agreement which, among other things, should state that, if on official test, he will follow the rules. If he violates the rules, he has no recourse when adverse action is taken against him. It is estimated that not more than one-half of all DHIA members have signed membership agreements. This package of agreements contains samples for:

1. Articles of Incorporation for a local DHIA.
2. Bylaws for a local DHIA.
3. Individual membership Agreements.
4. Supervisor's contract.
5. Certificate of Incorporation for a State DHIA.
6. State DHIA Constitution and Bylaws.
7. Memorandum of Understanding between the land grant college or university and the State DHIA.

In addition, there should be an agreement between computing centers and State DHIA's.

Another committee was charged with the development of a handbook for extension workers in the DHI program. This was published in April 1973 by Extension Service, USDA.

There are a host of other accomplishments that could be listed; however, this list contains the most significant. An overall statement of accomplishment might be that the Coordinating Group has become the focal point for all activities that concern national policy for the program. It provides a mechanism for coping with problems as they occur and for future guidance and

development. The original composition of the Coordinating Group was:

Administrator, Federal Extension Service (FES),
Chairman

Director, Animal Husbandry Research Division
Agricultural Research Service (AHRD, ARS),
Vice Chairman

Extension Committee on Organization and Policy (1)

Chairman of the four Regional DHIA Sub-groups,
Extension Dairymen (4)

National DHIA (1)

FES (1)

American Dairy Science Association (ADSA) (1)

National Association of Animal Breeders (NAAB) (1)

Purebred Dairy Cattle Association (PDCA) (1)

Committee Secretary (ARS)

The present composition of the Coordinating Group is:

ARS, Chairman

Extension Service (ES-USDA), Vice-Chairman

ARS, Secretary-Coordinator

ARS (1)

ES-USDA (1)

Extension Committee on Organization and Policy (1)

Chairman of the four Regional DHIA Subgroups,
State Extension Dairymen (4)

PDCA (2)

National DHIA, four regions (4)

NAAB (1)

ADSA (1)

Computing Center Workshop (1) (nonvoting)

DR. PLOWMAN NAMED TO HEAD THE DAIRY HERD IMPROVEMENT SECTION

On January 25, 1965, Dr. Corley was appointed acting chief of the Dairy Cattle Research Branch and chief September 1 of that year. In 1966, Dr. R. Dean Plowman, leader of the Genetics and Management Investigations Unit, assumed responsibility for the Dairy Herd Improvement Section.

In July 1968, the Dairy Herd Improvement Section was renamed the "Dairy Herd Improvement Investigations Unit" (DHII). Dr. Plowman was named acting chief of the Dairy Cattle Research Branch in early 1968, and chief in June of that year. Dr. Frank N. Dickinson was named acting leader of DHII in July 1968. He was confirmed as leader in April 1969.

THE BELTSVILLE TEST HERD

In 1969, the Beltsville Test Herd was established as an instrument to promote uniformity of data handling and reporting where such uniformity is appropriate and to aid the processing centers in maintaining very high accuracy in their computing systems. At first, the Test Herd consisted of the entire dairy breeding herd at Beltsville, Md., but in 1971, it was reduced to 30 cows for easier handling. Unusual situations that affect individual cows are added to the Test Herd data to enable the centers to determine the capability of their systems to handle such situations.

THE TEST INTERVAL METHOD

Since July 1, 1969, the Test Interval Method has been the only acceptable method of computing Official DHI records. Nevertheless, in certain cases, an extension of time to comply was granted by the Coordinating Group for the NCDHIP upon written request from the processing center. As of April 1973, all centers were calculating records by the Test Interval Method.

The Test Interval Method uses the interval of time from one test day until the following test day as

the test period. Random scheduling of the test day to comply with the 15 to 45 day interval between tests is desirable. The test period (number of days from the day following the previous test through the current test day, inclusive) is divided into two equal parts. Production credits for the first half of the test period are calculated from the previous test-day information, while production credits for the second half of the test period are calculated from the current test-day information. The totals for the two halves of the test period are added to obtain the test period total.

Production totals from the first day of the lactation through the first test day are based on the first test-day information. Production totals for the period from the last test day until the record is terminated are based on the last test-day information. In either case, an approved regression factor may be used to reflect actual milk production more accurately. The current test period is defined as ending with and including the current test day. The next test period begins on the following day.

Processing centers are permitted to adjust credits for the test period based on average lactation curve effects, provided such adjustments more nearly reflect actual dairy production and provided that sufficient evidence for this has been submitted to the Coordinating Group for the NCDHIP and approved by it.

THE ANIMAL IMPROVEMENT PROGRAMS LABORATORY--1972

The Animal Improvement Programs Laboratory created under the reorganization of July 1, 1972, is responsible for the work of the NCDHIP for ARS as well as for the administration of the National Poultry Improvement Plan. The Laboratory has 19 employees who support the NCDHIP by work in administration, industry contact, research, computer programming, and operations--such as operating the computer programs. The research is directed toward improving the genetic evaluation of bulls and cows in the Nation's dairy cattle herd. This effort is the strongest in the history of the national program.

Dr. Dickinson, chief of the Laboratory, and associates regularly appear before industry groups and workshops to explain the need for new research, as well as

procedures for receipt and handling of data. The Dairy Herd Improvement Letter is usually published six to eight times a year to present testing participation, information on records received and sires summarized, herd summary data, the results of research on genetic improvement of dairy cattle, and articles promoting the testing program. A programming unit and an operations unit support the work of the Laboratory.

The Animal Improvement Programs Laboratory cooperates with State university scientists to find better methods of dairy sire and cow evaluation and collects data files as authorized by the Memorandum of Understanding to aid research.

NATIONAL DHI COORDINATOR APPOINTED

On July 1, 1973, Frank D. Murrill, extension dairyman from California, began serving temporarily as National DHI Coordinator. The primary purpose of the NDHI Coordinator will be to expand and strengthen the DHI Program by implementing and coordinating the policies and procedures established by its sponsors and the National DHI Coordinating Group. He has his office with the Animal Improvement Programs Laboratory at Beltsville.

SUMMARY

The present National Cooperative Dairy Herd Improvement Program has several facets--the dairymen; the local DHI's; the State DHIA's; the National DHIA, Inc.; the Extension Service, USDA; the State Cooperative Extension Services; the Purebred Dairy Cattle Association; the National Association of Animal Breeders; the American Dairy Science Association; and the Animal Improvement Programs Laboratory, Animal Physiology and Genetics Institute, ARS. The cost is borne by all parties--each one pays its own way. The composition of the Coordinating Group affords all segments of the industry a voice in policy. The program now includes 28.7 percent of the Nation's dairy cows and is expected to grow in percent and numbers.

APPENDIXES

Appendix A consists of the first paragraphs from the Memorandum of Understanding. Appendix B is a map showing State DHIA's and membership in NDHIA, Inc. Appendix C is a summary of important dates in the history of the program. Appendix D is a list of the leaders of the program in ARS and its predecessor organizations. Appendixes E through G show the number of associations, herds, and cows in the respective plans as of January 1 for selected years. Appendix H shows Official DHI and DHIR participation and production from 1906 through 1972. Appendix I lists the number of testing associations by State, 1906 through 1972. Appendixes J and K list the State Extension Dairymen in each State who advise on the Dairy Herd Improvement Program and on dairy cattle breeding programs, respectively. Organizational charts for the program at various times are included as Appendixes L through Q. I have not attempted to define lines of authority and lines of cooperation. Instead the lines indicate either or both, and the reader is referred to the text for specific relationships. Appendix R is a list of the present members of the Coordinating Group for the NCDHIP.

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APPENDIX A.--Memorandum of Understanding 1/

Memorandum of Understanding between Cooperative Extension Service _____ (State) and Extension Service and Agricultural Research Service, U.S. Department of Agriculture, relating to National Cooperative Program in Dairy Herd Improvement including Sire and Cow Evaluation.

The Cooperative Extension Service of the _____, hereinafter referred to as the Agency, the (federal) Extension Service, hereinafter referred to as the Service, and the Agricultural Research Service, hereinafter referred to as ARS, recognizing that cooperation is a matter of working together toward a common end and is not merely one of cooperative financing, desire to enter into this Memorandum of Understanding for carrying out the National Cooperative Dairy Herd Improvement Program including cow and sire evaluations, hereinafter referred to as the Program.

Participation in this cooperation on the part of ARS is under authority included in the Act establishing the Department of Agriculture, the Department of Agriculture Organic Act of 1944, and the annual appropriation Acts providing funds for the activities of ARS.

The Program sponsored by the parties to this agreement is a cooperative undertaking between dairymen; local, state and national associations; and the Agency, Service and ARS. The Program consists of official and unofficial production recordkeeping plans. Official recordkeeping plans include DHI (Dairy Herd Improvement) and DHIR (Dairy Herd Improvement Registry), in cooperation with the several breed registry organizations. The unofficial plans in the Program include Owner-Sampler and WADAM (Weigh-a-Day-a-Month). These plans are conducted on a national basis and coordinated by ARS and the Service. The sponsoring group in each State is the Agency.

APPENDIX A.--Memorandum of Understanding (cont'd.)

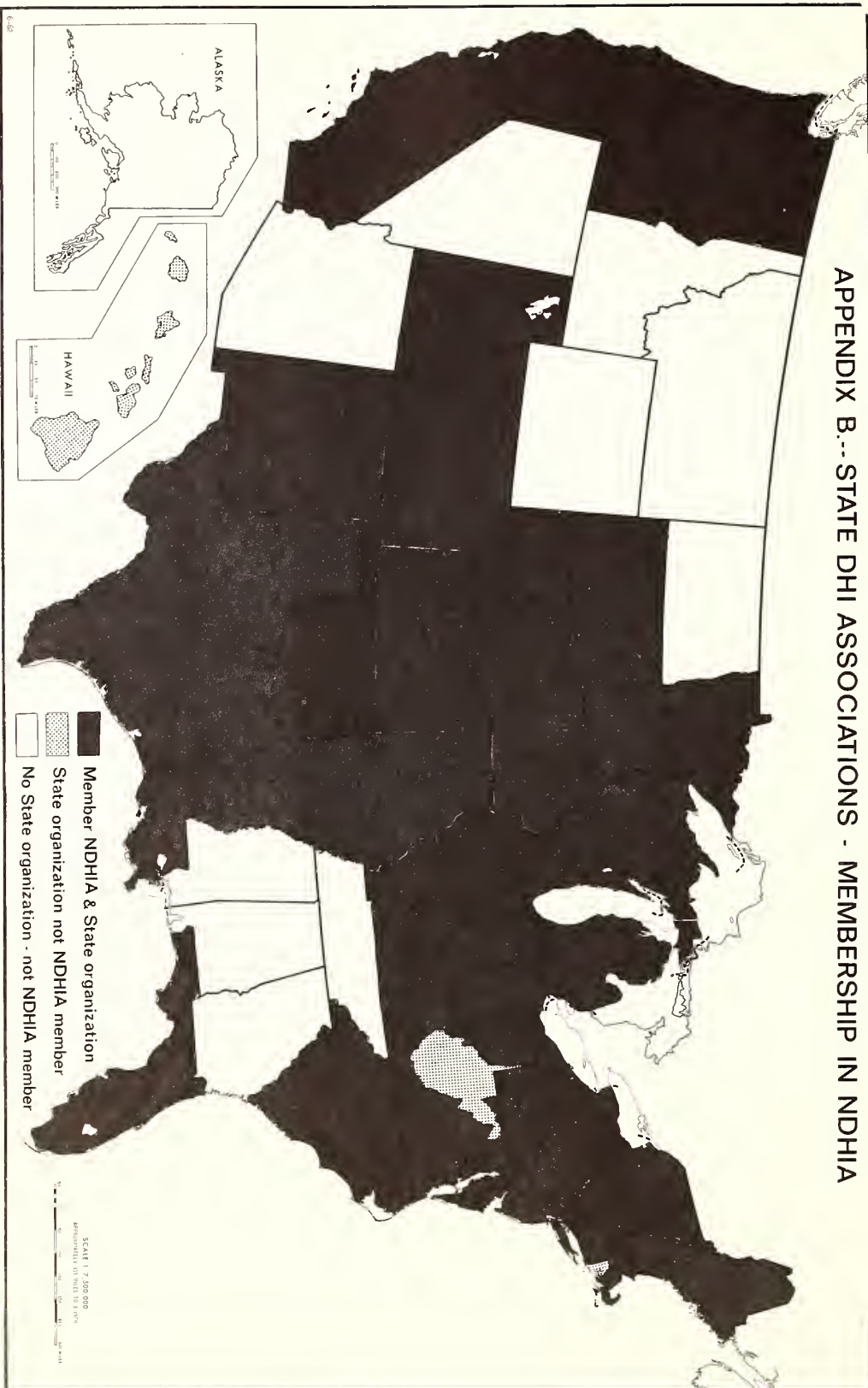
Under this sponsorship participating dairymen join together into organizations to conduct performance recording in their herds under rules and standards set forth by the Coordinating Group of the National Cooperative Dairy Herd Improvement Program. The governing bodies of the state and local associations are responsible for the enforcement of all rules and standards and for carrying out the Program of the associations.

The sponsoring parties to the Program look to the Coordinating Group which they have formed to advise them on the conduct of the Program. The Coordinating Group includes representation from the American Dairy Science Association, National DHIA, Inc., Purebred Dairy Cattle Association, National Association of Animal Breeders, an Extension dairyman from each of four regions in the United States, Extension Committee on Organization and Policy, Extension Service, and Agricultural Research Service. The Coordinating Group counsels and advises the Agency, Service and ARS on matters relating to the Program. It formulates the necessary uniform rules and standards, established tolerance to be used in weighing, testing and sampling devices required in official recordkeeping, and designates those devices which meet the tolerances.

The Program is a cooperative effort involving on-the-farm services, demonstration, extension, education and research. It provides farmers with on-the-farm services needed in order to effectively and economically breed, feed, and care for individual cows on a day-to-day basis. It also provides farmers with data needed to make farm management decisions. The data obtained are vital to State and local dairy extension and education programs and to researchers at State Experiment Stations and ARS. The lactation records are used by ARS to identify the breeding value of cows and sires, the results of which are made available to dairy farmers, the National Association of Animal Breeders, breed registry associations, and others who use the information for genetically improving production traits

1/ First six paragraphs

APPENDIX B.- STATE DHI ASSOCIATIONS - MEMBERSHIP IN NDHIA



APPENDIX C.--Important Dates in the NCDHIP

1895 -- Dairy Division established in USDA.

1905 -- Dairy Farming Investigations Section established in Dairy Division to support dairy cow production testing.

Helmer Rabild organized the first dairy-cow-testing association in the United States, in Newago County, Mich.

1906 -- First production records were reported.

1908 -- Helmer Rabild employed to establish a national cow-testing program.

