

# Building a Holistic Foundation for Animal Health

by  
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A collection of articles  
on holistic animal health.  
By Richard J. Holliday, DVM

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## **Introduction**

This is not a book about different alternative ways to treat animals nor is it filled with research data or esoteric formulas. It is, however, a compilation of experiences and opinions garnered from almost 75 years of life experience and 50 years of veterinary practice. At all times my goal has been to share with the reader the idea that anyone can prove these fundamental concepts of animal health by watching and learning from animals who will share their secrets with us if we are attentive.



## **Biography**

Richard John Holliday received his DVM degree from the University of Missouri in 1959. He conducted a private mixed practice in northwest Missouri for 25 years. For the last 23 years he has been employed as a Technical Service Veterinarian by the Impro Products, Inc of Waukon, Iowa, a company that produces and markets holistic animal health products for dairy cattle.

Dr. Holliday became certified as a Veterinary Acupuncturist in 1988 and was President of the International Veterinary Acupuncture Society for a 2 year term from 1992 to 1994. Holliday has been actively involved in promoting organic agriculture and holistic veterinary medicine for almost 40 years and has lectured and written extensively on those subjects. He recalls that his interest in organic agriculture began when he was 14 years old and read Louis Bromfield's books "Pleasant Valley" and "Malabar Farm." Richard and his wife Ruth have been married for 53 years and have 3 daughters, 15 grandchildren and 1 great grandson.

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## The Evolution of a Holistic Veterinarian

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Progressive Dairyman. Used here by permission.

I believe that a broad based interest in soil conservation began in the 1930's as a result of the devastating "dust bowl" era when the shortcomings of the then current agricultural practices became apparent. This trend continued on many fronts and the most visible one at present is the "organic movement." It is well to remember that "organic" is only one part of a much larger trend toward sustainable agriculture that is changing the very nature of the way farming is done here in the United States and in many other parts of the world as well. My evolution as a holistic veterinarian roughly paralleled this broader national movement.

In High School I read Louis Bromfield's books *Pleasant Valley* and *Malabar Farm* in which he detailed his success in rebuilding worn-out farms near his boyhood home in Ohio. These books were my earliest exposure to alternative agriculture. They are still a good reference for anyone interested in soil conservation and the early history of at least one part of the natural farming movement.

In undergraduate studies at the University of Missouri I had the opportunity to study soils under the renowned Dr. William A. Albrecht. It was years later that I fully appreciated the importance of his work ... that it takes healthy soils to make healthy crops and healthy crops to make healthy animals. His book, *Soil Fertility and Animal Health*, is a classic. Dr. Albrecht's influence and acceptance in the realm of sustainable or biological agriculture is greater now than while he was alive. One of his sayings was, "Study books and observe nature; if they do not agree, throw away the books." I have tried to follow this advice throughout my career. It has paid huge dividends in insights and knowledge gained.

In Vet school I was fortunate that most of my clinical instructors were former veterinary practitioners. They gave us a practicality in our approach to medicine that kept the mind open to anything that worked. One of our large animal clinician/instructors was almost 80 years old when I was in Vet school. His inquisitive mind was an inspiration to all students. He would try any sort of treatment at least once, to judge it's worth. The results of some of these unorthodox remedies and therapies were at times astounding. He taught us to not be bound by tradition and not be afraid to try something new or to explore a new idea.

One day one of my good "natural farming" clients took me on an impromptu field trip. We drove to an area where his cornfield joined his neighbor's. Both fields were basically the same as to soil type, variety and stage of growth. His neighbor's corn was tall with dark green undamaged leaves. Kenny's corn was just about as tall and green but the plants in several rows around the perimeter of his field were severely damaged. He explained. "My neighbor uses all the modern chemical fertilizers, herbicides and insecticides. I use only naturally occurring soil amendments like manure, lime, gypsum and rock phosphate. Deer will walk through miles of 'chemical' corn without taking a bite and then feast on my crops because it tastes better."

