

## Type Appraisal Vital for Breed Advancement

From the early scorecard for judges in the show ring to today's type traits appraisal program, the tools used to evaluate Jersey conformation in this country have evolved over the past 150 years. The breadth of information collected during this period has been used to develop a cow whose genetics are sought the world over and a system that serves as a model for other countries.

Today, more than 100,000 Jersey cows are evaluated for conformation each year through the Uniform Functional Type Traits Appraisal Program administered by the American Jersey Cattle Association (AJCA). Remnants of the breed's early type program—points on a show ring scorecard—survive in its current program through final scores assigned each cow and compliment a newer notion—evaluation of biological traits on a linear scale—which was introduced 36 years ago.

Industry-wide, the type information is sent to the Council on Dairy Cattle Breeding (CDCB), where it is used to calculate genetic evaluations for males and females, to A.I. organizations, where it is used to develop superior sires, and to Jersey breeders on the farm, where it is used to manage, mate and merchandise the herd.

The type program, along with two other long-running foundation programs—registration and production testing—provides a framework for breed improvement. The contemporary Jersey is larger-framed, more dairy and tighter-uddered than her early predecessor because of the efforts of her caretakers to systematically modify type for improved milk yield and components while also maintaining breed advan-

tages in feed and reproductive efficiency and longevity.

### Early Years

Jersey breeders have long recognized there exists a correlation between conformation and production. The key to successfully pairing them has been discovering what kind of type is associated



The Jersey association's type program, officially established in 1932, has evolved over the years. Today, a team of 12 appraisers from the AJCA evaluate cows in their "working clothes" for 16 biological traits and a final score. Herd appraisal is one of the services bundled with REAP, the association's flagship herd improvement program.

with high production and then developing methods to measure it and tools to improve it.

The efforts of the national Jersey association, then known as the American Jersey Cattle Club (AJCC), to direct improvements in type began in 1875 with the creation of a Scale of Points for Cows, a scorecard for judges in the show ring. Adapted from the one used on the Island of Jersey, the scorecard identified 24 phenotypic characteristics, assigning varying levels of significance to each.

The AJCC initiated its first official type program in 1932, with a purpose to "take the show ring to the farm." As such, evaluations were structured like the scorecard, with 13 categories: general appearance; stature; breed character; back, rump and tail; feet; legs; dairy character; chest and barrel; fore udder; rear udder; teats; suspensory ligament; and mammary system.

Each cow examined by the official inspectors, or "classifiers" as they came to be known, was rated in each category and then assigned a final score relative to an ideal score of 100 points. Classification labels were Excellent (90 points or more), Very Good (85-89 points), Good Plus (80-84 points), Good (75-79 points), Fair (70-74 points) or Poor (69 or fewer points).

Though it was slow to catch on, with a mere 674 animals evaluated in its first year, the classification program became widely accepted by Jersey breeders by the mid-1940s. A cow's classification score painted a picture of her type conformation sight unseen and became a valuable merchandising tool.

Results from herd classifications were routinely published in breed materials and a key component of the prestigious Constructive Breeder Award. Cows with elite final scores of Excellent or Very Good and superior production were prized advertising material and prime foundation stock.

The success of the Jersey classification program in reaching its goals—to improve the type of Jersey cattle that will produce more profitably and extend their useful years over a longer period of time—was spelled out in an AJCC advertisement in the February 20, 1945, issue of *The Jer-*



**Generators Topsy**  
Excellent-97% 1980



**Empire Crusader Heidi**  
Excellent-97% 1984



**WF Barber Shasta**  
Excellent-97% 2002



**Huronian Centurion Veronica 20J**  
Excellent-97% 2008

sey Bulletin. The text noted, of the 14,143 cows with production and classification records, the 801 Excellent cows out-produced all their peers with 483 lbs. fat on average. Production and final score closely followed suit for the other cows, with 4,213 Very Good cows producing 460 lbs. fat, 6,060 Good Plus cows averaging 448 lbs. fat, 2,700 Good cows making 434 lbs. fat and 369 Fair cows producing 420 lbs. fat.

By the 1970s, limitations of the classification system for breeding a cow with “functional” type—a phenotype that enables a cow to produce volumes of component-rich milk over many lactations—became apparent. The answer to this hurdle was a cooperative research program between the AJCC and USDA’s Animal Improvement

Program Laboratory which set out to develop a more accurate type evaluation program. The AJCC made available its entire file of classification data in return for estimates of heritabilities, repeatabilities and genetic correlations.