1914 -- Dairy recordkeeping associations were first included in Extension Service programs.

1922 -- The Dairy Extension Section of the American Dairy Science Association (ADSA) reported on the standardization of cow-testing association work.

1924 -- Bureau of Dairying established, replacing the Dairy Division. Sidney L. Thompson appointed to head the Dairy Introduction Section of the Bureau.

1925 -- Joseph B. Parker appointed fieldman for cow-testing in the Bureau of Dairying.

Cow-Testing Association Letter first published.

First set of rules for cow testing adopted by ADSA.

McDowell Method for Centering the Testing Day included in first rules.

John H. McLain appointed in charge of the Dairy Introduction Section.

1926 -- Bureau of Dairying renamed Bureau of Dairy Industry.

The Standard DHIA Plan and the Owner-Sampler Plan introduced.

APPENDIX C.--Important Dates in the NCDHIP (cont'd.)

- 1927 -- ADSA resolved that cow-testing associations be called D.H.I.A.'s.
- ADSA Dairy Records Committee established to regularly review and revise rules for testing.
- 1929 -- Dr. John C. McDowell named chief of Division of Dairy Herd Improvement Investigations (DHII) as it replaced the Dairy Introduction Section.
- 1931 -- Cow testers renamed supervisors.
- 1932 -- A new tabulating machine in the Division of DHII made it possible to summarize feeds by type.
- 1933 -- Proving bulls on a lactation basis initiated nationwide.
- 1935 -- National Cooperative Sire-Proving Program initiated by the Division of DHII under the direction of Dr. J. Frank Kendrick.
- 1937 -- List of sires proved in DHIA testing first published as Miscellaneous Publication 277 of the USDA.
- 1938 -- Dr. J. Frank Kendrick named chief of Division of DHII.
- 1940's- Central laboratories for butterfat testing established in several States.
- First State DHIA's organized.
- 1950's- Feed, cost, and income records included in machine-processed records by some States.
- 1951 -- Computer first used to calculate DHIA records in Utah by Lyman Rich and Bliss Crandall.
- 1952 -- Memorandum of Understanding signed among State Cooperative Extension Services, the U. S. Extension Service, and the Agricultural Research Service.

APPENDIX C.--Important Dates in the NCDHIP (cont'd.)

- 1954 -- Agricultural Research Administration reorganized as the Agricultural Research Service, and DHIA work is included in the Dairy Herd Improvement Sire-Proving Section, Dairy Husbandry Research Branch.
- 1956 -- Owner-Sampler participation first tabulation by USDA.
- Weigh-a-Day-a-Month (WADAM) Plan initiated.
- 1957 -- Cornell University worked with 10 Northeastern States using IBM -650 computers to process monthly DHIA records.
- 1958 -- Dairy Husbandry Research Branch became Dairy Cattle Research Branch, and Dairy Herd Improvement Sire-Proving Section became Dairy Herd Improvement Section(DHIS).
- DHIS first used IBM-650 to process herd average summaries, and centers were established in Iowa, North Carolina, Ohio, and Oklahoma to process monthly records on the computer.
- 1959 -- Dairy Herd Improvement Registry established as a testing plan for breed registry organizations.
- First computing center workshop held.
- TeSa butterfat test approved by ADSA and AOAC for dairy record-keeping programs.
- 1960 -- IBM-705-III computer first used by DHIS to summarize sires.
- Sire Summary publication first called Sire Summary List.
- 1962 -- The Daughter-Herdmate Comparison Method of evaluating dairy sires adopted by USDA.

APPENDIX C.--Important Dates in the NCDHIP (cont'd.)

1962 -- Dr. Robert H. Miller directed work of DHI in USDA as Dr. Kendrick left to develop Washington Data Processing Center.

1963 -- Dr. Ernest L. Corley appointed to head DHI work.

1964 -- Cow Index List first published, then renamed Cow Performance Index List in second publication.

1965 -- Dr. Corley appointed chief, Dairy Cattle Research Branch.

National DHIA, Inc., was formed, the membership consisting of State DHIA's.

Coordinating Group for NCDHIP formed.

1966 -- Test Interval Method (TIM) first proposed for calculation of DHIA records.

DHIR became the only testing plan for breed registry organizations.

Dr. R. Dean Plowman became acting leader of DHI Section.

1967 -- DHIS converted computer programs to IBM-360.

1968 -- TIM first used (in April) for calculation of DHIA records by California and Pennsylvania. Several other centers adopted it soon thereafter.

Dr. Plowman named chief, DCRB.

Dr. Frank N. Dickinson named acting leader, DHIS.

Dairy Herd Improvement Section renamed Dairy Herd Improvement Investigations Unit (DHII).

1969 -- Dr. Dickinson named leader, DHII.

Standard DHIA Plan name changed to Official DHI.

APPENDIX C.--Important Dates in the NCDHIP (cont'd.)

1969 -- Beltsville Test Herd developed to test processing centers' handling of records.

TIM adopted by the Coordinating Group as the only acceptable method of calculating Official DHI records.

1970 -- Other Unofficial Plans first tabulated as part of NCDHIP.

1972 -- ARS reorganized; Divisions and Branches abolished; DHII included in Animal Improvement Programs Laboratory, Animal Physiology and Genetics Institute; Dr. Dickinson named acting leader of Laboratory.

1973 -- Dr. Dickinson named chief of Laboratory.

Frank D. Murrill named first National DHI Coordinator.

APPENDIX D.--Men Who Have Directed the Collecting and
Summarizing of Records and the National Sire
Evaluation Program

1908 -- Helmer Rabild
1925 -- Joseph B. Parker and John H. McLain
1929 -- Dr. John C. McDowell
1938 -- Dr. J. Frank Kendrick
1962 -- Dr. Robert H. Miller
1963 -- Dr. Ernest L. Corley
1966 -- Dr. R. Dean Plowman
1968 -- Dr. Frank N. Dickinson

APPENDIX E.--HERDS AND COWS ENROLLED IN OFFICIAL DHI, NUMBER OF ASSOCIATIONS, AND PERCENT OF COWS ON TEST FOR SELECTED YEARS

STATES	HERDS				COWS				ASSOCIATIONS				OFFICIAL DHI COWS AS PCT OF STATE COWS			
	1940	1950	1960	1970	1940	1950	1960	1970	1940	1950	1960	1970	1940	1950	1960	1970
	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	%	%	%	%
ALABAMA-----	56	99	249	299	2,613	6,721	17,803	33,078	5	8	21	21	0.6	1.6	5.6	24.0
ALASKA-----	(2/)	(2/)	(2/)	5	(2/)	(2/)	(2/)	193	(2/)	(2/)	(2/)	2	(2/)	(2/)	(2/)	10.7
ARIZONA-----	64	220	228	64	3,097	12,031	25,951	13,785	4	10	6	4	6.3	25.6	49.0	27.0
ARKANSAS-----	66	68	57	96	1,668	1,943	1,918	5,411	4	6	6	11	.4	.4	.7	5.5
CALIFORNIA-----	1,479	2,065	2,068	1,493	90,021	181,343	295,536	324,563	64	110	33	28	13.4	19.7	33.2	41.8
COLORADO-----	146	221	317	246	3,730	5,872	15,514	18,171	12	19	25	16	1.5	2.9	11.8	18.0
CONNECTICUT-----	392	445	508	381	11,469	14,121	22,035	23,659	19	22	8	7	8.8	12.0	23.4	35.9
DELAWARE-----	65	88	121	80	1,376	2,283	3,595	4,913	3	5	3	3	3.8	6.2	12.0	32.8
FLORIDA-----	41	51	124	93	2,633	4,902	21,620	22,235	4	5	10	11	2.4	3.2	9.7	11.7
GEORGIA-----	12	141	324	360	511	5,754	19,715	33,770	1	11	26	29	.1	1.4	7.0	24.1
HAWAII-----	17	0	5	12	1,456	707	203	4,174	1	1	5	1	(2/)	6.7	1.6	32.6
IDAH0-----	139	568	861	447	2,510	9,277	25,441	24,902	7	28	13	28	1.3	4.2	11.5	16.1
ILLINOIS-----	1,765	1,952	1,791	1,238	33,640	40,131	58,272	56,407	78	91	85	51	2.9	4.0	8.6	17.5
INDIANA-----	1,166	1,574	1,249	918	20,756	27,498	35,789	47,681	59	81	61	52	2.7	3.3	7.3	19.8
IOWA-----	1,663	2,208	1,889	1,652	28,558	38,665	54,454	61,936	69	99	75	71	1.9	3.3	6.0	11.7
KANSAS-----	407	830	813	794	8,660	13,891	26,110	40,266	18	40	51	56	1.1	2.2	7.0	19.5
KENTUCKY-----	300	330	456	506	6,266	8,320	17,348	25,230	15	24	40	31	1.2	1.3	3.1	7.1
LOUISIANA-----	54	79	59	114	2,572	3,173	3,966	10,789	4	7	8	24	.8	1.0	1.4	8.2
MAINE-----	304	506	656	367	5,729	10,041	20,980	13,533	13	23	15	12	4.0	3.3	21.6	26.9
MARYLAND-----	264	769	990	616	7,123	24,266	44,181	42,196	14	37	18	16	3.5	9.9	19.5	25.0
MASSACHUSETTS-----	365	493	553	398	10,349	15,355	22,100	19,248	18	26	13	10	7.4	12.5	22.8	29.2
MICHIGAN-----	1,903	3,047	1,949	1,470	29,358	53,294	60,851	79,676	85	131	32	55	3.2	5.2	8.2	16.9
MINNESOTA-----	1,265	2,660	3,786	3,291	23,964	48,084	107,188	119,456	56	111	158	77	1.4	3.2	3.2	11.9
MISSISSIPPI-----	119	34	133	277	3,812	1,515	7,678	22,898	7	4	9	20	.7	.3	1.7	11.4
MISSOURI-----	347	893	661	567	9,331	17,867	21,714	31,366	23	48	44	41	1.0	1.8	3.0	8.5
MONTANA-----	81	196	122	77	2,666	4,622	5,559	5,228	8	13	9	6	1.7	3.6	6.3	11.9
NEBRASKA-----	187	274	346	410	3,974	3,757	13,240	20,000	15	17	23	29	.6	.3	3.7	9.9
NEVADA-----	35	23	44	54	527	924	3,661	3,743	2	2	3	3	3.9	4.4	19.1	27.1
NEW HAMPSHIRE-----	258	296	318	199	6,277	7,564	11,742	10,619	9	14	9	9	7.9	10.3	22.2	27.9
NEW JERSEY-----	554	628	566	342	18,143	23,463	27,516	22,167	26	28	10	8	12.3	14.5	20.1	29.6
NEW MEXICO-----	7	48	42	31	641	2,381	4,055	11,641	1	4	5	3	.6	4.0	8.3	32.3
NEW YORK-----	2,916	4,271	3,877	3,493	74,162	119,882	151,649	193,257	134	201	49	49	5.2	8.1	12.0	18.9
NORTH CAROLINA-----	158	283	701	757	6,471	8,403	32,084	54,146	11	19	43	39	1.7	2.2	9.1	28.5
NORTH DAKOTA-----	10	65	187	148	324	1,113	5,403	6,313	2	3	15	12	.1	.3	1.7	4.1
OHIO-----	1,358	1,593	2,087	1,912	24,686	28,483	60,137	88,516	59	95	81	71	2.4	2.7	7.8	19.1
OKLAHOMA-----	128	97	170	331	3,725	2,700	7,348	22,526	12	17	21	16	.5	.4	2.2	14.9
OREGON-----	532	636	568	329	13,936	18,619	28,737	25,255	21	31	19	15	5.4	7.8	16.1	23.0
PENNSYLVANIA-----	2,442	3,994	4,456	3,281	49,170	88,263	139,606	150,493	107	175	59	61	5.4	8.7	15.0	21.0
PUERTO RICO-----	80	(2/)	31	7	4,223	(2/)	4,422	1,007	4	(2/)	4	1	(2/)	(2/)	(2/)	(2/)
RHODE ISLAND-----	65	71	62	32	2,124	2,375	2,764	1,852	4	4	2	2	8.8	11.3	18.4	23.4
SOUTH CAROLINA-----	88	64	154	271	3,323	2,223	10,557	28,842	5	4	17	24	1.9	1.3	7.5	41.2
SOUTH DAKOTA-----	120	167	189	143	2,551	2,977	5,883	5,800	6	9	14	18	.5	.8	2.1	2.9
TENNESSEE-----	242	297	384	480	5,796	9,271	16,283	31,363	16	18	28	40	1.0	1.4	2.8	10.0
TEXAS-----	179	377	361	316	6,730	14,401	21,866	30,564	14	32	26	23	.5	1.1	3.3	8.7
UTAH-----	423	541	480	393	5,016	9,531	16,265	21,130	9	20	20	17	5.0	8.2	16.1	27.8
VERMONT-----	931	1,070	1,115	695	23,428	30,903	45,462	38,147	39	52	51	27	7.6	10.7	17.5	18.5
VIRGINIA-----	464	947	1,126	908	17,850	39,348	50,961	64,272	31	53	60	38	4.2	7.9	13.8	28.6
WASHINGTON-----	384	1,096	941	640	11,176	29,947	43,626	49,423	13	48	25	23	3.2	9.1	17.4	27.0
WEST VIRGINIA-----	132	265	245	186	3,240	6,810	8,736	10,215	7	15	15	12	1.3	2.9	5.2	16.2
WISCONSIN-----	3,741	3,406	2,828	3,065	73,831	83,281	98,986	140,253	160	149	70	41	3.3	3.4	4.5	7.6
WYOMING-----	28	40	46	24	743	577	1,441	1,558	2	3	6	3	1.1	1.0	4.1	8.2
UNITED STATES-----	27,943	40,100	41,293	34,308	676,141	1,088,872	1,746,752	2,122,011	1,300	1,973	1,509	1,267	2.9	4.9	9.8	16.9

1/ THE NUMBERS OF U.S. MILK COWS ARE LISTED IN TABLE 10 IN THE AUGUST 1972 DAIRY HERD IMPROVEMENT LETTER, ARS-NE-5. THROUGH 1966, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE AND U.S. TOTAL COWS. FROM 1967 THROUGH 1969, JANUARY 1 ENROLLMENT WAS COMPARED TO THE PREVIOUS YEAR'S STATE COWS AND TO DECEMBER OF PREVIOUS YEAR'S U.S. COWS. FROM 1970, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE COWS AND TO JANUARY 1 OF STATED YEAR'S U.S. COWS. DHI ENROLLMENT IS INCLUDED IN 1970.

2/ HERDS NOT ENROLLED OR NO DATA RECEIVED.