We did a taste test. The sap from his corn tasted sweet ... almost like sugar cane. One row away, just across the fence, the sap was bland and had a bitter aftertaste. He then suggested that I notice the number of empty pesticide cans in the trash dumps on the farms where I made most of my sick animal vet calls and look for a correlation.” There definitely was. I have never forgotten his words and I have seldom found them in error. He taught me two natural principles ... animals can recognize and will seek out healthy nutrition if available and there is an adverse relationship between heavy use of ag-chemicals and animal health.

1940 saw the publication of *An Agricultural Testament* by Sir Albert Howard, an English researcher working in India to develop composting methods to increase soil fertility. He found that animals were healthier when fed highly nutritious feed grown on high organic matter soils. He reported that his work-oxen fed on these “organically grown” feeds remained healthy even when directly exposed to Foot and Mouth disease. Sir Albert’s book is reputed to have been the impetus for J. I. Rodale to begin publication of the magazine “Organic Gardening and Farming.” This magazine was instrumental in popularizing the health benefits of organic farming for animals and humans alike. In the 60’s and 70’s it was our program guide as we tried to farm our small acreage organically and apply natural principles to our own health and that of our animals. It also inspired me to become more holistic in my vet practice.

*Acres USA* is another national publication that has been a tremendous advocate for ecological agriculture for over 30 years. The publisher, Charles Walters, is a pioneer in this field and has written extensively on this subject.

In 1984 I became employed as a technical services veterinarian for a company that produces and markets colostrum-whey based animal health and nutrition products. For the last 23 years I’ve been able to apply holistic principles to various health problems as I consulting with large and small, organic and conventional dairymen across the country. In 1988 I witnessed the birth of the CROPP Cooperative and I have been peripherally associated with Organic Valley ever since. In 1989 I took advanced training from the International Veterinary Acupuncture Society and became board certified in Veterinary Acupuncture. The study of 5000 year old holistic medical technology added a whole new dimension to my understanding of health and disease. When the Rodales’ first popularized the term “organic” it referred to the goal of building fertile, biologically active soils high in organic matter. At present, the emphasis of organic regulation seems to have shifted somewhat from soil building to restricting the use of prohibited substances. The USDA defines the requirements to qualify as organic and the National Organic Standards Board insures compliance with some of the more important natural principles. It is interesting to note that while organic certified dairies are regulated by the government, all dairies are subject to the constraints imposed by natural principles and the innate nature of the cow.

I have been privileged to watch and participate in the growth of sustainable or organic agriculture over several decades. It will be interesting to see how it unfolds in the future.

It is a difficult task to briefly describe “holistic” or “alternative” veterinary medicine. The dictionary defines “holistic” as being concerned with wholes or with complete systems rather than with parts or divisions, while “alternative” describes something existing or functioning outside the established cultural, social, or economic system. Both definitions are correct but do not adequately address the wide variations within the realm of holistic veterinary medicine as practiced today.

The range of alternative therapies is immense ... acupuncture, herbs, homeopathy, refined colostrum products, microbial products (lactobacillus and yeasts), mega-vitamins, radionics, and many other natural products and procedures. The list goes on and on, and I apologize if I've left out someone's favorite therapy. Most are useful and generally effective alternatives to the drugs, hormones and antibiotics commonly used in veterinary medicine today.

### **A HOLISTIC PRACTITIONER**

I believe that the distinguishing characteristic of holistic practitioners is the way they approach problems ... in short, the way they think. A true holistic practitioner not only looks at the patient as an integrated unit but also views it in the context of the whole ecosystem in which it lives. In this regard, a sick animal is not only a patient to be treated but is also a symptom of a sick farm. Both patients need help. Any remedial action must include what is necessary for the immediate relief of the patient as well as a critical assessment of the long-term effects of the chosen therapy on the patient and the environment. Part of the treatment must also be the removal or reduction of predisposing factors.

A holistic practitioner should also be well versed in several treatment modalities and be able to pick the most appropriate ones needed in any situation. In some situations this might even include the judicious use of antibiotics, if really indicated and if it has a reasonably good chance of success.

Finally, a true holistic practitioner should emphasize holistic animal health management (proactive) rather than any kind of treatment (reactive), whether it be holistic or conventional.