Coinciding with this arrangement was a new system for evaluating animals—the uniform functional type traits appraisal program—recommended by the National Association of Animal Breeders as a unified program for all breeds and adopted by the AJCC, the American Guernsey Cattle Club and the Ayrshire Breeders Association in 1980.

The new breed type program evaluated traits using a numerical score from one biological extreme to another. Thirteen traits were evaluated: stature; chest and body; dairy character; foot angle; rear

legs side view; pelvic angle; rump width; fore udder attachment; rear udder width; rear udder height; front teat placement; suspensory ligament; and udder depth. Information was also gathered on several

vice Award and the AJCA-NAJ Award for Meritorious Service, in part for his four decades of work with the Type Advisory Committee (TAC) and the Research Advisory Committee.

“It paved the way for determining what value each trait contributes to herd life, which traits are most profitable and what scores for each trait are most desirable. It gave the Jersey cow herself opportunity to tell her breeders what profitable, functional type conformation looks like.”

In that first year, 39,119 Jersey cows in 689 herds were evaluated through the new type appraisal program.

#### Appraisal Today

Though the Functional Type Traits Appraisal Program is routinely evaluated and changes made periodically, the overall structure of the program is similar to the one adopted 36 years ago.

Cows continue to be inspected on the farm in their “working clothes” by a team of 12 appraisers. All cows in their first and second lactations are evaluated; cows in subsequent lactations may be re-appraised at the discretion of the herd owner. In 1995, the appraisal program was bundled with registration, Equity and performance programs (production testing and pedigrees) as REAP, providing herd appraisals once every 7-10 months as part of program fees.

In addition to the 13 initial traits—stature; chest and body (now strength); dairy character (now dairy form); foot angle; rear legs; pelvic angle (now rump angle); rump width; fore udder attachment; rear

### Changes in PTA for Final Score and Individual Traits 1994-2013

Type Appraisal Trait	Accumulated 5 Years (2009-2013)	Accumulated 10 Years (2004-2013)	Accumulated 20 Years (1994-2013)	Descriptive Change
Final Score (FS)	0.65	1.10	2.09	higher FS
Stature (ST)	0.65	1.05	1.80	taller
Strength (SR)	0.15	0.34	0.64	stronger
Dairy Form (DF)	0.25	0.53	1.68	more dairy
Foot Angle (FA)	0.15	0.27	0.59	steeper
Rear Leg (RL)	0.00	0.07	0.22	more set
Rump Angle (RA)	0.25	0.18	0.08	more slope
Rump Width (RW)	0.15	0.40	0.74	wider
Fore Udder (FU)	0.50	0.87	1.72	tighter
Rear Udder Height (RH)	0.65	0.98	2.11	higher
Rear Udder Width (RUW)	0.25	0.52	1.61	wider
Udder Depth (UD)	0.65	1.02	1.28	shallower
Udder Cleft (UC)	0.15	0.33	0.64	deeper
Front Teat Placement (TP)	0.15	0.61	1.57	closer
Teat Length (TL)	0.00	0.15	0.13	minimal change

The chart above shows genetic change in Jersey type over a 20-year period as expressed through Predicted Transmitting Ability for final score and 14 biological traits.

miscellaneous, or supplemental traits, to determine their future worth in the appraisal program.

Final scores continued to be assigned as well, but on a 50-point scale instead, with the new labels of Excellent (90 points and above); Very Good (80-89 points); Desirable (70-79 points); Acceptable (60-69 points) and Poor (50-59 points).

The program set out to evaluate cows early in their productive life and without the appraiser’s knowledge of sire, previous score or production so genetic merit could be separated from environmental and management effects.

“This was the first step to combine type and production in a tool that Jersey breeders could use to breed more productive animals,” said Dr. John Wilk, who received both the AJCA Distinguished Ser-



Pleasant Nook F Prize Circus  
Excellent-97% 2008



KCJF Regency Treasure  
Excellent-97% 2008



Burgesse Keeper  
Excellent-96% 1978



Sybil Surville Jesse  
Excellent-96% 1980





**Generators Imp**  
Excellent-96% 1981



**W.F. Justin Punch**  
Excellent-96% 1987



**W.F. Justin Lanita**  
Excellent-96% 1989



**Billings Top Rosanne**  
Excellent-96% 1989

udder height; rear udder width; front teat placement; suspensory ligament (now udder cleft); and udder depth—are three new teat traits—front teat length, rear teat placement rear view and rear teat placement side view. As before, values for each trait are assigned on a scale from 1 to 50, except for stature, which is scored from 1 to 80. Information on five supplemental traits (mobility, rear legs rear view, pasterns, udder tilt and rear teat length) is also gathered.

