



# The Nutrition Evolution

Explore how the philosophy behind feeding livestock has evolved since the discipline's beginning in the early 1900s.

by *Kayla Jennings*

A curious spirit and a desire to problem solve on the part of agriculturists as early as 1916 is perhaps the beginning of the road to modern cattle nutrition as it is known today. In the early 1900s, problems feeding livestock were increasingly evident as animals were not performing to expectation. Some say this lack of performance stemmed from lower-quality feed ingredients, while other accounts attribute the challenge to war-time rationing — which diverted products traditionally used in livestock feed.

Regardless, these changes took the scientific community by storm — spurring

the initial use of supplementation in beef cattle nutrition programs. While it is clear feeding stock has changed dramatically for a variety of reasons, the driving factor in the field's advancements since day one has been to improve quality and to reduce feed costs.

## Interest ignited

The first feed companies on record were popping up in the early 1900s with a mission to develop feed and other supplements to increase profitability and performance in the livestock enterprise. This interest possibly trickled down from industry leaders because at the time — shortly after the beginning of World War I — the National Research Council (NRC) appointed the Agriculture Committee to deal with burgeoning needs for food and fiber.

One year later, the NRC organized a subcommittee on protein metabolism in animal feeding. Much research regarding protein requirements for cattle performance followed its initiation. This era was, in fact, the time when the first compounds in a new class of nutrients were discovered and named vitamin — an amine vital for life.

In 1919 the subcommittee was converted into a stand-alone group entitled the Committee on Food and Nutrition, which divided activities between a subcommittee on food and nutrition and one on animal nutrition. The committee disbanded in 1928, and the Committee on Animal Nutrition (CAN) was formed.

Meanwhile, producers began latching on to the idea of added supplementation. By 1926 many feed companies began building near railroads for more convenient mass transportation of goods. Freight cars were loaded and unloaded with raw ingredients, and the final product was developed using the most modern operating methods available.

Some factories even had a small laboratory to check the integrity and quality of the raw ingredients being used — a novel idea then. Little did feed manufacturers know — this concept would become commonplace in the years to follow. Additionally, early feed products were often tested on employees' herds to ensure the feed's ability to perform before going on the market — much as companies use experimental herds today.

Through experiments by feed companies and CAN, several problems were revealed in the way cattle were fed. The industry realized defective composition in farm feeds was the primary cause of weakness in animals and this problem was due to soil depletion caused by heavy cropping and poor range management.

It was apparent depleted farm feed rations required added minerals to produce a complete feed. As a result, throughout the late '20s and the '30s, nutritionists emphasized mineral supplementation and identified riboflavin, pantothenic acid, niacin, vitamin B6, vitamin K, cobalt and certain fatty acids as essential nutrients. Those discoveries were of enormous economic value and were noted as perhaps the outstanding development in that generation.

## More with less

The desire to learn more did not end with the discovery of essential nutrients, as the mantra of “doing more with less” came to the forefront. This not-so-unique concept has been a point of study for animal nutritionists for almost a century.

As time progressed, more urban centers developed with dense populations. This expansion required farmers to produce more food with less land — sound familiar? Animals were confined to smaller spaces,



A lot has changed since the the early years of livestock production, but the theme of increased efficiency has stood the course of time.

and as the farming industry grew, the challenges became more serious.

In the meantime, CAN was making significant advancements in the vitamin and mineral realm. These findings were in perfect time for circumstances surrounding World War II regarding nutrition. Rationing was yet another reason more had to be done with less. It led to the use of innovative ingredients in animal feed such as corn and soybean meal – appropriately supplemented with minerals and vitamins – to replace the fish oil, skim milk and meat processing scraps repurposed for food resources.

Throughout the '40s, CAN worked tirelessly to develop ways to meet animal nutrition requirements while allowing traditional ingredients to go toward feeding the human population. It was not until this time scientists truly began discovering the minimal individual nutrition requirements livestock needed to thrive.

As scientific advancements progressed, more people set their career paths toward this effort. One of those individuals is BioZyme® Inc. Director of Nutrition and Regulatory Support Kevin Glaubius. In more than 30 years of experience, he has seen immense shifts from the use of antibiotics in feed to the enhancement of quality control and the regulation of the feed industry – he can only imagine what else may come down the pipeline in his tenure.

The beginning of his career was amid the pharmaceutical evolution of the '60s. Much of the research in this era focused on how to use antibiotics to achieve the goal of increased efficiency with less input cost. Glaubius says many feed additives with antibiotics were created to increase animal health and performance. “Back then, we were allowed to feed a medication that improved performance, digestibility, feed efficiency or daily gain,” he explains.

This development was accompanied by the use of computer software to aid in balancing rations. Precision nutrition was a coined phrase during the '80s and '90s in animal nutrition, as Glaubius recalls. Emphasis was placed on measuring and analyzing feed and forage samples to most accurately develop rations to fulfill the maintenance requirements discovered a few decades earlier.

Fast forward to 2011, when the Food Safety Modernization Act (FSMA) was signed into law.