It should be noted that the terms holistic and alternative are not interchangeable. For example: an acupuncturist may be practicing alternative medicine, but if he only treats symptoms and does not search for the cause or other useful therapies ... then he is probably not a holistic practitioner. A fine distinction perhaps, but a significant one.

### **ADVANTAGES AND DISADVANTAGES**

To me, the greatest advantage to the holistic approach is that it works! In the hands of an experienced practitioner most holistic/alternative treatments have as good or a better success rate than conventional therapy. I think this is true because holistic practitioners attempt to find and treat the cause not just the symptoms.

There are many other advantages to holistic medicine ... less pollution, fewer side effects, and especially the fact that holistic medicine follows the old medical axiom, “at least do no harm.” This advice seems to have been lost or overlooked in the U.S. as evidenced by the recent report that pharmaceutical drugs are now either the 4th or 6th leading cause of death.

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Unfortunately, several factors have slowed public acceptance. The sale and use of natural products do not generate the huge profits necessary to buy researchers, lobbyists and politicians as does the sale of antibiotics, pharmaceuticals, herbicides and insecticides. Thus we have little credibility in some circles because we do not have research to back up our empirical observations.

Because so few schools teach these advanced concepts, there are not enough qualified practitioners, although the number is growing. Those that do engage in holistic practice are often subjected to harassment by government agencies.

The biggest disadvantage is that most people tend to use it for the wrong reasons and at the wrong time! They will turn to alternative treatments only as a last resort when everything conventional medicine has to offer has failed. Usually by this time the patient is in advanced stages of the disease and also suffering from the side effect of all the prescribed drugs they have used. When the alternative approach also fails, and it usually does in this situation, the patient gives up on the entire concept and never realizes that the alternative treatment might have worked had they used the right product or technique at the right time. Unfortunately, this apparent “failure” provides more evidence for the pharmaceutical /medical complex to ridicule and condemn the entire concept of holistic medicine.

### **THE FOCUS OF HOLISTIC ANIMAL HUSBANDRY**

The success of the holistic approach requires a change in perspective and the development of a holistic outlook towards livestock management and disease control. It is not as simple as merely substituting a “natural” alternate therapy for a “toxic” drug. The principles behind the success of holistic therapy go much deeper than the characteristics or source of the medication.

Conventional Veterinary Medicine is primarily concerned with the treatment of sick animals. Even if successful, the loss of life and production added to the cost of treatment makes this approach by far the most expensive.

Veterinarians also emphasize disease prevention. Herd health checks and vaccination programs fall into this category. As essential as these procedures are, the outlook is still towards preventing disease. Vaccinations may increase resistance against a specific organism but does little to elevate the animal’s vitality to the health enhancement level. Typical of this category are herds or flocks where the animals are not really sick or showing symptoms but are not really well and productive either.

A third concept, usually neglected by conventional veterinary practitioners, is that of health enhancement through holistic management. Everything possible is done to raise health and vitality to the highest level possible. All management practices are evaluated on the basis of their effects on the vitality of each animal in the herd. Strict attention is given to providing superlative nutrition. In so far as possible, all environmental stress factors are eliminated. Water is checked for nitrates or other toxins. Housing and ventilation are maintained at optimum levels. Any equipment with which the animals come in contact is properly maintained and adjusted. There are literally hundreds of other environmental factors that impact animal health and they all must be considered. When animals are maintained at a high level of vitality their resistance is much higher. Health enhancement is much more profitable than either treatment or prevention.