Final score is assigned cow-side by the appraiser based on the linear and supplemental trait breakdowns. The traits dairy form, foot angle, fore udder attachment, rear udder height, rear udder width, udder cleft, udder depth and teat placement are useful predictors of survival rates and lifetime profitability and thus receive heavy emphasis in the calculated final score.

Critical to the quality of the data collected is the quality of the work done by the men and women who score cows for a living. Before they are set out on their own, appraisers learn about the program in a classroom setting and an apprentice-like environment, where they travel to farms with a senior appraiser to learn how to evaluate traits, calculate final score and use equipment.

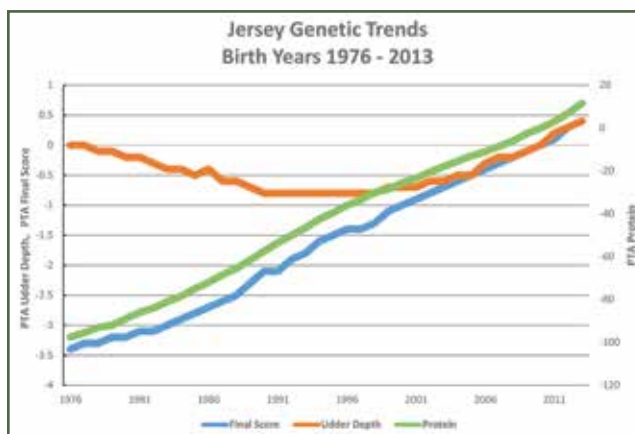
“Every member of our team needs to be on the same page,” said Ron Mosser, who has been an area representative for the AJCA for 14 years and senior appraiser since September 2008. “Consistency is important because what we do

is like painting by numbers. If we score a cow in Vermont, a breeder in California or an A.I. representative in Ohio should be able to visualize what that cow looks like by reading her type trait numbers.”

To ensure this, the appraisal team meets at least once a year cow-side to review trait definitions and current program statistics, address variances among appraisers, implement program changes and address

Jersey breeders about association services.

“My focus after we get done scoring is to get the appraiser’s opinion on the weaknesses of the herd,” said Frank Dinis, herdsman for Hilmar Jerseys of Hilmar, Calif. The 4,600-cow dairy uses a number of services to manage the herd, including REAP and JerseyTags. “We trust their opinion because they come into the herd with a fresh set of eyes.”



The chart above shows genetic trend for final score, protein yield and udder depth for cows born over the past 37 years. Jersey breeders have simultaneously improved the genetic level of their cows for protein and final score.

The genetic trend for udder depth (orange line) illustrates how breed tools can impact phenotype. While genetic merit has been improving in recent years, it had been declining. In 1992, udder depth was incorporated in the formula for Production Type Index after research showed it to be the type trait most highly-correlated with profitability. The trend for the trait turned upward beginning in 1996, when cows bred using the tool began to be appraised.

program needs from their perspective.

Because they are on the farm on a frequent, routine basis, appraisers often are the face of the AJCA for many Jersey breeders. Their visits serve a dual purpose—to appraise animals and educate

### Breeder Directed

Since the program’s inception in 1932, the type program has been directed by the Type Advisory Committee. Early on, the committee was comprised of official classifiers. As the market for commercial cattle grew, the make-up of the committee changed, to capitalize on opportunities to merchandise Jerseys to dairy producers milking other breeds of cattle.

Proposals to AJCC President Charles S. Kelly in 1956 asked the board to consider modifying Jersey type to not only satisfy the thinking of the “show ring” participant, but also the “production breeder.”

In his report to the board in March 1959, then executive secretary James F. Cavanaugh wrote, “To attract commercial dairymen and dairymen with other breeds

to become owners of Registered Jerseys, our production needs to be higher. Among the possibilities we might consider are changes in the emphasis placed on straightness of line, beauty and smoothness in both our classification and show



**Maplerow Mercury Aron-PTL-P**  
Excellent-96% 1991



**AU Golden Surville Brass Candy**  
Excellent-96% 1992



**Stor Acres Duncan HLSE (5)**  
Excellent-96% 1995



**Duncan Eilene of HLF**  
Excellent-96% 1996

Not pictured: Springdale Plum WST Pear, Excellent-96% (1982), and Otter Crest Spirit Ritzzy, Excellent-96% (1986).

ring, with more evidence of milking ability and wearability.”