APPENDIX F.--HERDS AND COWS ENROLLED IN THE OWNER-SAMPLER PLAN, PERCENT OF COWS ON OWNER-SAMPLER TEST, AND PERCENT OF COWS ON TEST IN ALL PLANS FOR SELECTED YEARS 1/

STATES	HERDS				COWS				OWNER-SAMPLER COWS AS :				COWS OF ALL PLANS AS :			
	1958 : 1962 : 1967 : 1972				1958 : 1962 : 1967 : 1972				PERCENT OF STATE COWS :				PERCENT OF STATE COWS :			
	NO.				NO.				%				%			
ALABAMA-----	(2/)	4	5	13	(2/)	278	300	1,850	(2/)	0.1	0.2	1.4	0.6	1.6	6.7	24.6
ALASKA-----	15	7	4	7	375	200	150	399	(2/)	(2/)	7.5	23.5	(2/)	(2/)	(2/)	28.6
ARIZONA-----	(2/)	11	(2/)	4	(2/)	2,564	(2/)	2,580	(2/)	5.1	(2/)	4.7	5.3	25.6	49.5	43.0
ARKANSAS-----	(2/)	21	96	65	(2/)	679	2,700	3,167	(2/)	.3	2.3	3.3	.4	.4	2.3	8.8
CALIFORNIA----	583	335	142	92	17,074	14,330	8,886	11,427	2.0	1.8	1.2	1.4	13.4	19.7	34.8	50.2
COLORADO-----	61	32	15	46	1,681	1,149	730	4,008	1.2	1.0	.7	4.0	1.5	2.9	12.6	19.1
CONNECTICUT----	89	88	83	42	2,778	3,006	3,302	2,029	2.7	3.4	4.7	3.3	8.8	12.0	26.4	40.1
DELAWARE-----	20	12	10	1	348	290	246	53	1.1	1.2	1.4	.4	3.8	6.2	14.7	34.3
FLORIDA-----	4	6	6	(2/)	225	915	2,068	(2/)	.1	.5	1.2	(2/)	2.4	3.2	11.2	19.6
GEORGIA-----	(2/)	(2/)	6	(2/)	(2/)	(2/)	385	(2/)	(2/)	(2/)	.3	(2/)	.1	1.4	8.3	29.2
HAWAII-----	(2/)	(2/)	1	1	(2/)	(2/)	26	653	(2/)	(2/)	.2	5.0	(2/)	6.7	(2/)	47.6
IDAHO-----	4	12	21	20	41	231	601	860	(2/)	.1	.4	.6	1.3	4.2	12.1	16.5
ILLINOIS-----	340	405	400	298	6,800	11,596	13,215	11,153	.9	2.1	3.4	3.9	2.9	4.0	11.3	23.1
INDIANA-----	362	190	442	98	2,487	4,858	29,555	3,917	.5	1.2	9.8	1.7	2.7	3.8	8.3	25.5
IOWA-----	1,333	1,429	1,445	965	24,396	31,335	37,645	29,839	2.5	3.7	5.6	6.4	1.9	3.3	9.2	18.1
KANSAS-----	122	121	125	135	1,569	3,313	3,976	5,988	.4	1.0	1.7	3.1	1.1	2.2	8.2	22.5
KENTUCKY-----	4	6	44	31	100	60	1,575	1,533	(3/)	(3/)	.4	.5	1.2	1.3	4.1	7.9
LOUISIANA-----	(2/)	(2/)	8	3	(2/)	(2/)	551	310	(2/)	(2/)	.3	.2	.8	1.0	3.7	12.9
MAINE-----	83	141	99	67	1,732	3,652	3,758	2,741	1.6	3.9	5.1	4.2	4.0	8.3	24.8	31.8
MARYLAND-----	76	120	75	63	2,564	4,250	3,165	3,231	1.1	1.9	1.8	2.0	3.5	9.9	21.0	26.9
MASSACHUSETTS--	89	117	78	43	1,969	2,810	2,655	1,449	1.8	3.0	3.6	2.3	7.4	12.5	25.1	32.3
MICHIGAN-----	1,072	1,534	1,451	945	23,683	42,366	49,075	41,398	3.0	6.6	9.0	8.8	3.2	5.2	12.9	27.9
MINNESOTA-----	367	1,224	2,372	2,455	6,680	30,427	64,590	78,844	.5	2.4	5.6	8.1	1.4	3.2	9.6	18.3
MISSISSIPPI----	(2/)	1	1	4	(2/)	33	71	397	(2/)	(3/)	(3/)	.2	.7	.3	2.0	12.6
MISSOURI-----	83	73	144	187	1,749	1,874	4,165	8,863	.2	.3	1.0	2.6	1.0	1.8	4.1	10.8
MONTANA-----	32	22	37	14	815	895	1,676	1,331	.9	1.2	3.2	3.4	1.7	3.6	7.3	15.9
NEBRASKA-----	40	85	83	67	700	2,550	2,816	3,376	.2	.8	1.2	1.8	.6	.8	4.4	11.4
NEVADA-----	6	4	2	3	162	34	1,135	303	1.2	.2	8.7	2.2	3.9	4.4	19.1	40.4
NEW HAMPSHIRE----	90	62	60	50	2,123	1,675	2,210	2,100	3.7	3.3	5.4	5.8	7.9	10.8	26.8	34.7
NEW JERSEY-----	149	132	39	13	4,132	4,353	1,853	687	2.9	3.4	1.9	1.1	12.3	14.5	23.5	33.8
NEW MEXICO-----	4	34	5	3	97	1,420	1,613	550	.2	3.5	4.2	1.7	.6	4.0	17.0	38.6
NEW YORK-----	2,568	3,258	2,654	1,603	70,047	99,942	95,823	67,492	5.3	8.0	8.6	6.9	5.2	8.1	18.5	28.0
NORTH CAROLINA--	52	36	37	34	1,376	1,264	1,479	1,901	.4	.5	.7	1.0	1.7	2.2	11.0	30.4
NORTH DAKOTA----	78	38	41	20	867	809	820	890	.3	.3	.4	.7	.1	.3	3.3	5.0
OHIO-----	1,970	1,665	1,446	915	36,558	36,964	41,000	33,208	4.4	5.5	7.8	7.5	2.4	2.7	12.8	26.9
OKLAHOMA-----	53	45	46	54	1,220	1,300	2,357	2,844	.3	.5	1.4	2.0	.5	.4	3.4	16.8
OREGON-----	230	160	120	46	1,275	4,675	3,600	2,210	.7	3.0	3.0	2.1	5.4	7.8	19.7	26.1
PENNSYLVANIA----	816	1,270	1,337	1,073	19,092	33,586	39,308	39,378	2.0	3.8	5.1	5.7	5.4	8.7	17.6	32.6
PUERTO RICO-----	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)
RHODE ISLAND----	4	3	(2/)	(2/)	138	101	(2/)	(2/)	.9	.7	(2/)	(2/)	8.8	11.3	19.0	23.4
SOUTH CAROLINA--	(2/)	2	2	2	(2/)	69	196	113	(2/)	.1	.3	.2	1.9	1.3	9.4	42.3
SOUTH DAKOTA----	199	294	380	386	3,302	6,683	11,600	14,200	1.1	2.7	5.4	8.2	.5	.8	3.7	9.1
TENNESSEE-----	4	3	7	7	106	85	226	239	(3/)	(3/)	.1	.1	1.0	1.4	3.4	10.6
TEXAS-----	1	4	13	45	26	187	1,116	3,396	(2/)	(2/)	.3	1.0	.5	1.1	3.5	9.5
UTAH-----	34	19	33	17	984	433	1,034	714	1.0	.5	1.3	.9	5.0	8.2	17.1	28.9
VERMONT-----	472	650	636	471	13,467	21,721	27,664	23,136	4.9	8.3	12.9	11.3	7.6	10.7	24.7	31.0
VIRGINIA-----	25	108	53	44	400	3,260	2,146	2,325	.1	1.0	.9	1.1	4.2	7.9	14.0	29.7
WASHINGTON-----	406	276	36	32	9,064	8,445	1,189	1,952	3.6	3.6	.6	1.0	3.2	9.1	22.5	28.9
WEST VIRGINIA----	5	10	23	19	74	418	807	759	(3/)	.3	1.0	1.5	1.3	2.9	6.4	19.0
WISCONSIN-----	9,291	10,866	11,241	10,839	226,468	306,584	349,547	385,620	9.9	14.3	17.6	20.7	3.3	3.4	17.6	27.8
WYOMING-----	33	19	25	3	1,257	753	1,122	214	3.4	2.6	5.1	1.3	1.1	1.0	9.9	10.9
UNITED STATES--	21,269	24,954	25,439	21,345	490,001	698,302	825,127	805,555	2.5	4.0	6.0	6.6	2.9	4.9	13.6	24.8

1/ OWNER-SAMPLER TABULATION BEGAN IN 1956. THE NUMBERS OF U.S. MILK COWS ARE LISTED IN TABLE 10 IN THE AUGUST 1972 DAIRY HERD IMPROVEMENT LETTER, ARS-NE-5. THROUGH 1966, JANUARY 1 ENROLLMENT WAS COMPARED TO THE PREVIOUS YEAR'S STATE AND U.S. TOTAL COWS. FROM 1967 THROUGH 1969, JANUARY 1 ENROLLMENT WAS COMPARED TO THE PREVIOUS YEAR'S STATE COWS AND TO DECEMBER OF PREVIOUS YEAR'S U.S. COWS. FROM 1970, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE COWS AND TO JANUARY 1 OF STATED YEAR'S U.S. COWS.

2/ HERDS NOT ENROLLED OR NO DATA RECEIVED.

3/ LESS THAN ONE-TENTH OF ONE PERCENT.

APPENDIX G.--HERDS AND COWS IN WEIGH-A-DAY-A-MONTH AND OTHER UNOFFICIAL PLANS FOR SELECTED YEARS 1/

STATES	WEIGH-A-DAY-A-MONTH 2/								OTHER UNOFFICIAL PLANS 3/							
	HERDS				COWS				HERDS				COWS			
	1958:	1962:	1967:	1972:	1958:	1962:	1967:	1972:	1970:	1971:	1972:	1970:	1971:	1972:	1970:	1972:
	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
ALABAMA-----	115	59	18	---	3,277	3,139	1,246	---	---	---	---	---	---	---	---	---
ALASKA-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ARIZONA-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ARKANSAS-----	126	74	15	3	3,039	1,944	500	150	---	---	---	---	---	---	---	---
CALIFORNIA-----	16	1	---	---	385	179	---	---	204	71	45	56,893	18,660	12,989	---	---
COLORADO-----	9	8	---	2	210	192	---	373	2	7	---	143	561	---	---	---
CONNECTICUT-----	10	---	---	4	284	---	---	358	---	---	1	---	---	150	---	---
DELAWARE-----	6	4	3	---	117	90	54	---	---	---	---	---	---	---	---	---
FLORIDA-----	30	35	18	21	4,257	9,061	5,358	7,525	---	15	19	---	6,730	8,522	---	---
GEORGIA-----	73	35	42	77	3,328	2,249	4,838	12,500	---	---	---	---	---	---	---	---
HAWAII-----	2	3	---	4	52	160	---	3,849	---	---	---	---	---	---	---	---
IDAH0-----	81	12	---	1	1,346	354	---	278	---	---	23	---	---	1,887	---	---
ILLINOIS-----	265	257	274	152	5,343	6,168	8,151	6,348	---	---	---	---	---	---	---	---
INDIANA-----	81	---	---	---	1,102	---	---	---	---	---	---	---	---	---	---	---
IOWA-----	259	18	---	2	3,661	212	---	60	---	---	---	---	---	---	---	---
KANSAS-----	103	50	10	---	1,380	1,000	300	---	---	---	---	---	---	---	---	---
KENTUCKY-----	200	183	59	12	4,000	4,339	2,083	889	---	---	---	---	---	---	---	---
LOUISIANA-----	73	163	198	191	3,000	9,177	12,830	11,944	---	---	---	---	---	---	---	---
MAINE-----	18	6	1	---	342	130	---	---	---	---	2	---	---	70	---	---
MARYLAND-----	3	---	---	---	60	---	---	---	---	11	10	---	810	770	---	---
MASSACHUSETTS-----	4	1	---	---	134	70	---	---	---	---	---	---	---	---	---	---
MICHIGAN-----	180	67	---	---	3,700	1,865	---	---	124	83	66	5,330	3,884	3,227	---	---
MINNESOTA-----	139	1	---	---	2,214	48	---	---	---	---	---	---	---	---	---	---
MISSISSIPPI-----	71	129	50	10	2,104	4,537	2,500	600	---	---	---	---	---	---	---	---
MISSOURI-----	288	243	---	---	5,951	5,826	---	---	---	---	---	---	---	---	---	---
MONTANA-----	40	---	---	---	800	---	---	---	---	---	---	---	---	---	---	---
NEBRASKA-----	97	6	43	6	1,400	150	946	192	---	---	---	---	---	---	---	---
NEVADA-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NEW HAMPSHIRE-----	---	---	7	13	---	---	368	679	---	---	---	---	---	---	---	---
NEW JERSEY-----	17	4	---	---	568	172	---	---	---	---	1	---	---	104	---	---
NEW MEXICO-----	17	26	13	---	763	2,384	1,404	---	---	---	---	---	---	---	---	---
NEW YORK-----	37	---	---	---	1,103	---	---	---	96	129	334	6,641	9,438	20,877	---	---
NORTH CAROLINA-----	206	108	69	23	5,093	3,514	3,333	979	---	---	---	---	---	---	---	---
NORTH DAKOTA-----	185	73	23	25	2,556	1,472	573	910	---	---	---	---	---	---	---	---
OHIO-----	7	13	---	---	88	504	---	---	---	---	---	---	---	---	---	---
OKLAHOMA-----	109	44	4	---	2,838	1,853	123	---	---	---	---	---	---	---	---	---
OREGON-----	200	---	---	---	2,500	---	---	---	8	---	15	450	---	1,446	---	---
PENNSYLVANIA-----	23	---	---	---	605	---	---	---	882	974	951	39,564	44,040	45,465	---	---
PUERTO RICO-----	---	13	28	23	---	1,516	4,439	5,485	---	---	---	---	---	---	---	---
RHODE ISLAND-----	7	---	---	---	127	---	---	---	---	---	---	---	---	---	---	---
SOUTH CAROLINA-----	67	48	12	10	1,980	1,879	664	723	---	---	---	---	---	---	---	---
SOUTH DAKOTA-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TENNESSEE-----	181	99	41	30	3,387	2,159	1,213	1,435	---	---	---	---	---	---	---	---
TEXAS-----	50	18	10	---	1,634	1,222	640	---	---	---	---	---	---	---	---	---
UTAH-----	52	3	---	---	596	30	---	---	---	---	---	---	---	---	---	---
VERMONT-----	7	5	---	---	140	125	---	---	---	---	---	---	---	---	---	---
VIRGINIA-----	29	6	3	---	813	355	359	---	---	---	---	---	---	---	---	---
WASHINGTON-----	11	1	---	---	167	30	---	---	21	17	45	2,275	2,268	5,034	---	---
WEST VIRGINIA-----	40	120	60	27	797	2,512	1,474	725	---	---	---	---	---	---	---	---
WISCONSIN-----	88	---	---	---	1,816	---	---	---	---	---	---	---	---	---	---	---
WYOMING-----	7	---	---	---	432	---	---	---	---	---	---	---	---	---	---	---
UNITED STATES-----	3,629	1,936	1,001	596	79,489	70,617	53,429	56,052	1,337	1,307	1,512	111,256	86,391	100,541	---	---

1/ DASHES INDICATE HERDS NOT ENROLLED OR NO DATA RECEIVED.