## SOME THOUGHTS ABOUT STRESS

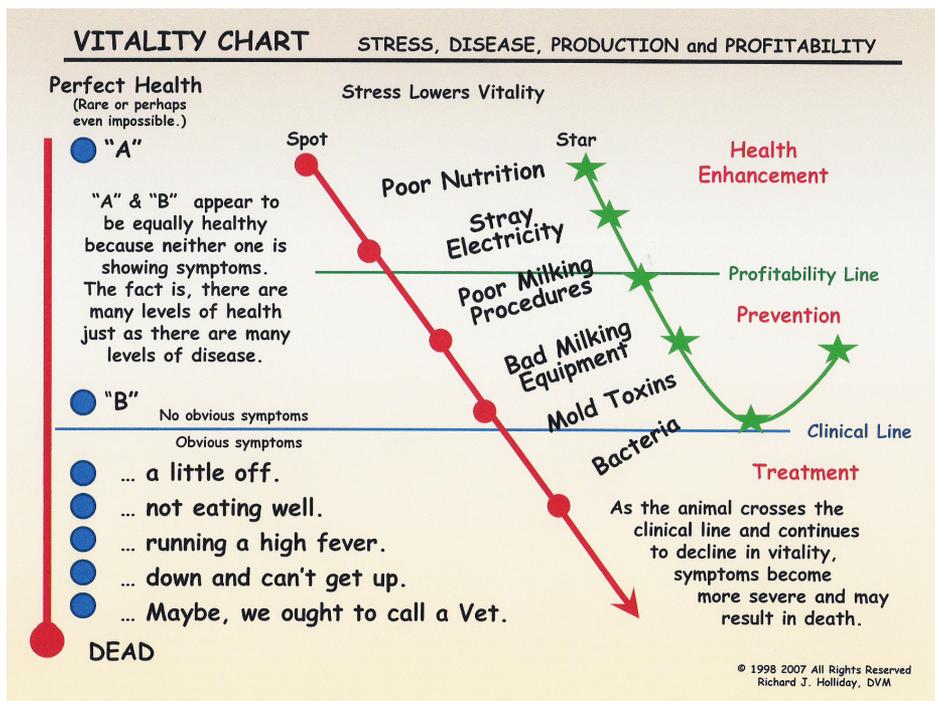
Stress is known to lower immune function and may be the primary factor that sets the stage for animal disease.

There are three categories of stress.

1. Environmental or physical stress, such as faulty nutrition, bad water, lack of sanitation, poorly designed and maintained equipment, unsuitable habitat, etc.. Good management has some influence on most of these but can not control all of them. For example, weather cannot be controlled but the effects can be mitigated with proper housing.

2. Physiological stress, usually associated with reproduction and lactation. We can minimize some of the effects of this type, but we can not totally eliminate it.

3. Psychological stress may occurs when weaning, changing groups, establishing a new “pecking order”, etc. This type can be held to an acceptable level with good management.



All animals vary in their ability to accommodate stress. Some differences are due to inheritance ... species, breed and sex. Others are associated with the individual's life history of health and disease. Older animals do not accommodate stress as well as younger ones do. A young animal that suffers an episode of severe scours/pneumonia may survive, grow and appear thrifty even though some irreversible damage to heart, lungs and intestinal lining may forever impair it's ability to pump blood and absorb oxygen and nutrients. Under stress this animal will probably show earlier and more severe symptoms than others in the same group that did not go through the sickness.

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Stresses are cumulative. A small stress has a greater effect in an animal already carrying a big stress load, than it has in another relatively stress free animal.

Over many years, I have developed a graph or map that allows me focus my thinking and helps me keep the various aspects of health and disease in their proper perspective. Any animal's relative health status can be plotted on this graph. Since this Vitality Chart also seems useful to illustrate certain principles of holistic thought, I would like to share it with you and will use it as the basis for this article and for almost all future discussions of health and disease.

On the chart, note that the "vitality" line on the left side (looks like a thermometer) runs from PERFECT HEALTH to DEAD. I purposefully do not assign any numbers because the positions are variable and I'd rather think in terms of relationships and not absolutes. I doubt we ever attain perfect health but "DEAD" is common.

The "profitability line" indicates a relative loss of production, profitability or performance. The "clinical line" by definition separates healthy animals from sick animals, based solely on the presence or absence of symptoms. These lines are actually wide, gray areas and their position arbitrary and quite variable. It depends a great deal on how well the herdsman relates to and observes his animals.

Physiological and psychological stresses are represented on the chart as a wavy gray line. These stresses usually occur at predetermined times, such as parturition, weaning, and other routine changes or events.