Quality assurance spans beyond food production facilities. Inspectors crack down all the way to the livestock feed level to ensure quality in food products is not compromised from the very beginning.

According to Glaubius, this was another major change for feed companies aiming to provide the gamut of nutrition products for cattlemen. “It affected everything from equipment to microbial levels within a feed mill,” he says. “If you think about it, the same guy that’s inspecting the local bread factory could now be the guy that’s inspecting a feed mill for animal food.”

The FSMA brought food safety to a new level. Instead of food safety regulations focusing only on food products, the act now encompasses more regulations associated with the feedstuffs an animal eats before entering the food chain. “Essentially, feed is considered no different than food now,” Glaubius notes.

This new step in the industry came at a huge cost to feed companies everywhere. After all, conducting hazard control on every single ingredient, as well as the feed packaging itself, is no easy feat. As a result BioZyme and other companies had to incorporate a full-time position dedicated to quality assurance.

While this milestone did not necessarily change the feed rations themselves, it did add another layer of precision to the nutrition field. Dissimilarly, the soon-to-follow Veterinary Feed Directive (VFD) of 2017 did change cattle-feeding philosophy immensely. Since the VFD now requires a prescription for any antibiotic utilization in feed and feed medications are now reserved for treatment of sick animals, feed yard managers had to completely change their viewpoint regarding health and nutrition.

In accordance with the new regulations, the industry reduced the use of antibiotics, but the regulations still allow producers access to these products when they need them.

“[The VFD] has created a fundamental shift in the mindset of the feed dealer, the feed mill, the feed manufacturer,” Glaubius explains. “The change that VFD drove was, instead of focusing on how we supplement the animals with protein, energy, minerals, macro minerals, trace minerals, vitamins, to improve performance, the focus has shifted to animal performance with increased emphasis on promoting animal health.”

As the field continues to advance, Glaubius predicts even more of these regulations, pushing the need for new products focused on precision. As an example, he says, “If you think about a row crop producer, he’s got sensors on his sprayer tank that identify weeds out of the row in the corn crop, and it’s spraying a dose of the weed spray specifically on weeds as it comes across them. I think that’s where we’re headed with animal nutrition. It is more precision products designed for very specific purposes to meet that animal’s needs, and to fit the level of stress that that animal is under.”

### On the pipeline

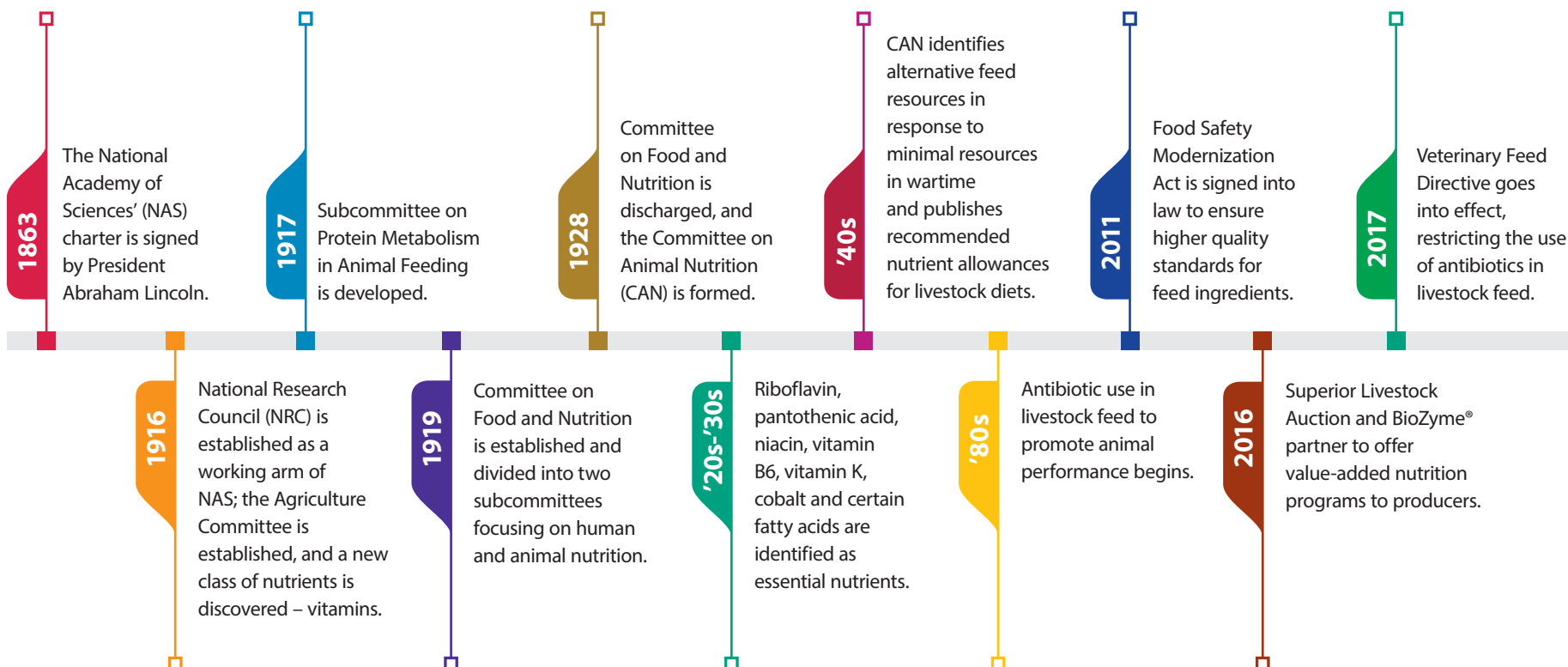
There is no doubt health and nutrition go hand in hand, and cattle owners are beginning to see the value in a quality nutrition program since it results in fewer health problems throughout an animal’s life. Fewer health problems translate to increased animal performance at a lower cost – achieving the goal animal nutritionists built their research around in the very beginning.