2/ PERCENTAGE OF U.S. COWS FOR WADAM FOR GIVEN YEARS WAS .4 AND .5. THE NUMBERS OF U.S. MILK COWS ARE LISTED IN TABLE 10 IN THE AUGUST 1972 DAIRY HERD IMPROVEMENT LETTER, ARS-NE-5. THROUGH 1966, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE AND U.S. TOTAL COWS. FROM 1967 THROUGH 1969, JANUARY 1 ENROLLMENT WAS COMPARED TO DECEMBER OF PREVIOUS YEAR'S STATE AND U.S. TOTAL COWS. FROM 1970, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE COWS AND TO JANUARY 1 OF STATED YEAR'S U.S. COWS.

3/ PERCENTAGE OF U.S. COWS FOR OTHER UNOFFICIAL PLANS FOR GIVEN YEARS RANGED FROM .7 TO .9. THE NUMBERS OF U.S. COWS ARE LISTED IN TABLE 10 IN THE AUGUST 1972 DAIRY HERD IMPROVEMENT LETTER, ARS-NE-5. FROM 1970, JANUARY 1 ENROLLMENT WAS COMPARED TO PREVIOUS YEAR'S STATE COWS AND TO JANUARY 1 OF STATED YEAR'S U.S. COWS.

APPENDIX H.--STATUS OF THE OFFICIAL DAIRY HERO IMPROVEMENT PLAN IN THE UNITED STATES AND PERCENT OF COWS ON TEST, 1906-73 1/

YEAR	ASSOCI- ATIONS 2/	SUPER- VISORS 3/	OFFICIAL DHI PLAN										PERCENT OF COWS ON TEST: ALL PLANS	
			HERDS EN- ROLLED	COWS EN- ROLLED	COWS PER HERD	PCT. OF U.S. COWS	HERDS REPTD.	COWS REPTD.	AVERAGE PRODUCTION			U.S. COWS	ON TEST	
			NO.	NO.	NO.	%	NO.	NO.	LB	%	LB	THOU.	%	
1906----	1	---	31	239	7.7	(.5/)	---	---	5,300	4.06	215	5/17,110	(.5/)	
1907----	4	---	---	1,606	---	0.01	---	---	5,366	4.10	220	17,509	0.01	
1908----	6	---	---	3,921	---	.02	---	---	---	---	---	17,872	.02	
1909----	25	---	---	11,921	---	.07	---	---	---	---	---	18,081	.07	
1910----	40	---	---	6/25,000	---	.14	---	---	5/5,730	3.96	5/227	18,300	.14	
1911----	64	---	---	6/40,000	---	.22	---	---	---	---	---	18,302	.22	
1912----	82	---	---	6/43,000	---	.23	---	---	---	---	---	18,397	.23	
1913----	100	---	---	47,150	---	.26	---	---	---	---	---	18,460	.26	
1914----	163	---	---	73,280	---	.39	---	---	---	---	---	18,701	.39	
1915----	211	---	---	105,526	---	.55	---	---	---	---	---	19,153	.55	
1916----	346	---	---	150,677	---	.77	---	---	---	---	---	19,632	.77	
1917----	459	---	11,720	216,831	18.5	1.08	---	---	---	---	---	20,092	1.08	
1918----	353	---	9,778	172,518	17.6	.85	---	---	---	---	---	20,416	.85	
1919----	385	---	10,000	167,313	16.7	.82	---	---	---	---	---	20,425	.82	
1920----	468	---	11,948	203,472	17.0	1.00	---	---	6,175	4.00	247	20,335	1.00	
1921----	452	---	11,209	193,928	17.3	.95	---	---	---	---	---	20,336	.95	
1922----	513	---	12,503	215,321	17.2	1.04	---	---	---	---	---	20,731	1.04	
1923----	627	---	16,357	277,010	16.9	1.32	---	---	---	---	---	21,018	1.32	
1924 <u>7/</u> ----	---	---	---	---	---	---	---	---	---	---	---	21,211	---	
1925----	732	---	18,677	307,073	16.4	1.43	---	42,302	7,189	3.95	234	21,417	1.43	
1926----	777	---	19,540	327,653	16.8	1.52	---	103,443	7,331	3.96	290	21,503	1.52	
1927----	837	---	21,128	362,014	17.1	1.70	---	116,509	7,411	3.95	293	21,312	1.70	
1928----	947	---	23,327	414,891	17.8	1.96	---	152,412	7,476	3.96	296	21,191	1.96	
1929----	1,090	---	26,182	465,804	17.8	2.19	---	194,859	7,498	3.97	293	21,223	2.19	
1930----	1,143	---	27,888	507,549	18.2	2.35	---	235,624	7,642	3.96	303	21,618	2.35	
1931----	1,112	---	26,308	510,714	19.4	2.30	---	219,924	7,812	3.92	306	22,218	2.30	
1932----	1,005	---	20,351	427,044	21.0	1.85	---	186,683	7,858	3.95	310	23,108	1.85	
1933----	881	---	15,447	358,501	23.2	1.49	---	163,014	7,849	3.99	313	24,105	1.49	
1934----	793	---	13,694	325,837	23.8	1.30	---	203,930	8,015	4.02	322	25,062	1.30	
1935----	809	---	15,573	364,218	23.4	1.45	---	200,367	7,977	4.04	322	25,198	1.45	
1936----	876	---	17,344	404,412	23.3	1.67	---	257,248	7,912	4.03	319	24,187	1.67	
1937----	992	---	20,772	496,562	23.9	2.09	---	354,568	7,923	4.04	320	23,727	2.09	
1938----	1,106	---	23,701	558,993	23.6	2.40	---	448,025	7,831	4.05	317	23,340	2.40	
1939----	1,228	---	25,949	625,284	24.1	2.69	---	507,563	7,977	4.05	323	23,215	2.69	
1940----	1,300	---	27,948	676,141	24.2	2.91	---	545,382	8,133	4.07	331	23,273	2.91	
1941----	1,383	---	31,381	763,502	24.3	3.23	---	591,103	8,225	4.07	335	23,671	3.23	
1942----	1,421	---	32,957	816,117	24.8	3.36	---	514,758	8,323	4.07	339	24,288	3.36	
1943----	1,057	---	24,155	616,972	25.5	2.47	---	375,914	8,325	4.06	338	25,027	2.47	
1944----	954	---	20,825	561,587	27.0	2.21	---	383,337	8,296	4.05	336	25,451	2.21	
1945----	949	---	21,254	577,200	27.2	2.25	---	384,360	8,592	4.03	346	25,597	2.25	
1946----	1,124	---	23,331	627,878	27.0	2.51	---	413,554	8,635	4.04	349	25,033	2.51	
1947----	1,426	---	28,812	775,546	26.9	3.22	---	533,061	8,638	4.03	348	24,089	3.22	
1948----	1,668	---	33,274	886,129	26.6	3.80	---	620,385	8,675	4.03	350	23,329	3.80	
1949----	1,787	---	35,851	943,939	26.3	4.23	---	729,150	8,907	4.03	359	22,336	4.23	
1950----	1,973	---	40,100	1,088,872	27.2	4.94	---	836,922	9,172	4.03	370	22,024	4.94	
1951----	2,143	---	42,949	1,186,615	27.6	5.41	---	885,859	9,195	4.02	370	21,944	5.41	
1952----	2,109	---	40,105	1,166,297	29.1	5.42	---	928,376	9,192	3.98	366	21,505	5.42	
1953----	2,151	---	40,983	1,226,588	29.9	5.75	---	1,020,326	9,253	3.98	368	21,338	5.75	
1954----	2,175	---	41,254	1,311,698	31.8	6.05	---	1,079,557	9,363	3.97	372	21,691	6.05	
1955----	2,288	---	41,240	1,333,866	32.3	6.18	---	1,175,378	9,502	3.95	375	21,581	6.18	
1956----	2,266	---	40,984	1,406,306	34.4	6.68	---	1,229,971	9,713	3.94	383	21,044	8/8.46	
1957----	1,700	2,310	41,638	1,479,799	35.5	7.22	---	1,256,129	9,894	3.93	389	20,501	9/9.30	
1958----	1,544	2,293	39,985	1,548,884	38.7	7.83	---	1,345,750	10,068	3.91	394	19,774	10.71	
1959----	1,500	2,337	40,284	1,607,538	39.9	8.59	---	1,406,665	10,327	3.88	401	18,711	11.93	
1960----	1,509	2,397	41,293	1,746,752	42.3	9.76	---	10/1,343,725 <u>10/</u>	10,561	3.87 <u>10/</u>	409	17,901	13.63	
1961----	1,395	2,448	42,558	1,867,469	43.9	10.66	28,649	1,280,785	10,796	3.87	418	17,515	14.81	
1962----	1,436	2,472	42,034	1,958,355	46.6	11.36	32,794	1,531,826	11,032	3.86	426	17,243	15.82	
1963----	1,441	2,516	41,937	2,006,534	47.8	11.91	35,378	1,674,803	11,286	3.85	434	16,842	16.53	
1964----	1,420	2,474	40,670	2,010,144	49.4	12.36	35,689	1,746,475	11,685	3.83	447	16,260	17.36	
1965----	1,424	2,439	40,075	2,087,581	52.1	13.32	35,604	1,821,252	11,976	3.82	457	15,677	18.90	
1966----	1,418	2,378	38,879	2,058,592	52.9	13.77	34,886	1,852,533	12,127	3.81	462	14,954	19.76	
1967----	1,344	2,319	37,683	2,098,919	55.7	15.22	34,515	1,890,024	12,307	3.80	468	13,793	21.59	
1968----	1,318	2,304	36,869	2,131,929	57.8	16.06	33,560	1,924,200	12,397	3.80	471	13,273	22.82	
1969----	1,289	2,250	35,617	2,138,953	60.1	16.65	33,130	1,959,647	12,553	3.79	476	12,847	23.55	
1970----	1,267	2,225	34,308	2,122,011	61.9	16.87	31,138	1,937,390	12,750	3.79	483	12,575	24.81	
1971----	1,274	2,201	33,996	2,218,402	65.3	17.87	30,699	1,995,463	13,000	3.76	489	12,414	25.71	
1972----	1,247	2,186	33,197	2,244,685	67.6	18.28	30,190	2,050,132	13,226	3.75	496	12,279	26.12	
1973----	1,231	2,164	33,578	2,359,611	70.3	20.25	---	---	---	---	---	11,651	28.65	

1/ DASHES INDICATE DATA NOT REPORTED OR CALCULATED. DHI ENROLLMENT IS INCLUDED FROM 1962.

2/ NUMBER OF ASSOCIATIONS INCLUDES ALL PLANS.

3/ PRIOR TO 1957, ASSOCIATIONS WERE COUNTED ON THE BASIS OF SUPERVISOR CIRCUITS. NUMBER OF SUPERVISORS INCLUDES ALL PLANS.

4/ LESS THAN .01 PERCENT.

5/ U.S. COWS FROM 1906 THROUGH 1924 ARE AN ESTIMATE OF THE NUMBER OF COWS AND HEIFERS 2 YEARS OLD AND OLDER JANUARY 1, KEPT FOR MILK, EXCLUDING THOSE NOT FRESH. THE ESTIMATE WAS OBTAINED BY SUBTRACTING 1,120,000 FROM THE NUMBERS GIVEN IN TABLE 543, AGR. STATIS., 1967 FOR COWS AND HEIFERS 2 YEARS OLD AND OLDER, KEPT FOR MILK. FROM 1925 THROUGH 1966, U.S. COWS ARE THE AVERAGE NUMBER OF MILK COWS ON FARMS FOR THE PREVIOUS YEAR, EXCLUDING HEIFERS NOT YET FRESH. ESTIMATED BY THE STATIS. RPT. SERV., USDA.

6/ ESTIMATED.

7/ DATE FOR COLLECTING DATA CHANGED IN 1924 FROM JULY 1 TO JANUARY 1, SO 1924 WAS SKIPPED.

8/ OWNER-SAMPLER TABULATION BEGAN IN 1956.

9/ WEIGH-A-DAY-A-MONTH TABULATION BEGAN IN 1957.

10/ NATIONAL TESTING YEAR CHANGED IN 1960 TO BEGIN MAY 1. THESE VALUES ARE AVERAGES OF 1959 AND 1961.

11/ FOR 1967 THROUGH 1969, AVERAGE NUMBER OF MILK COWS ON FARMS IN DECEMBER OF PREVIOUS YEAR, EXCLUDING HEIFERS NOT YET FRESH. ESTIMATED BY THE STATIS. RPT. SERV., USDA.

12/ BEGINNING 1970, NUMBER OF MILK COWS AND HEIFERS THAT HAVE CALVED JANUARY 1 OF STATED YEAR, EXCLUDING HEIFERS NOT YET FRESH. ESTIMATED BY THE STATIS. RPT. SERV., USDA.