In December 1959, the AJCC board appointed a committee that included five Jersey breeders from across the country.

The responsibilities of the TAC were spelled out in AJCC board action in July 1968: develop and maintain a concept of the desired type for the Jersey breed; work toward implementation of this desired type in our breed’s classification program and show ring; work with judges, classifiers and club staff to obtain maximum uniformity in the application of desired type; and act as liaison between breeders and the board of directors regarding rules and policy.

Though the committee provided guidance, the AJCC board mandated the workings of the organization’s type program—an arrangement that is still in place. Today, the TAC is comprised of six Jersey breeders, the AJCA president, the chair of the AJCA Breed Improvement Committee, and A.I. representative and a technical advisor. Breeders and the A.I. representative serve five-year terms.

“The current structure works well because it reflects the make-up of the breed—dairy producers from large herds, small herds, show herds and production herds across the country, along with a dash of industry representation,” noted Dr. Wilk, who chaired the TAC when the Functional Type Traits Appraisal Program was adopted and is the current technical advisor. “Our system works well because it is designed for Jersey cows and directed by people who have Jersey cows.”

### Breeder Approved

“Every breeder, every customer has a somewhat different idea about what they want or need from the type program,” said Mosser. “Some use it to increase the marketability of their herd. Some use it to gather information for mating programs like JerseyMate or to make individual matings on their own.”

For Hilmar Jerseys, the type program has been one of the key tools used to improve the performance and functionality of the cows. “I use individual trait information on udder depth, rear udder height and teat placement to make corrective matings,” noted Dinis, who downloads type data from JerseyLink and then imports it into DairyComp 305. “By having breakdowns, I can mate specifically for whatever traits I want. For example, if I select a bull that sires wide teat placement, I run the command on DairyComp to mate him only to cows with teat placement greater than 30 (centrally placed).”

“I like that we can track progress—see-

## Outline History of the Appraisal Program

- 1834 The Royal Jersey Agricultural Society (RJAS) constructs the Scale of Points for Cows
- 1875 The AJCC adopts its own Scale of Points based on the RJAS card, with greater emphasis on dairy temperament and mammary development.
- 1932 Jersey classification program initiated by the AJCC.
- 1949 Research project, “Relation Between Heifer Type and Type and Production of Cows,” undertaken.
- 1964 Registration, classification and testing records converted to electronic data processing equipment.
- 1978 First multi-trait selection tool, Production Type Index (PTI), introduced, with a relative emphasis of 70% production and 30% type. Reliability for type calculated for the first time. Subsequent updates to PTI in 1987, 1990, 1992, 1994 and 1998.
- 1980 The AJCC introduces the uniform functional type traits appraisal system as a replacement for the classification program. Appraisers evaluate a record 28,801 cows during the fiscal year.  
  
Generators Topsy, 1973 National Grand Champion, is appraised Excellent-97%, the first of just six cows in breed history to earn the distinction.
- 1998 Functional Trait Index (FTI) incorporated in formula for PTI.
- 1995 REAP, a bundling of registration, Equity/NAJ membership, appraisal and performance evaluation, introduced.
- 1996 Appraisers begin use handheld computers on the farm and submit information to the AJCA office electronically.
- 2000 Appraisers evaluate a record 50,941 cows during the fiscal year.
- 2002 Jersey Performance Index (JPI) implemented, with 70% emphasis on production and 30% on fitness traits. Subsequent updates to JPI in 2005, 2006, 2010 and 2015.  
  
Research project, “Type Traits and Culling: Profile of a Low-Risk Jersey Cow” released by Dr. Kent Weigel of the University of Wisconsin.
- 2008 Appraisers evaluate a record 77,106 cows during the year.
- 2013 Type program application developed for mobile devices.  
  
Appraisers evaluate a record 100,714 cows during the year.
- 2015 JPI updated and now includes a relative emphasis of 58% production and 42% fitness traits.  
  
A record 119,545 animals scored during the fiscal year by a team of 12 appraisers.

ing where we are and where we’ve been—and chart where we need to be. We use the information to make every member of the herd perform at a higher level than her dam. As cattle breeders and merchandisers, this is important, because, if she isn’t milked in our herd, she will be milked in

the herd of someone who bought her.”