If an animal progressively declines from good health to sickness or even death (going straight down the left side of the chart), it will first cross the "profitability line" as it becomes less productive and then the "clinical line" when it begins to show symptoms of disease. These symptoms may be mild at first ... "a little off," ... gradually increasing in severity until "DEAD". (See Vitality Chart) We know and accept that there are differing levels of illness but our management decisions frequently seem to be based on the premise that animal "B" is just as healthy as animal "A". We all know that different levels of health do exist but in practice we tend to overlook this because "A" and "B" both look equally healthy even though there is great difference in their respective vitality. Production records and breeding records are a great aid to identify those animals that have lost productivity but are not yet showing symptoms.

Let's compare the reactions of "Spot" and "Star," both living a relatively stress free life and having a high level of vitality. (position 1 on the chart) If something happens to their ration and they are subjected to nutritional stress, they will probably both decline in vitality to position 2. Notice that Spot was affected more severely, possibly because she suffered a grave illness when young (as discussed earlier). Both still appear to be healthy and productive but some of their "reserve" is used up.

Adding another stress causes both to slip down to position 3. Star is still doing well but now Spot has dropped under the profitability line. She shows no clinical symptoms but performance or production testing may indicate problems. In a dairy animal this could be evidenced by lowered production, a change in SCC or an impairment of breeding efficiency.

Add one more stress and Spot and Star fall to position 4, both below the profitability line. Spot is dangerously close to the clinical line but still shows no obvious symptoms although a really close observer might see mild symptoms developing.

As one last insult, let's expose both of them to a pathogenic bacteria capable of causing disease. Both suffer the same loss of vitality from this exposure (striped line). Star dips in vitality but does not go "clinical." She is able to overcome the infection because she had some resistance left. Spot drops over the line and begins to show symptoms. Conventional medicine would diagnose the bacteria as the "cause" of her disease.

This example is obviously oversimplified to illustrate a principle, but does beg the question: “In this example, did the germs cause the disease? ..... Or would it be more accurate to ask: “Did the bacteria trigger a disease in an animal that was already suffering from stress-induced, low vitality?” I go with the trigger theory. The deciding factor was not the presence or absence of a disease organism, but the presence or absence of a strong immune system. Obviously, microorganisms do vary in their ability to cause disease and a highly pathogenic organism may be able to cause disease in relatively stress free animals. These epidemics however are probably not as costly in the long run as the day to day losses incurred by common infections.

I think we give germs way too much weight as the cause of problems. My guess is that a germ can't tell if an animal is dead or alive ... but if an animal is so “stressed out” that it “tastes” dead to the bacteria, they immediately begin the recycling process. In a dead animal we call it decomposition ... in a live animal we call it disease. In the grand scheme of things, the “bugs” are probably only doing the job assigned to them.

### **SOME OBSERVATIONS BASED ON THE CHART**

- Let's go back to poor old Spot's predicament. We could give her some antibiotics and hopefully kill enough germs to get her back up over the clinical line. Or, we could treat her with herbs, or homeopathy or whatever and probably help her enough to shut off the symptoms. BUT, unless we eliminate the stresses that put her at the susceptible level in the first place, we have really only installed a big Band-Aid!
  - Timing is critically important. If you start treatment early, a mild treatment has a greater chance of getting results. If this is not successful, you still have time to escalate to a more heroic treatment. Some conventional dairymen overlook the importance of timing when their hope for a spontaneous recovery leads them to withhold treatment of sick animals until the last possible moment in order to minimize the economic loss of discarded milk or meat. A holistic treatment does not have this disadvantage and can be used anytime.
  - Generally speaking, the closer to the top of the chart we recognize a problem and begin to correct it, the lower the cost.
  - If healing and/or health occurs at all, it is a function of the natural inclination of the animal to be healthy. Drugs, from whatever source derived, only aid this natural process.
  - Just because an animal shows no symptoms does not mean it's healthy.
- The final stress that triggers symptoms is usually not the primary cause of the illness. For example, bacteria may “trigger” mastitis but the real “cause” may be nutritional deficiencies or other stresses.