APPENDIX I--NUMBER OF DHI ASSOCIATIONS, BY STATE, 1906-73 1/, 2/, 3/

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
MICHIGAN-----	1	4	2	5	4	3	4	4	3	3	10	15	7	13	14	11	17
MA NE-----			3	4	3	6	5	4	5	8	11	5	1	---	---	---	3
NEW YORK-----			1	1	3	9	18	21	29	35	47	43	19	25	28	24	31
VERMONT-----				2	6	10	11	17	28	33	38	47	18	12	18	17	21
IOWA-----				2	5	4	8	7	8	13	23	30	15	11	14	17	22
CALIFORNIA-----				1	3	2	4	4	5	7	9	15	16	14	18	21	21
WISCONSIN-----				9	10	10	8	11	24	37	51	81	112	105	115	103	127
NEBRASKA-----				1	---	---	---	3	2	3	4	4	2	2	---	---	1
COLORADO-----					1	1	2	1	1	---	---	3	5	5	5	4	6
PENNSYLVANIA-----					1	1	2	2	7	14	19	24	21	35	64	46	45
OHIO-----				1	---	---	---	1	4	5	20	30	24	24	41	35	36
WASHINGTON-----				1	3	1	---	---	---	1	12	18	11	9	6	10	10
MARYLAND-----						1	3	3	2	4	7	8	4	2	6	7	6
ILLINOIS-----						4	3	2	7	3	3	17	15	27	23	25	24
MINNESOTA-----						3	7	10	9	11	22	26	23	21	19	23	37
NEW HAMPSHIRE-----						1	1	1	4	8	11	12	8	9	10	10	11
OREGON-----						1	1	1	7	11	15	17	11	6	9	5	5
UTAH-----						1	---	---	1	1	---	1	1	---	1	1	1
MASSACHUSETTS-----						2	2	2	3	---	4	4	---	---	1	5	6
VIRGINIA-----						2	2	2	---	---	2	4	4	5	8	10	12
KANSAS-----								1	1	1	1	4	3	15	13	13	13
INDIANA-----								2	2	3	7	9	7	10	5	10	5
KENTUCKY-----								1	1	---	1	1	---	---	5	5	2
MISSOURI-----									2	1	2	5	4	5	6	7	11
NEW JERSEY-----									2	3	4	8	9	9	12	8	6
WEST VIRGINIA-----									1	1	3	1	1	1	3	5	5
CONNECTICUT-----									1	3	6	3	---	---	1	---	2
NORTH CAROLINA-----									2	---	---	---	---	---	2	2	---
LOUISIANA-----									1	---	---	---	---	---	1	---	---
SOUTH DAKOTA-----									1	1	3	3	---	---	---	---	---
NEVADA-----										1	---	1	---	---	---	1	1
ARIZONA-----											2	2	1	---	---	2	1
RHODE ISLAND-----											2	2	---	---	4	4	4
DELAWARE-----											2	3	2	2	1	---	---
IDAHO-----											2	1	1	4	5	6	4
MISSISSIPPI-----											1	---	---	---	---	3	2
MONTANA-----											1	2	---	---	---	---	---
TENNESSEE-----											1	8	4	6	3	3	4
NEW MEXICO-----												1	---	---	---	1	1
WYOMING-----												1	---	1	---	---	---
ALABAMA-----													2	1	3	1	1
GEORGIA-----													1	---	---	---	---
NORTH DAKOTA-----													1	1	1	2	6
OKLAHOMA-----														1	1	2	1
SOUTH CAROLINA-----														1	1	1	---
TEXAS-----														3	---	---	---
ARKANSAS-----																1	2
FLORIDA-----																	2
PUERTO RICO-----																	
HAWAII-----																	
ALASKA-----																	
UNITED STATES-----	1	4	6	25	40	64	82	100	163	211	346	459	353	385	468	452	513

APPENDIX I--NUMBER OF OHI ASSOCIATIONS, BY STATE, 1906-73 (CONT'D.)

	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
MICHIGAN-----	53	---	105	108	102	105	94	90	88	69	58	51	46	51	62	69	77
MAINE-----	4	---	2	1	---	---	---	5	5	5	4	3	3	7	11	12	13
NEW YORK-----	27	---	24	28	36	42	54	51	69	79	74	69	81	96	105	115	129
VERMONT-----	20	---	17	23	23	25	23	23	28	29	26	27	27	30	36	35	35
IOWA-----	47	---	56	61	77	86	101	101	100	82	60	53	52	54	54	59	66
CALIFORNIA-----	27	---	20	30	35	32	32	33	31	62	60	52	52	56	59	60	65
WISCONSIN-----	151	---	176	169	159	166	154	142	131	96	78	69	94	95	124	140	154
NEBRASKA-----	4	---	2	6	10	17	23	28	29	26	20	17	14	16	18	16	15
COLORADO-----	6	---	7	6	5	9	14	15	15	15	15	11	11	9	11	11	13
PENNSYLVANIA-----	36	---	42	43	49	65	76	88	88	85	86	83	84	86	91	97	102
OHIO-----	36	---	21	25	28	29	39	38	37	36	31	30	27	32	38	47	54
WASHINGTON-----	11	---	10	8	11	10	12	15	12	15	13	10	10	11	10	12	13
MARYLAND-----	4	---	9	10	8	7	8	9	13	11	9	11	10	10	14	12	13
ILLINOIS-----	23	---	24	26	30	34	51	59	62	57	53	52	57	63	59	67	72
MINNESOTA-----	55	---	88	84	85	105	117	120	96	69	45	36	30	30	35	47	53
NEW HAMPSHIRE-----	10	---	5	4	2	4	7	7	8	9	9	9	9	9	9	9	9
OREGON-----	4	---	7	8	9	11	14	14	16	16	14	10	9	10	17	16	20
UTAH-----	4	---	5	4	5	5	5	8	6	7	1	1	1	2	4	6	9
MASSACHUSETTS-----	6	---	3	6	7	9	11	11	13	13	14	11	11	13	13	13	17
VIRGINIA-----	13	---	15	18	18	20	20	20	20	25	28	25	23	23	24	28	31
KANSAS-----	9	---	8	11	13	14	20	22	25	18	17	14	13	15	14	13	16
INDIANA-----	10	---	17	25	31	34	41	51	37	32	30	30	33	30	37	44	53
KENTUCKY-----	3	---	2	---	2	---	8	12	12	8	6	6	6	7	7	14	13
MISSOURI-----	12	---	13	19	21	25	34	36	34	28	29	24	19	21	23	21	22
NEW JERSEY-----	6	---	6	9	11	17	18	16	15	17	16	17	18	19	21	23	25
WEST VIRGINIA-----	6	---	3	3	3	4	6	7	9	6	5	6	6	6	6	7	7
CONNECTICUT-----	1	---	1	2	4	5	3	4	4	2	2	2	8	13	15	15	18
NORTH CAROLINA-----	---	---	2	5	5	5	8	7	7	8	9	7	6	6	8	8	10
LOUISIANA-----	---	---	---	---	1	2	2	2	3	2	6	5	4	11	7	3	3
SOUTH DAKOTA-----	4	---	11	9	10	8	14	12	12	7	4	4	2	2	2	2	4
NEVADA-----	4	---	3	1	3	---	1	---	---	---	---	---	---	1	---	2	2
ARIZONA-----	1	---	2	1	1	2	3	4	3	2	2	2	2	2	2	2	4
RHODE ISLAND-----	3	---	---	---	---	---	1	1	1	2	2	3	3	3	3	4	4
DELAWARE-----	---	---	---	---	---	---	1	1	1	1	1	1	1	1	1	1	1
IDAHO-----	8	---	8	8	9	12	13	13	12	10	5	4	4	5	7	7	8
MISSISSIPPI-----	1	---	1	2	---	1	1	2	3	3	2	1	---	---	---	6	5
MONTANA-----	2	---	4	3	7	7	8	9	9	8	6	4	4	4	5	5	8
TENNESSEE-----	2	---	2	2	2	3	7	10	10	8	8	6	4	3	6	13	15
NEW MEXICO-----	1	---	---	1	1	2	2	1	1	1	1	1	1	1	1	1	1
WYOMING-----	---	---	1	---	---	---	1	1	1	1	1	1	1	1	1	2	2
ALABAMA-----	---	---	---	---	1	3	4	7	6	4	3	2	1	---	3	5	6
GEORGIA-----	---	---	---	---	1	1	2	1	---	1	1	---	1	1	1	2	1
NORTH DAKOTA-----	8	---	5	3	6	4	7	9	9	5	7	5	4	2	2	2	2
OKLAHOMA-----	3	---	5	5	5	12	22	25	21	20	15	15	12	13	11	12	10
SOUTH CAROLINA-----	---	---	---	---	---	---	1	3	2	---	1	1	1	1	3	4	5
TEXAS-----	---	---	---	---	1	3	6	7	5	5	3	2	3	5	9	12	14
ARKANSAS-----	2	---	---	---	---	2	---	1	3	---	1	---	---	---	2	1	4
FLORIDA-----	---	---	---	---	---	---	1	2	---	---	---	---	---	---	---	2	3
PUERTO RICO-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	1
HAWAII-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1
ALASKA-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
UNITED STATES-----	627	---	732	777	837	947	1,090	1,143	1,112	1,005	881	793	809	876	992	1,106	1,228

APPENDIX I---NUMBER OF OHI ASSOCIATIONS, BY STATE, 1906-73 (CONT'D.)

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
MICHIGAN-----	85	89	92	59	61	63	71	93	114	116	131	133	126	132	125	130	120
MAINE-----	13	13	13	3	13	15	16	21	24	22	23	28	30	31	32	30	27
NEW YORK-----	134	137	137	101	100	95	115	132	161	175	201	220	227	221	223	227	218
VERMONT-----	39	41	46	38	29	22	30	27	36	51	52	61	61	64	67	69	69
IOWA-----	69	73	78	57	54	45	55	70	87	93	99	104	90	87	90	92	97
CALIFORNIA-----	64	69	72	60	64	70	78	90	105	103	110	111	116	113	112	120	117
WISCONSIN-----	160	166	178	110	74	68	112	133	141	147	149	152	145	141	135	136	136
NEBRASKA-----	15	17	16	14	11	9	10	10	15	18	17	19	22	23	25	25	29
COLORADO-----	12	12	12	12	12	15	13	18	21	17	19	25	23	20	24	26	29
PENNSYLVANIA-----	107	114	122	118	119	118	117	136	145	154	175	200	193	198	204	212	217
OHIO-----	59	60	63	35	25	35	57	71	71	74	95	100	120	138	124	126	136
WASHINGTON-----	13	16	16	16	15	16	31	36	47	49	46	50	46	42	48	48	45
MARYLAND-----	14	16	16	8	14	17	21	21	26	28	37	41	41	44	46	47	48
ILLINOIS-----	78	85	87	72	56	58	63	79	82	85	91	96	88	95	102	107	101
MINNESOTA-----	56	58	59	42	35	33	42	85	99	99	111	124	108	118	83	127	129
NEW HAMPSHIRE-----	9	9	9	9	8	9	11	10	11	12	14	16	17	15	18	17	17
OREGON-----	21	24	24	10	6	6	12	22	19	28	31	33	35	34	37	37	35
UTAH-----	9	14	14	11	12	12	12	16	18	21	20	22	18	20	21	25	22
MASSACHUSETTS-----	18	18	18	10	8	7	6	14	17	22	26	31	31	33	32	32	31
VIRGINIA-----	31	35	38	32	28	34	37	44	47	50	53	64	57	60	57	60	59
KANSAS-----	18	20	21	19	15	17	20	21	30	34	40	42	36	39	44	53	52
INOIANA-----	59	63	63	46	36	39	49	61	75	81	81	79	73	95	105	101	83
KENTUCKY-----	15	14	15	11	13	11	11	18	21	20	24	27	32	30	33	37	38
MISSOURI-----	23	25	27	23	26	24	28	33	37	46	48	51	52	42	47	44	45
NEW JERSEY-----	26	27	30	25	22	23	23	26	27	28	28	29	29	31	26	27	29
WEST VIRGINIA-----	7	8	8	8	8	9	10	12	13	12	15	16	17	17	16	20	21
CONNECTICUT-----	19	20	21	16	16	16	16	18	18	21	22	22	24	27	29	31	27
NORTH CAROLINA-----	11	11	12	9	8	7	6	15	23	22	19	21	25	33	33	35	35
LOUISIANA-----	4	5	4	4	1	1	1	4	5	5	7	10	12	9	8	11	8
SOUTH OAKOTA-----	6	7	7	4	3	3	1	3	5	5	9	9	12	11	11	10	14
NEVADA-----	2	3	4	4	1	2	3	3	3	2	2	2	2	3	1	3	3
ARIZONA-----	4	4	4	3	4	6	4	5	7	9	10	11	11	11	13	13	13
RHODE ISLAND-----	4	4	3	3	1	1	1	1	2	3	4	4	4	4	4	4	3
DELAWARE-----	3	3	3	1	1	3	3	4	4	4	5	5	6	6	6	6	6
IDAHO-----	7	10	13	9	6	9	11	14	21	26	28	29	26	26	29	32	33
MISSISSIPPI-----	7	7	4	2	---	---	---	6	4	4	4	7	7	5	5	5	5
MONTANA-----	8	7	8	4	4	5	5	8	12	12	13	14	12	9	9	9	9
TENNESSEE-----	16	16	15	15	13	5	6	10	14	16	18	20	21	22	20	21	23
NEW MEXICO-----	1	2	2	3	1	1	1	3	4	4	4	4	4	3	3	4	5
WYOMING-----	2	2	2	1	1	---	---	6	---	3	3	3	3	3	3	4	4
ALABAMA-----	5	5	1	1	1	1	1	---	---	---	8	12	14	16	20	19	17
GEORGIA-----	1	1	1	1	1	1	2	4	9	11	11	13	13	14	19	20	23
NORTH DAKOTA-----	2	3	4	7	5	1	2	---	3	4	3	4	4	8	11	13	13
OKLAHOMA-----	12	12	11	9	9	6	2	7	17	15	17	30	30	12	28	24	22
SOUTH CAROLINA-----	5	5	5	---	---	---	---	---	2	2	4	6	6	8	10	11	11
TEXAS-----	14	20	15	6	7	5	3	13	23	27	32	28	25	25	22	21	25
ARKANSAS-----	4	4	4	2	2	---	---	---	---	2	6	7	4	2	3	5	5
FLORIDA-----	4	6	4	3	3	4	3	---	3	3	5	7	9	9	10	10	10
PUERTO RICO-----	4	1	---	---	1	1	1	1	---	---	---	---	---	---	---	---	1
HAWAII-----	1	2	---	1	1	1	2	2	---	1	1	1	1	1	1	1	1
ALASKA-----													1	1	1	1	---
UNITED STATES-----	1,300	1,383	1,421	1,057	954	949	1,124	1,426	1,668	1,786	1,973	2,143	2,109	2,151	2,175	2,288	2,266

APPENDIX I---NUMBER OF DHI ASSOCIATIONS, BY STATE, 1906-73 (CONT'D.)