Another Jersey breeder who uses the type program for mating and merchandising is Tammie Stiles-Doran, who chairs the TAC and manages Skip-A-Rilla Jerseys and Bush River Jerseys with her family in Newberry, S.C. “The majority of bulls we



use are high for PTA (Predicted Transmitting Ability) Type and JUI (Jersey Udder Index), so the type program numbers are extremely important. Because our herd is primarily in confined housing, I rely heavily on these breakdowns to select bulls that sire sound feet and legs and snug udders.”

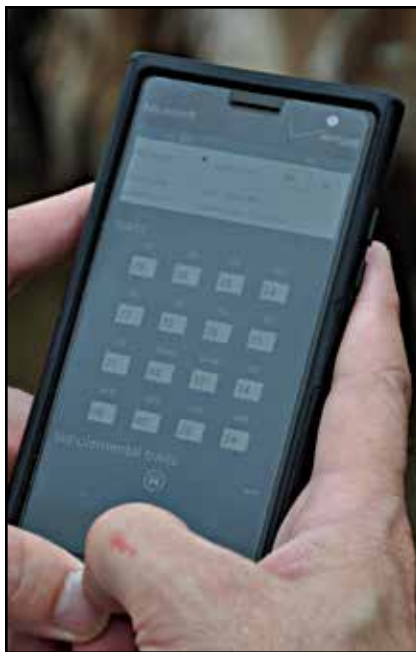
“And while I love looking at breakdowns, final scores are most exciting to me,” commented Doran, breeder of 11 cows appraised over Excellent-93%, including SAR Andre, Excellent-95%, winner of the 2004 National Jersey Jug Futurity. “With challenges from low milk prices, high feed costs and hot, humid weather, the bright spot in my day is gazing at the Jerseys in our barn we are developing. As a Registered Jersey breeder, there is nothing more satisfying than seeing our efforts rewarded with a great appraisal day and high scores.”

### Genetic Tools

Dinis and Doran and their fellow Jersey breeders across the country have been able to make tremendous gains in the genetic levels of their herds using tools developed from the association’s type database. Type is an integral part of many of the tools that Jersey breeders now use to breed a better cow, including Jersey Performance Index (JPI) and all the CDCB merit functions—Net Merit Dollars, Cheese Merit Dollars, Fluid Merit Dollars and Grazing Merit Dollars. Jersey breeders can sort bulls by type traits online using BullsEye and focus on type with the corrective mating option in JerseyMate, which is also available ‘round the clock on the internet.

The earliest efforts to incorporate type in the sire selection end of the breeding program were daughter averages for final score. For three decades, daughter averages and the subsequent measure—daughter-dam comparisons—were the most useful measures Jersey producers had to predict a bull’s ability to transmit desirable conformation. Jersey breeders could also find averages for final score and breakdowns for bulls with classified daughters in the Official Jersey Sire Summary published by the AJCC. The dairy industry adopted herdmate comparisons in 1962, eventually settling on the term Predicted Difference (PD) as a means of estimating a bull’s ability to sire daughters that will perform above or below their “average” contemporary.

The first multi-trait selection tool, Production Type Index (PTI), was adopted in May 1978. The index combined production (as PD Dollar Value) and type into a single value, with a respective ratio of 3:1. It was also the first time PD Type was made available, along with a measure of



Appraisers now use a special app for their cell phones to enter scores for each of the 16 biological traits and supplemental traits, if necessary, and then transmit this data to the AJCA electronically.

repeatability (now termed reliability) for type. The AJCC also continued to publish daughter averages for final score along with PDs for breakdowns in its Official Jersey Sire Summary.

The first time PTAs for individual traits were included in an index was 1998, when Functional Trait Index (FTI) was incorporated in the PTI formula. FTI is the sum of PTAs for several type traits, weighted by their economic contribution to lifetime profitability.

The breed-specific index, Jersey Performance Index (JPI), was adopted in August 2002. It had features familiar to Jersey breeders because its foundation was PTI. Overall, the ratio of production to fitness traits was 7:3. JPI has been updated several times, most recently in 2015, and now includes a relative emphasis of 58% production traits and 42% fitness traits.

Because Jersey breeders rely so heavily on genetic tools to improve their herds, the gathering of high quality phenotypic type information continues to be critical, even with the onset of genomic evaluations, which were first published as Genomic Predicted Transmitting Abilities for the Jersey breed in January 2009.