## A QUIZ!

If you are already following holistic principles or aspire to do so, you should be able to answer these questions. If you can't answer them, you have some homework to do.

1. Is the ration adequate with no excesses, deficiencies or toxins? Were the feeds grown on fertile soil with little or no chemical contamination? Are the feed ingredients appropriate to the species, type and age of the animals?
2. Is the water pure? Has it been checked for nitrates and other harmful chemicals? What is the actual nitrate level in the water? Do you drink from the same water supply as the animals? Does the water taste good to you?
3. Are there any harmful electrical or electromagnetic influences on the premise? Do you ever receive mild electrical shocks when working in the area where the animals are kept?
4. If used, is milking equipment properly maintained and adjusted?
5. Are all procedures involving the animals such as milking, vaccinating, and routine surgery carried out in a timely and sanitary manner?
6. Do your animals have a clean, dry, well-ventilated environment when confined? Can you kneel down in the pens without getting wet knees? Is breathing uncomfortable or unpleasant to you when breathing at the same distance above the ground as the animal breathes in air?
7. Is there any evidence of mold, mycotoxins or aflatoxins in the feed? Some are not apparent until symptoms occur ... have you checked?

## NUTRITION AND HOLISTIC ANIMAL HEALTH

In 1951 I had the good fortune to study the rudiments of soil science at the University of Missouri under the late Dr. William Albrecht. I must confess that at the time I took his course, I did not fully appreciate the correlation between soil fertility and animal health. I wanted to get on with the real veterinarian's job of treating sick animals. It was only after I had completed my animal disease education in Veterinary school and began to receive my animal health education from some dedicated "organic farmer" clients that I came back to Albrecht's work and finally began to understand his wisdom.

His book "Soil Fertility and Animal Health"<sup>1</sup> is still a classic, and should be required reading for anyone aspiring to be a holistic herdsman. As one could guess from the title, his premise is that it takes a fertile healthy soil to grow healthy nutritious crops to sustain healthy productive animals or people. Incidentally, soil vitality and crop or feed vitality, as well as animal vitality can be plotted on the "Vitality Chart" discussed in the previous issue.

Stated another way, an animal can only be as healthy as the feed it eats and the feed can only be as healthy as the soil upon which it was grown and the soil to be healthy must be highly fertile and biologically active. Within the broad framework of this concept, in this article I would like to illustrate four main points.

Good nutrition can prevent disease.

Good nutrition can cure disease.

Nature is a better judge of nutrition than nutritionists.

Healthy production is the most profitable.

Good nutrition can prevent disease  
.. most of the time, but not always!

Another candidate for a required reading list is the book "An Agricultural Testament" by Sir Albert Howard, published in 1940.<sup>2</sup> Sir Albert was formerly the Director of the Institute of Plant Industry in Indore, India and the British Agricultural Advisor to States in Central India and Pajutana. This book is the summation of decades of his work to improve soil fertility and plant and animal health by composting agricultural residues and returning them to the soil. It is also reputed to be one of the sparks that inspired J. I. Rodale to begin publication of the great magazine "Organic Gardening and Farming."

Most of this work is related to soil fertility and the intricacies of composting, but I would like to quote one paragraph that forever changed the way I looked at animal health and disease:

“My work animals were most carefully selected and everything was done to provide them with suitable housing and with fresh green fodder, silage, and grain, all produced from fertile land. I was naturally intensely interested in watching the reaction of these well-chosen and well-fed oxen to diseases like rinderpest, septicaemia, and foot-and-mouth disease which frequently devastated the countryside. None of my animals were segregated; none were inoculated; they frequently came in contact with diseased stock. As my small farm-yard as Pusa was only separated by a low hedge from one of the large cattle-sheds on the Pusa estate, in which outbreaks of foot-and-mouth disease often occurred, I have several time seen my oxen rubbing noses with foot-and-mouth cases. Nothing happened. The healthy well-fed animals reacted to this disease exactly as suitable varieties of crops, when properly grown, did to insect and fungus pest -- no infection took place.”

Once my mind was opened to the possibility that good nutrition could prevent disease, I found evidence of it almost every place I looked.