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
MICHIGAN-----	106	106	82	82	78	95	84	89	80	76	67	55	55	55	85	83	83
MAINE-----	16	15	15	15	16	15	15	15	15	14	13	13	13	12	13	13	13
NEW YORK-----	49	49	49	49	49	49	49	49	49	49	49	49	43	49	47	47	48
VERMONT-----	53	51	50	51	16	38	35	31	30	29	28	28	27	27	27	27	26
IOWA-----	75	72	70	75	71	75	72	72	74	71	71	74	72	71	68	64	64
CALIFORNIA-----	35	34	33	33	33	34	34	32	30	30	30	30	30	28	27	27	27
WISCONSIN-----	76	75	73	70	64	60	61	61	59	57	50	50	50	41	39	35	33
NEBRASKA-----	26	30	28	28	27	29	29	28	29	27	29	31	31	29	32	31	28
COLORADO-----	21	21	22	25	20	25	15	15	14	15	12	15	13	16	14	14	15
PENNSYLVANIA-----	219	58	59	59	59	59	59	58	59	59	59	61	60	61	60	59	61
OHIO-----	80	80	81	81	80	83	82	83	86	86	80	80	73	71	69	69	67
WASHINGTON-----	26	25	26	25	24	24	24	23	23	24	22	22	22	23	23	25	22
MARYLAND-----	45	44	18	18	18	17	18	16	17	36	17	17	17	16	14	14	14
ILLINOIS-----	96	91	94	85	64	63	64	58	56	57	53	53	54	51	49	52	50
MINNESOTA-----	132	141	152	158	73	89	89	87	87	87	83	80	77	77	76	74	74
NEW HAMPSHIRE-----	9	9	9	9	10	9	9	9	9	9	9	9	9	9	9	9	1
OREGON-----	20	20	19	19	23	18	18	18	18	17	16	15	15	15	13	13	14
UTAH-----	22	22	24	20	20	19	18	19	15	15	15	15	16	17	17	16	18
MASSACHUSETTS-----	13	13	13	13	12	12	12	11	10	10	10	11	10	10	10	8	7
VIRGINIA-----	59	58	61	60	62	65	66	52	61	54	39	40	38	38	39	39	41
KANSAS-----	45	52	50	51	47	55	51	49	52	54	56	57	51	56	57	57	57
INDIANA-----	67	64	64	61	66	57	57	57	59	60	59	59	54	52	48	47	46
KENTUCKY-----	39	36	40	40	45	48	47	44	40	40	38	36	36	31	36	36	37
MISSOURI-----	46	45	43	44	50	46	44	44	48	45	47	45	44	41	38	37	39
NEW JERSEY-----	29	29	27	10	10	9	10	10	10	9	9	8	8	8	6	5	5
WEST VIRGINIA-----	15	15	15	15	14	14	13	12	12	12	11	11	12	12	12	11	11
CONNECTICUT-----	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7
NORTH CAROLINA-----	38	41	42	43	46	47	53	53	42	42	40	40	42	39	37	38	38
LOUISIANA-----	9	10	8	8	9	8	15	15	21	23	25	19	25	24	25	26	26
SOUTH DAKOTA-----	11	13	14	14	15	15	16	15	20	20	18	20	20	18	17	16	16
NEVADA-----	4	2	3	3	5	5	5	3	3	3	2	2	2	3	3	3	3
ARIZONA-----	5	6	6	6	4	4	5	5	4	4	4	4	4	4	4	4	2
RHODE ISLAND-----	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
DELAWARE-----	3	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
IDAHO-----	33	32	19	18	36	19	38	40	40	37	36	33	30	28	26	27	27
MISSISSIPPI-----	4	4	6	9	13	13	13	17	16	17	19	20	19	20	20	21	21
MONTANA-----	8	8	8	9	8	8	8	8	7	6	6	6	6	6	6	6	6
TENNESSEE-----	19	21	22	28	33	37	38	39	42	43	42	42	36	40	36	33	31
NEW MEXICO-----	4	4	4	5	6	6	6	6	6	6	4	4	5	3	3	3	3
WYOMING-----	6	7	7	6	5	5	5	4	4	5	5	5	5	3	4	4	4
ALABAMA-----	18	18	18	21	21	22	22	22	22	22	23	23	22	21	21	21	20
GEORGIA-----	21	22	23	26	25	27	29	32	34	31	31	31	29	29	29	28	26
NORTH DAKOTA-----	11	11	11	15	14	13	13	17	19	18	16	13	14	12	11	12	12
OKLAHOMA-----	21	20	20	21	20	19	17	17	14	14	15	16	15	16	17	17	17
SOUTH CAROLINA-----	12	12	15	17	18	15	16	21	21	20	24	14	24	24	23	11	11
TEXAS-----	24	24	20	26	28	30	30	27	26	26	26	25	23	23	23	24	23
ARKANSAS-----	6	2	4	6	7	10	11	11	14	13	9	11	14	11	14	14	16
FLORIDA-----	9	10	10	10	10	10	9	9	10	10	10	10	9	11	11	11	13
PUERTO RICO-----	3	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1
HAWAII-----	1	1	5	5	4	1	1	1	1	1	1	1	1	1	1	1	1
ALASKA-----	---	---	---	---	---	1	2	2	2	1	2	1	1	2	2	2	1
UNITED STATES-----	1,700	1,544	1,500	1,509	1,395	1,436	1,441	1,420	1,424	1,418	1,344	1,318	1,289	1,267	1,274	1,247	1,231

1/ BLANKS INDICATE OHIA'S NOT YET ORGANIZED IN STATE. DASHES INDICATE ASSOCIATIONS CEASED OPERATION OR DATA NOT COLLECTED.

2/ DATE FOR COLLECTING DATA CHANGED IN 1924 FROM JULY 1 TO JANUARY 1.

3/ PRIOR TO 1957, ASSOCIATIONS WERE COUNTED ON THE BASIS OF SUPERVISOR CIRCUITS. NUMBER OF SUPERVISORS INCLUDES ALL PLANS.

APPENDIX J.--EXTENSION DAIRYMEN ADVISING ON THE DAIRY HERD IMPROVEMENT PROGRAM IN EACH STATE

ALABAMA----- (VACANCY), DAIRY SCIENCE DEPT., AUBURN UNIVERSITY, AUBURN 36830.

ALASKA-----ARTHUR L. BRUNDAGE, EXPERIMENT STATION RESEARCH STAFF, UNIVERSITY OF ALASKA, PALMER 99645.

ARIZONA-----DENNIS V. ARMSTRONG, DEPT. OF DAIRY SCIENCE, UNIVERSITY OF ARIZONA, TUCSON 85721.

ARKANSAS-----LANTIS RATCLIFF, ANIMAL INDUSTRY & VETERINARY SCIENCE DEPT., UNIVERSITY OF ARKANSAS, LITTLE ROCK 72203.

CALIFORNIA-----FRANK D. MURRILL, EXTENSION SERVICE, UNIVERSITY OF CALIFORNIA, DAVIS 95616.

COLORADO-----DAVID C. JORDAN, ANIMAL SCIENCE DEPT., COLORADO STATE UNIVERSITY, FORT COLLINS 80521.

CONNECTICUT-----ROBERT H. BENSON, ANIMAL INDUSTRIES DEPT., UNIVERSITY OF CONNECTICUT, STORRS 06268.

DELAWARE-----W. R. HESSELTINE, ANIMAL AND POULTRY SCIENCE DEPT., UNIVERSITY OF DELAWARE, NEWARK 19711.

FLORIDA-----DANIEL W. WEBB, DAIRY SCIENCE BLDG., UNIVERSITY OF FLORIDA, GAINESVILLE 32601.

GEORGIA-----W. HARDY MCKINNEY, ANIMAL INDUSTRY DIVISION, UNIVERSITY OF GEORGIA, ATHENS 30601.

HAWAII-----JAMES H. KOSHI, ANIMAL SCIENCE DEPT., UNIVERSITY OF HAWAII, HONOLULU 96822.

IDAHO-----GEORGE W. CLEVELAND, DAIRY SCIENCE DEPT., UNIVERSITY OF IDAHO, BOISE 83701.

ILLINOIS-----GERHARD W. HARPESTAD, DAIRY SCIENCE DEPT., UNIVERSITY OF ILLINOIS, URBANA 61801.

INDIANA-----WILLIAM M. DILLON, DEPT. OF ANIMAL SCIENCES, PURDUE UNIVERSITY, LAFAYETTE 47907.

IOWA-----DONALD E. VOELKER, ANIMAL & DAIRY SCIENCE DEPT., IOWA STATE UNIVERSITY, AMES 50010.

KANSAS-----E. RALPH BONEWITZ, DAIRY SCIENCE DEPT., KANSAS STATE UNIVERSITY, MANHATTAN 66502.

KENTUCKY-----EVANS E. WRIGHT, DAIRY SCIENCE DEPT., UNIVERSITY OF KENTUCKY, LEXINGTON 40506.

LOUISIANA-----NOLAN J. MATHERNE, LA. AGR. EXTENSION SERVICE, LOUISIANA STATE UNIVERSITY, BATON ROUGE 70803.

MAINE-----CALVIN K. WALKER, ANIMAL SCIENCE DEPT., UNIVERSITY OF MAINE, ORONO 04473.

MARYLAND-----CHARLES M. CHANCE, DAIRY SCIENCE DEPT., UNIVERSITY OF MARYLAND, COLLEGE PARK 20742.

MASSACHUSETTS-----SIDNEY J. LYFORD, JR., VETERINARY & ANIMAL SCIENCES DEPT., UNIVERSITY OF MASSACHUSETTS, AMHERST 01003.

MICHIGAN-----MARTIN A. WILSON, DAIRY DEPT., MICHIGAN STATE UNIVERSITY, EAST LANSING 48823.

MINNESOTA-----J. WILLIAM MUDGE, DAIRY HUSBANDRY DEPT., UNIVERSITY OF MINNESOTA, ST. PAUL 55101.

MISSISSIPPI-----GEORGE B. CRAIN, DAIRY SCIENCE DEPT., MISSISSIPPI STATE UNIVERSITY, STATE COLLEGE 39762.

MISSOURI-----REX E. RICKETTS, DAIRY HUSBANDRY DEPT., UNIVERSITY OF MISSOURI, COLUMBIA 65201.

MONTANA-----B. R. MOSS, DEPT. OF ANIMAL SCIENCE & RANGE MANAGEMENT, MONTANA STATE COLLEGE, BOZEMAN 59715.

NEBRASKA-----PHILLIP H. COLE, ANIMAL SCIENCE DEPT., UNIVERSITY OF NEBRASKA, LINCOLN 68503.

NEVADA-----MAX B. RADMALL, ANIMAL SCIENCE DEPT., UNIVERSITY OF NEVADA, RENO 89507.

NEW HAMPSHIRE-----GERALD D. HALE, ANIMAL SCIENCE DEPT., UNIVERSITY OF NEW HAMPSHIRE, DURHAM 03824.

NEW JERSEY-----EDWARD T. OLESKIE, ANIMAL SCIENCE DEPT., RUTGERS UNIVERSITY, NEW BRUNSWICK 08903.

NEW MEXICO-----J. BORDEN ELLS, DAIRY DEPT., NEW MEXICO STATE UNIVERSITY, LAS CRUCES 88001.

NEW YORK-----HARRY R. AINSLIE, ANIMAL SCIENCE DEPT., CORNELL UNIVERSITY, ITHACA 14850.

NORTH CAROLINA-----FRANK D. SARGENT, ANIMAL SCIENCE DEPT., NORTH CAROLINA STATE UNIVERSITY, RALEIGH 27607.

NORTH DAKOTA-----GEORGE R. FISHER, DAIRY HUSBANDRY DEPT., NORTH DAKOTA STATE UNIVERSITY, FARGO 58102.

OHIO-----WALLACE R. TAYLOR, DAIRY SCIENCE DEPT., OHIO STATE UNIVERSITY, COLUMBUS 43210.

OKLAHOMA-----JACK D. STOUT, DEPT. OF DAIRYING, OKLAHOMA STATE UNIVERSITY, STILLWATER 74074.

OREGON-----DONALD E. ANDERSON, ANIMAL SCIENCE DEPT., OREGON STATE UNIVERSITY, CORVALLIS 97331.

PENNSYLVANIA-----HERBERT C. GILMORE, DAIRY SCIENCE DEPT., PENNSYLVANIA STATE UNIVERSITY, UNIVERSITY PARK 16802.

PUERTO RICO-----J. L. VALE, AGR. EXTENSION SERVICE, BOX 44, UNIVERSITY OF PUERTO RICO, RIO PIEDRAS 00928.

RHODE ISLAND----- (VACANCY), DAIRY SCIENCE DEPT., UNIVERSITY OF RHODE ISLAND, KINGSTON 02881.

SOUTH CAROLINA-----GEORGE E. GRAMLING, DAIRY SCIENCE DEPT., CLEMSON UNIVERSITY, CLEMSON 29631.

SOUTH DAKOTA-----MYERS OWENS, DAIRY SCIENCE DEPT., SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS 57006.

TENNESSEE-----V. D. PARSONS, DAIRY DEPT., UNIVERSITY OF TENNESSEE, P. O. BOX 1071, KNOXVILLE 37901.

TEXAS-----J. W. DAVIS, JR., DAIRY SCIENCE DEPT., TEXAS A & M UNIVERSITY, COLLEGE STATION 77843.

UTAH-----JOHN J. BARNARD, DAIRY INDUSTRY DEPT., UTAH STATE UNIVERSITY, LOGAN 84321.

VERMONT-----WILLIAM P. LEAMY, ANIMAL & DAIRY SCIENCE DEPT., UNIVERSITY OF VERMONT, BURLINGTON 05401.

VIRGINIA-----WILLIAM N. PATTERSON, DAIRY SCIENCE DEPT., VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG 24061.

WASHINGTON-----BILL F. KELSO, ANIMAL SCIENCES DEPT., WASHINGTON STATE UNIVERSITY, PUYALLUP 98371.

WEST VIRGINIA-----R. D. KELLEY, ANIMAL INDUSTRY & VETERINARY SCIENCE DEPT., WEST VIRGINIA UNIVERSITY, MORGANTOWN 26506.

WISCONSIN-----EUGENE E. STARKEY, DAIRY SCIENCE DEPT., UNIVERSITY OF WISCONSIN, MADISON 53706.

WYOMING-----R. HARRY ANDERSON, DIVISION OF ANIMAL SCIENCE, UNIVERSITY OF WYOMING, LARAMIE 82070.

APPENDIX K.--EXTENSION DAIRYMEN ADVISING ON DAIRY CATTLE BREEDING PROGRAMS IN EACH STATE

ALABAMA------(VACANCY), DAIRY SCIENCE DEPT., AUBURN UNIVERSITY, AUBURN 36830.

ALASKA-----ARTHUR L. BRUNDAGE, EXPERIMENT STATION RESEARCH STAFF, UNIVERSITY OF ALASKA, PALMER 99645.

ARIZONA-----DENNIS V. ARMSTRONG, DEPT. OF DAIRY SCIENCE, UNIVERSITY OF ARIZONA, TUCSON 85721.

ARKANSAS-----LANTIS RATCLIFF, ANIMAL INDUSTRY & VETERINARY SCIENCE DEPT., UNIVERSITY OF ARKANSAS, LITTLE ROCK 72203.

CALIFORNIA-----FRANK D. MURRILL, ANIMAL SCIENCE BLDG., UNIVERSITY OF CALIFORNIA, DAVIS 95616.

COLORADO-----DAWSON C. JORDAN, ANIMAL SCIENCE DEPT., COLORADO STATE UNIVERSITY, FORT COLLINS 80521.