“Contrary to what one might think, the collection of phenotypic information is even more important in this genomic era,” noted Cari W. Wolfe, director of research and genetic program development at the AJCA. “For a genomic evaluation to mean anything, we need to have the phenotypic

information from progeny test programs to back up the evaluation. We need to know: is what we are seeing in a bull or cow’s genes what we are seeing transmitted to their progeny? Is a bull with a high genomic evaluation for rear udder width truly siring daughters with wide rear udders?”

### Technology

Advances in technology have helped to improve the efficiency in which information is gathered and to boost the quality of the data as well.

“When I participated in the type program as a breeder three decades ago, the classifier showed up at the farm with a very long sheet of carbon paper in triplicate listing all the cows to be scored,” Mosser recalled. “The classifier wrote down each cow’s scorecard and breakdowns by hand. I got one of the copies and the rest were mailed to Reynoldsburg, to be manually entered in the database by staff at the AJCC office.”

Typically, this process would require two weeks for appraisal information to be included on pedigrees and herd owners to receive their appraisal materials.

“We moved into the electronic era in 1996 when we adopted the first edition of the handheld computer,” noted Mosser. “This was a huge leap forward because it saved time, not just entering information, but also finding cows. Before this, I had to search through paperwork to find the particular cow I was appraising. Herds with 200-300 cows might have a good two dozen sheets of paper to sort through. It often took longer to find a cow than to appraise her.”

Each of the three generations of handheld computers used by appraisers led to a more efficient, streamlined flow of information and each technology upgrade has made programs more user-friendly for tech-savvy Jersey breeders.

Since September 2013, type data has been collected using cell phones and an application, now in its sixth generation, developed by AJCA for mobile devices. The appraiser uses the app to download the latest herd inventory information from DHI shortly before arriving at the farm and to sort and check pertinent information such as registration number, control number, lactation number, calving date and birth date. The appraiser can change calving date and lactation number if this needs to be corrected.

After the herd has been appraised, data is electronically sent to the AJCA and then to USDA’s Animal Genomics and Improvement Laboratory. Jersey breeders can get this information the same day as PDF or Excel documents by email or as

a download through JerseyLink. Type information is typically published on performance pedigrees the next business day.

Technology has not only eliminated time required to mail hard copy materials back and forth and manually key numbers into the database. It has also improved accuracy of the information in the type database. No longer do AJCA staff members need to decipher handwriting on paperwork that may have gotten wet in the barn or mangled in the mail or guess whether chicken scratches are ones or sevens or fours or nines.

Ultimately, it is the Jersey breeder on the farm that benefits from improvements in the integrity of the information. "More accurate information means more accurate proofs," summed Doran. "The appraisal breakdowns need to be free of errors so Jersey breeders get exactly what they expect from a bull's proof."

"It is amazing to me to see how the type program has grown from one or two people classifying 12,000 cows a year using pencils and carbon paper to a dozen appraisers scoring nearly 120,000 cows using their cell phones," said Dr. Wilk. "We will need to continue this momentum in efficiency in light of breed growth through REAP registrations, which have reached record numbers each of the past five years, leading to even more first and second lactation appraisals."

### **Down the Road**

The association's type program is ever evolving, changing to meet the needs of Jersey breeders who are utilizing new technologies themselves, such as robotic milkers, or managing their herds in specialized settings, like grazing.

Short term the program will adopt two new traits—rear teat position from the rear and from the side—which was a supplemental trait that showed significant variation among cows and has been proven to be of economic value. Longer term, the wealth of information in the type database may be paired with or genetically correlated with other herd management benchmarks to improve profitability.

For now, breeders can appreciate the decision leaders made 83 years ago to establish a program described as "one of the most forward steps taken by the Club and dairy leaders in many years." Published in that same article in the June 22, 1932, edition of *The Jersey Bulletin*, "It will meet with some criticism, but so have other forward movements, and it is worthy of adoption by breeders on a big scale without loss of time."

Summed Dr. Wilk, one of the individuals charged with getting Jersey breeders

on board with the next milestone change in the program, the Functional Type Traits Appraisal Program, "It is remarkable what Jersey breeders have done with their cow over the past five decades. When I was associate judge at The All American Jersey Show in 1970, the milking yearling class was the smallest class of the day. Last year, it was hands-down the largest class, with 42 entries. I was impressed by the quality too, not just at the top, but all the way through.

"I am equally in awe of the young cows at some of the large, commercial herds. There is nothing as pleasing as standing behind a row of two-year-olds as far as you can see, all of them tremendous cows.

"Jersey breeders can be proud of their success in developing a cow that calves earlier and is more productive, all while being even easier on the eye than her predecessor."