### **Good nutrition can cure disease ... often but not always!**

Eugene M. Poirot wrote a book in 1950 called “Our Margin of Life.”<sup>3</sup> This book details his experiences in the restoration of soils and the health benefits to animals when fed crops grown on high vitality soils. His son-in-law, a veterinarian who practiced in the same town as I did, confirmed the accuracy of this account, here quoted from Poirot’s book.

“Once Bang’s disease, which causes abortion, was so serious, and the blood test showed so high a percentage of infected cows, that the entire herd was threatened with liquidation. Fourteen years later, another test of all animals, including both the old infected cows and their offspring, more than four hundred head, failed to show a single reactor or suspect. When Bang’s disease is transmitted to humans by cows or their products it is called undulant fever. In this case it was controlled at the soil level in some yet unknown way, long before it had a chance to reach a human as undulant fever. A significant part of this story is that early in the restoration period this disease was eradicated by blood-testing cows and selling all reactors and suspects. The herd was clean for a period of three years. Then the infection hit again in January, when an immediate blood test disclosed only six head of reactors or suspects. These were sold at once, but by June the infection had reached eighty percent of the cows!

So none were sold, and soil restoration was continued. In two years calf crops became normal again.

Later, blood testing became required by law, but no reactors or suspects were found in any of the tests, nor has the disease reappeared after thirty-five years, even though all animals are offspring of infected cows, born on once infected pastures and living in an area where Bang’s disease was present on other farms before blood testing eradicated it.

I don’t know how to “cure” these many diseases - but Mother Nature does. That is why I like to give her the “tools” and keep her on my side.”

**Nature is a better judge  
of nutrition than nutritionists  
... if the proper choices are available!**

My good friend and client Carl lived down the highway about 3 miles from our home. He was a good farmer and dairyman who milked about 30 cows. My vet calls to his place were mostly for routine jobs like dehorning or vaccinating with an occasional milk fever or dystocia. His cows were well cared for and healthy. For many years he supplied our family with fresh milk right from the bulk tank. One year inclement weather made planting and harvesting hay and grain crops a great gamble with the result that feedstuffs that fall and winter looked good but had low nutritional value. By late winter Carl consulted me with two seemingly unrelated problems. One, his cattle were eating almost 2 pounds of a mixed mineral per head per day! Two, about 10 days before they were due to calve, his heifers would abort a live calf. The calf, with some care, would live, but in spite of all we could do the heifer would die within two or three days. After the third one in a row had died, I did what every smart vet would do ... I passed the buck and sent a dying heifer to the University Vet School for autopsy. Their diagnosis came back as starvation! Carl took good care of his animals and was feeding them almost all they could eat. This diagnosis was like an insult to Carl and difficult for either of us to accept. We could have accepted a diagnosis of malnutrition because of the poor crops that year but starvation seemed a little too harsh.

We then turned our attention to the mineral consumption problem. Available in that area at that time was a “cafeteria” mineral program in which each mineral was fed separately on the theory that each animal could then eat only what it needed to balance its own needs. Carl decided to try this program. His mineral feeder was in the middle of his cow lot and he had to carry each bag of mineral through the lot to empty into the feeder. Things went well for the first few trips, and then suddenly several of the normally docile cows suddenly surrounded him, tore a bag of mineral from his arms, chewed open the bag and greedily consumed every bit of the mineral, the bag and even some mud and muck where the mineral had spilled out ... astounding behavior for a bunch of tame dairy cows!

What was in the bag, you ask? ... a source of the trace mineral, zinc. During the next several days they ate several bags of this zinc source while completely ignoring all other minerals. Gradually they began eating normal amounts of the regular mineral. From that day on his heifers calved normally and things gradually returned to normal. Apparently, the difficult growing season has resulted in crops that were deficient in zinc or perhaps high in zinc antagonists. The basic mineral mix had a small amount of zinc in it but to get the zinc they needed, they had to consume large amounts. This gave them too much calcium. Calcium interferes with zinc absorption, which in turn increased their need for zinc. Even though their quest for zinc impelled them to eat the mixed mineral, every mouthful they took increased the imbalance.