CONNECTICUT-----ROBERT H. BENSON, ANIMAL INDUSTRIES DEPT., UNIVERSITY OF CONNECTICUT, STORRS 06268.

DELAWARE-----W. R. HESSELTINE, COLLEGE OF AGR. SCIENCES, UNIVERSITY OF DELAWARE, NEWARK 19711.

FLORIDA-----DANIEL W. WEBB, DAIRY SCIENCE BLDG., UNIVERSITY OF FLORIDA, GAINESVILLE 32601.

GEORGIA-----J. N. MADDOX, ANIMAL INDUSTRY DIVISION, UNIVERSITY OF GEORGIA, ATHENS 30601.

HAWAII-----JAMES H. KOSHI, ANIMAL SCIENCE DEPT., UNIVERSITY OF HAWAII, HONOLULU 96822.

IDAHO-----GEORGE W. CLEVELAND, DAIRY SCIENCE DEPT., UNIVERSITY OF IDAHO, P. O. BOX 300, BOISE 83701.

ILLINOIS-----RALPH V. JOHNSON, ANIMAL SCIENCE DEPT., UNIVERSITY OF ILLINOIS, URBANA 61803.

INDIANA-----N. J. MOELLER, DEPT. OF ANIMAL SCIENCES, PURDUE UNIVERSITY, LAFAYETTE 47907.

IOWA-----BASIL R. EASTWOOD, ANIMAL AND DAIRY SCIENCE DEPT., IOWA STATE UNIVERSITY, AMES 50010.

KANSAS-----E. RALPH BONEWITZ, DAIRY SCIENCE DEPT., KANSAS STATE UNIVERSITY, MANHATTAN 66504.

KENTUCKY-----JOHN H. NICOLAI, JR., DAIRY PRODUCTION DEPT., UNIVERSITY OF KENTUCKY, LEXINGTON 40506.

LOUISIANA-----H. W. ANDERSON, LA. AGR. EXTENSION SERVICE, LOUISIANA STATE UNIVERSITY, BATON ROUGE 70803.

MAINE-----GLENN K. WILDES, AREA DAIRY SPCC., COURT HOUSE ANNEX, ALFRED 04002.

MARYLAND-----PHILLIP K. HOLDAWAY, DAIRY SCIENCE DEPT., UNIVERSITY OF MARYLAND, COLLEGE PARK 20742.

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NORTH DAKOTA---GEORGE R. FISHER, DAIRY HUSBANDRY DEPT., NORTH DAKOTA STATE UNIVERSITY, FARGO 58103.

OHIO-----HARRY L. BARR, DAIRY SCIENCE DEPT., OHIO STATE UNIVERSITY, COLUMBUS 43210.

OKLAHOMA-----CLIFFORD H. BURTON, DEPT. OF DAIRYING, OKLAHOMA STATE UNIVERSITY, STILLWATER 74074.

OREGON-----DONALD E. ANDERSON, ANIMAL SCIENCE DEPT., OREGON STATE UNIVERSITY, CORVALLIS 97331.

PENNSYLVANIA---LAWRENCE W. SPECHT, DAIRY SCIENCE DEPT., PENNSYLVANIA STATE UNIVERSITY, UNIVERSITY PARK 16802.

PUERTO RICO-----A. A. ROMERO, BOX 726, DORADO 00646.

RHODE ISLAND---(VACANCY), DAIRY SCIENCE DEPT., UNIVERSITY OF RHODE ISLAND, KINGSTON 02881.

SOUTH CAROLINA--WILLIAM L. NORTHERN, DAIRY SCIENCE DEPT., CLEMSON UNIVERSITY, CLEMSON 29631.

SOUTH DAKOTA---MYERS OWENS, DAIRY SCIENCE DEPT., SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS 57007.

TENNESSEE-----C. K. CHAPPELL, DAIRY DEPT., UNIVERSITY OF TENNESSEE, KNOXVILLE 37916.

TEXAS-----A. M. MEEKMA, DAIRY SCIENCE DEPT., TEXAS A & M UNIVERSITY, COLLEGE STATION 77843.

UTAH-----JOHN J. BARNARD, DAIRY INDUSTRY DEPT., UTAH STATE UNIVERSITY, LOGAN 84321.

VERMONT-----K. S. GIBSON, ANIMAL AND DAIRY SCIENCE DEPT., UNIVERSITY OF VERMONT, BURLINGTON 05401.

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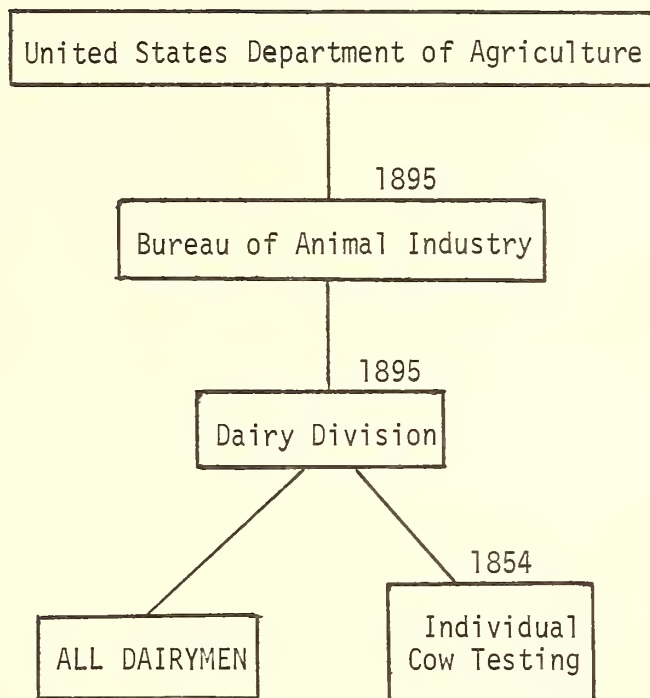
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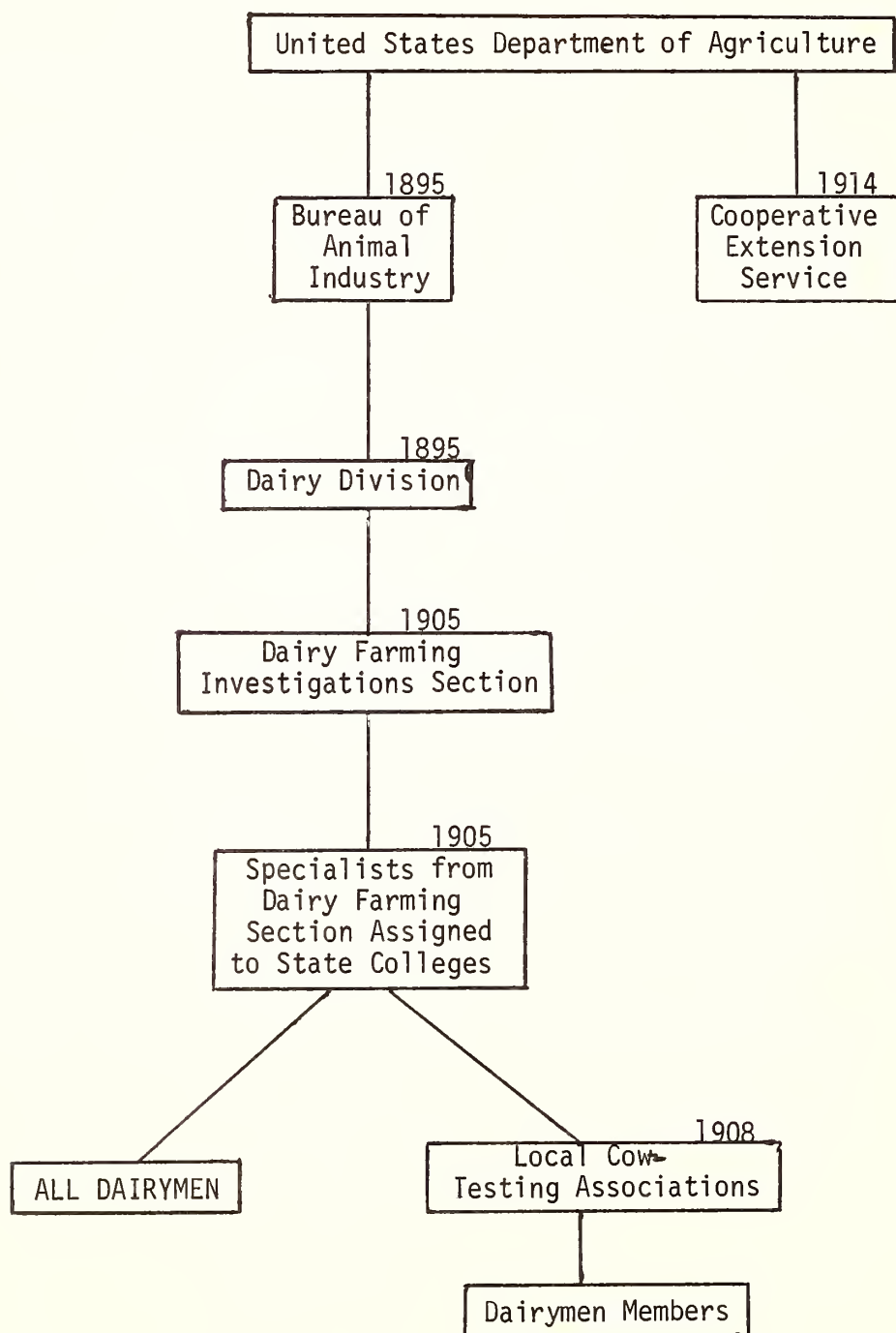
WYOMING-----R. HARRY ANDERSON, DIVISION OF ANIMAL SCIENCE, UNIVERSITY OF WYOMING, LARAMIE 82071.

APPENDIX L.--Status of production testing in 1895, when the Dairy Division, BAI, USDA, began supporting individual cow testing 1/



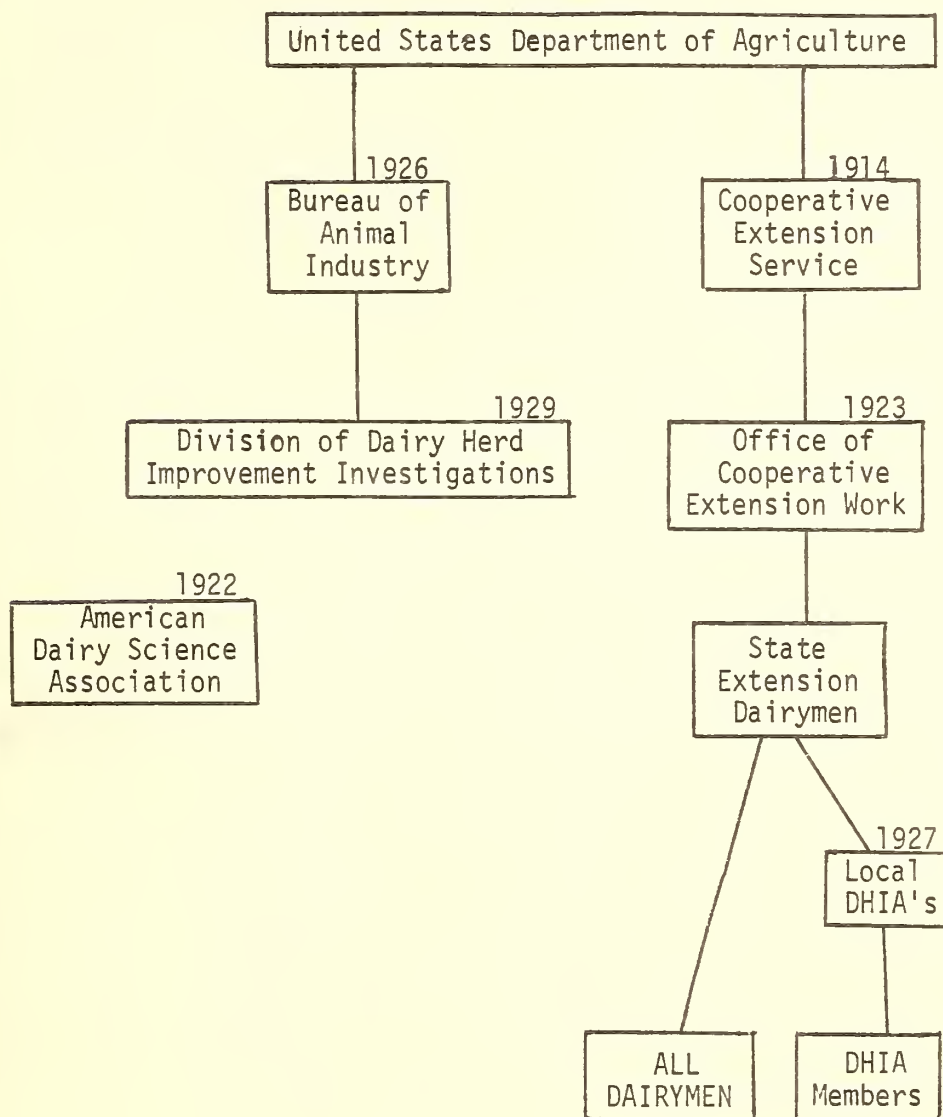
1/ Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

APPENDIX M.--Status of production testing in 1914 at the establishment
of the Cooperative Extension Service 1/