Glaubius says research projects are being developed all the time to continue increasing the body of knowledge as it relates to this field. At the same time, industry leaders are using research to develop a new industry standard via value-added programs for nutrition.

One such program spearheading the charge is through a partnership between BioZyme and Superior Livestock Auction. The first-of-its-kind initiative is on a mission to add value to cattle raised on a high-quality nutrition program. VitaFerm Raised® and VitaFerm Gain Smart® are two programs

*continued on page 40...*

## Livestock Nutrition Unfolded



rewarding cattlemen for subscribing to a nutrition program to promote health in the feed yard feedlot setting. His experience indicates feedlot managers want to source cattle with a history of performance and resiliency. These two programs are just one step in aiding them to find those cattle and, hopefully, to reward the commercial cattleman with a premium for developing the calves to fit the market.

Jason Barber, Superior Livestock Auction, says the programs came about in 2016 to complement many of their other marketing opportunities in an overarching effort to standardize the acceptability of the health and nutrition of cattle being sold. “The basis for both programs is getting cattle on a good nutrition program that’s recognized in this industry,” Barber explains. “The cattle have to be on that at least 45 days prior to selling, and then stay on these programs through delivery. The key to it is really keeping the cattle healthy. Once they’re delivered, it goes to the next phase in the chain. What’s really valuable about what BioZyme is doing is we’re creating a standard practice in the industry for this.”

Barber has seen immense value in many of BioZyme’s other programs and anticipates the same outcome here. While data supporting a premium associated with the programs will not come out until 2020, it is clear to Barber and Glaubius, the trend is certainly heading that way.

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— Jason Barber

From Barber’s perspective, it is evident these types of programs do more than provide value in one arena. “It’s really aiding the cattle that are in our other programs, too,” he says. “Whenever a natural calf gets a shot of antibiotics, when they get sick, they have to be removed from the program. One thing where you’re seeing a big shift on nutrition, in my opinion, is in trying to keep those cattle healthy ahead of time to where you don’t have to give them a shot of antibiotics and knock them out of the program. More producers are seeking these premiums and putting cattle in natural programs, and I think that’s where you’re really seeing a big focus on nutrition.”

Beyond improving cattle health, these programs provide yet another opportunity for cattlemen to get their calves into a program — and it is worth the extra management. “When you sell cattle on Superior, the more logos, the more icons, the more value-added programs you have on the screen, typically the more value there is in the cattle and the better they sell on sale day,” Barber says.

He parallels this era in nutrition to what the industry saw with vaccination protocols. In 1995, 45% of cattle

selling on Superior were unvaccinated. By 2013 it was less than 1%. While commercial cattlemen are still receiving premiums for good vaccination protocols, they are also averting a discount given to those who fail to act.

“I’m not saying that we’re there yet on the nutrition side, but we’re headed down that road,” Barber predicts. “More information is always more power. These buyers want to know everything about the cattle, besides just what they are, but what’s in them. If we can establish programs like this, it’s an instant recognition to buyers across the U.S. that are at purchasing these commercial cattle because they know they’re going to be healthier when they receive them and it’s going to be something that will reward the seller on auction day.”

Glaubius and Barber both agree many of these changes, especially regarding regulations, are a direct result of consumer demands. From a marketing point of view, they say consumers want to know as much as possible about where their food comes from and how it is developed. Barber notes, “If there’s another program that promotes health and well living, then it sure seems like the data is showing consumers want to know that

right now.” In addition, consumers are willing to pay more for products accompanied with more information.

This demand is driving research within animal nutrition to do more with less again. Glaubius foresees more regulations associated with health and nutrition in the cattle industry in the years to come, creating a big job for animal scientists today.

Glaubius reflects on research meetings only a decade ago concentrating primarily on antibiotic use and animal performance. Today, consumer demand has shifted the research agenda to identifying natural, plant-based ingredients to perform the same way an antibiotic would in the feed. “That’s been the big shift, I think that will continue,” he adds.

These advancements over the last century, and especially the last decade, are incredible in the cattle feeding world. Even so, they do beg the question: Will the mission to “do more with less” ever truly be accomplished? **HW**

**Editor’s Note:** *Scientific Advances in Animal Nutrition: Promise for the New Century: Proceedings of a Symposium* released by the National Research Council in 2001 was a resource in developing this story.