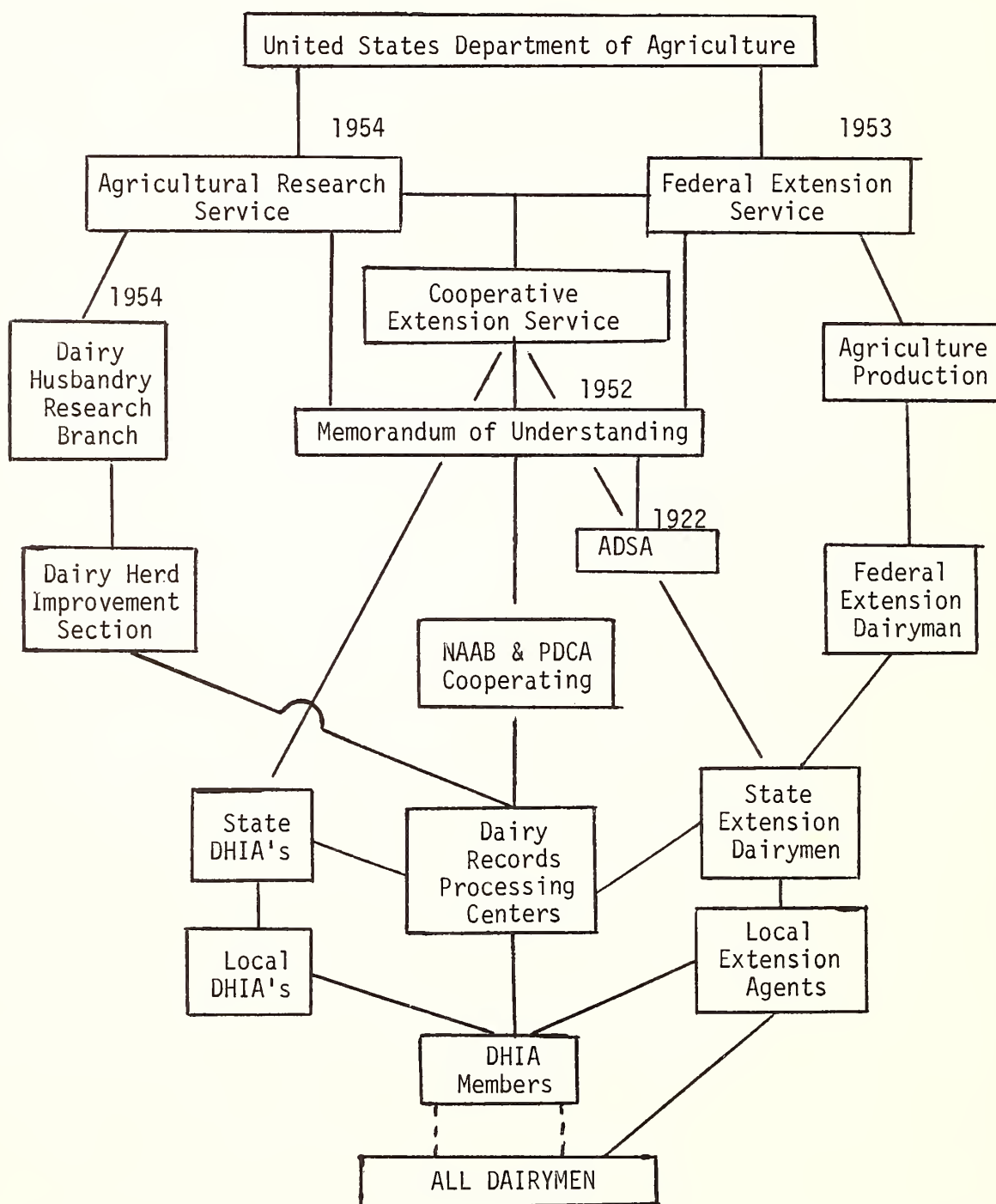
1/ Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

APPENDIX N.--Status of production testing in 1935 when the National Sire Proving Program was begun in the Division of Dairy Herd Improvement Investigations ^{1/}



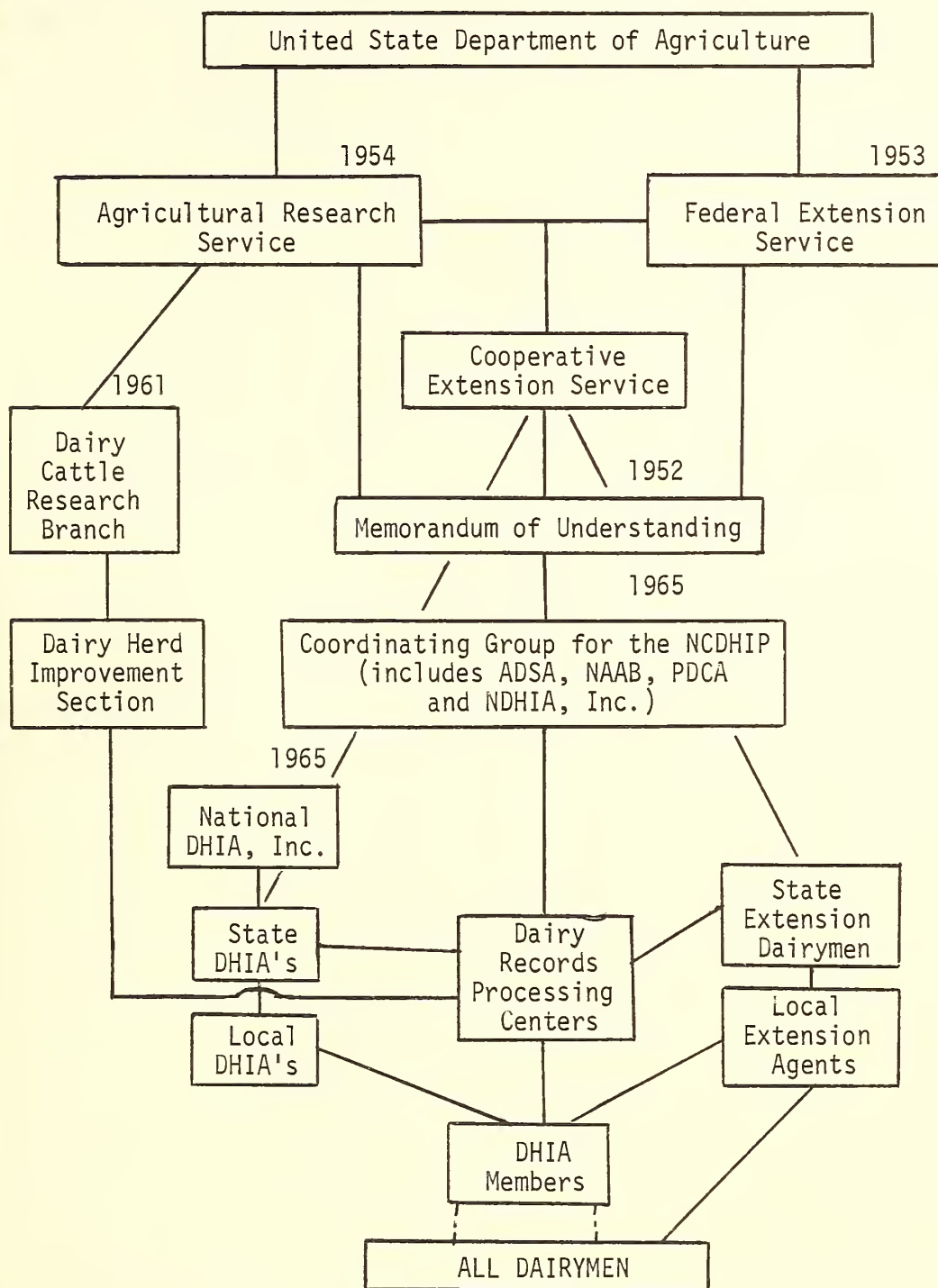
^{1/} Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

APPENDIX O.--Status of the NCDHIP in 1954 when the Agricultural Research Service was established 1/



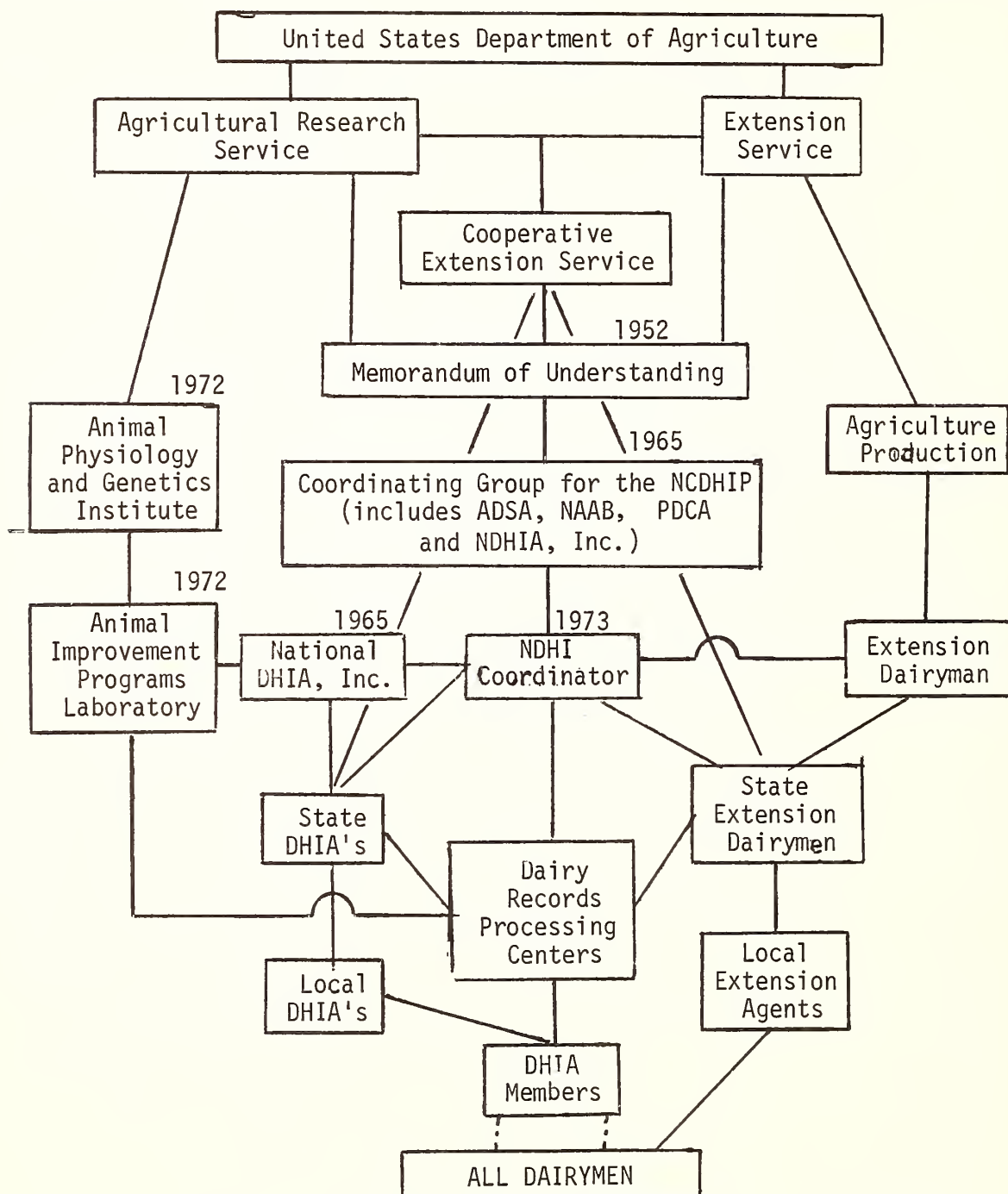
1/ Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

APPENDIX P.--Status of the NCDHIP in 1965 when the NCDHIP Coordinating Group and National DHIA, Inc., were formed 1/



1/ Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

APPENDIX Q.--Status of the NCDHIP in 1973 when the National DHI Coordinator was named 1/



1/ Dates in chart refer either to establishment of the organization or to its involvement in production-testing work.

AGRICULTURAL RESEARCH SERVICE - U. S. DEPARTMENT OF AGRICULTURE (ARS-USDA)

DR. R. DEAN PLOWMAN, (CHMN.), AREA DIRECTOR, AGRI. SCI. BLDG., UTAH STATE UNIV., LOGAN, UTAH 84321
TELEPHONE: 801, 753-7977

DR. JAMES W. SMITH, CHAIRMAN, AP & G INSTITUTE, BLDG. 161, BARC-EAST, BELTSVILLE, MARYLAND 20705
TELEPHONE: 301, 344-2259

MR. FRANK D. MJRRILL, NDHI COORDINATOR, BLDG. 263, BARC-EAST, BELTSVILLE, MARYLAND 20705
TELEPHONE: 301, 344-2335

EXTENSION SERVICE - U. S. DEPARTMENT OF AGRICULTURE (ES-USDA)

DR. CHARLES L. BEER, ES-USDA, ROOM 5509, SOUTH BLDG., WASHINGTON, D.C. 20250
TELEPHONE: 202, 447-4387

DR. N. P. RALSTON, EXTENSION DAIRYMAN, ES-USDA, ROOM 5051, SOUTH BLDG., WASHINGTON, D.C. 20250
TELEPHONE: 202, 447-6091

EXTENSION COMMITTEE ON ORGANIZATION AND POLICY (ECOP)

DR. WAYNE T. O'DELL, DIRECTOR OF EXTENSION SERVICE, CLEMSON UNIVERSITY, CLEMSON, SOUTH CAROLINA 29631
TELEPHONE: 803, 656-3382

STATE EXTENSION DAIRYMEN

DR. HARRY R. AINSLIE, ANIMAL SCIENCE DEPARTMENT, CORNELL UNIVERSITY, ITHACA, NEW YORK 14850
TELEPHONE: 607, 256-2196

MR. JOHN J. BARNARD, UTAH STATE UNIVERSITY, LOGAN, UTAH 84321
TELEPHONE: 801, 752-4100

DR. WILLIAM L. NORTHERN, DAIRY SCIENCE DEPARTMENT, CLEMSON UNIVERSITY, CLEMSON, SOUTH CAROLINA 29631
TELEPHONE: 803, 656-3231

MR. DONALD E. VOELKER, ROOM 4 - KILDEE HALL, IOWA STATE UNIVERSITY, AMES, IOWA 50010
TELEPHONE: 515, 294-2116

NATIONAL DAIRY HERD IMPROVEMENT ASSOCIATION, INC. (NDHIA)

MR. DALE GERLACH, SECRETARY, NDHIA, INC., ROUTE 2, TOLEDO, IOWA 52342
TELEPHONE: 515, 484-2341

MR. FRED POLINDER, JR., PRESIDENT, NDHIA, INC., 1093 POLINDER ROAD, LYNDEN, WASHINGTON 98264
TELEPHONE: 206, 354-3204

MR. CLYDE ROBISON, ROUTE 1, COAL CENTER, PENNSYLVANIA 15423
TELEPHONE: 412, 239-2652

MR. FRANKLIN TEAGUE, ROUTE 1, ELON COLLEGE, NORTH CAROLINA 27244
TELEPHONE: 919, 449-4362

AMERICAN DAIRY SCIENCE ASSOCIATION (AOSA)

MR. WALLACE R. TAYLOR, 625 STADIUM DRIVE, OHIO STATE UNIVERSITY, COLUMBUS, OHIO 43210
TELEPHONE: 614, 422-6564

NATIONAL ASSOCIATION OF ANIMAL BREEDERS (NAAB)

MR. WILLIAM M. DUFFEY, EXECUTIVE SECRETARY, P. O. BOX 1033, COLUMBIA, MISSOURI 65201
TELEPHONE: 314, 445-4406

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MR. NEWELL MILLS, ROUTE 1, BOX 153, FALLON, NEVADA 89406
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MR. ROBERT H. RUMLER, EXEC. SEC., HOLSTEIN-FRIESIAN ASSOCIATION, P.O. BOX 808, BRATTLEBORO, VERMONT 05302
TELEPHONE: 802, 254-4551

NATIONAL COMPUTING CENTER WORKSHOP (NON-VOTING)

MR. D. GLENN WALL, JR., P. O. BOX 5065, NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NORTH CAROLINA 27607
TELEPHONE: 919, 755-2632

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