Inevitably, symptoms began to show up in the most vulnerable group ... young heifers, still growing and in the last stages of pregnancy. Finally they just gave up and checked out ... all for want of a few grams of zinc. The decrease in feed conversion associated with zinc deficiencies coupled with the poor quality feed would result in malnutrition even when feed intake appeared to be adequate. I realize that other secondary factors may have been involved here, but the main factor was a zinc deficiency as evidenced by the remission of symptoms when zinc was supplied. (See “Zinc” side bar).

Carl had done as good a job as he could with the knowledge that was available at the time. When the essential ingredients were finally provided so that the animals could make their own choice, they picked out what they needed to regain their health. For me this incident epitomizes the concept that, given the chance, animals can balance rations better than computers or nutritionists can.

Many nutritionists tend to discount the ability of animals to balance their ration, asserting that by the time they feel the need to eat a certain item they are already in a deficient state. From their point of view, I suppose they have a point. The fallacy in their reasoning may be that they expect the animal to choose for the level of production that man desires while the animal chooses only what it needs to be healthy.

**Healthy production is the most profitable...in the long-term,  
if not in the short-term!**

Many years ago I was associated with a feed company that formulated and sold premixes for dairy cattle. It was a good feed, based on “natural” ingredients and principles. Many of the users commented on the superb health experienced by the animals on this program ... better reproduction, less mastitis, low cull rate. healthy calves, low vet bills, etc.

The down side was that production, although profitable, did not reach the high levels they had come to expect when feeding a more “conventional” ration designed mainly to increase production. Many dairymen who switched to such a feeding program often saw their production increase dramatically.

Unfortunately, in most of these cases, it wasn’t very long, and problems began creeping back into the herd ... cows didn’t come in heat like they should, conception rate when down. There were more cases of mastitis, calves didn’t do as well, vet expense increased, more cows began leaving the herd for health reasons. Eventually even production began to slide. The short-term higher production had been gained only at the long-term expense of lowered herd health, proving that old saying “there is no free lunch.”

There does seem to be a level at which animals can maintain health and have profitable production. The animals on the “natural” feeding program had achieved this happy state and the overall financial benefit associated with good health more than overcame the lower production and slightly higher feed costs.

When a herd like this is switched to a “conventional” program concerned mostly with high production the increased production and slightly lower feed costs usually do not make up for the increased costs of poor health.

**See everything you look at!**

The above experiences, along with many others, confirmed for me what Dr. Albrecht, Sir Albert and Mr. Poirot had discovered years before. Building on the foundation they had provided, I subsequently learned a lot about nutrition and animal health just by paying attention to what animals ate and the effects on their health. You, too, can prove these things to yourself, by doing the same thing. I remember Dr. Albrecht saying, “Study books and observe nature, if nature and the books do not agree, throw away the books.” I agree.

Footnotes:

1. Albrecht, Dr. William. Soil Fertility and Animal Health. Fred Hahne Printing Company. Webster City, Iowa. 1958, Has been reprinted as Volume 2 of a 4 volume set, “The Albrecht Papers”, available from ACRES U.S.A., P.O. Box 8800, Metairie, LA. USA (505) 889 2100.
2. Howard, Sir Albert, An Agricultural Testament. Oxford University Press 1940
3. Poirot, Eugene M. Our Margin of Life. Acres, U.S.A. Raytown, MO 1978

**ZINC**

Stress (including parturition) appears to increase the zinc requirement of animals. Zinc is required for the incorporation of cystine into keratin and thus plays an important role in maintaining hoof, horn and skin integrity.

Zinc plays an important role in wound healing, immune function and disease resistance. Some studies indicate that the first symptoms of a zinc deficiency is a decrease in immune function and a decrease in feed conversion.

Zinc plays a role in vitamin A transport and utilization and appears to play a role in vitamin E absorption. Reproductive performance after parturition improves with both zinc and vitamin E supplementation in late pregnancy.

High calcium and iron intake (including Ca and Fe in water). will increase the zinc requirement.

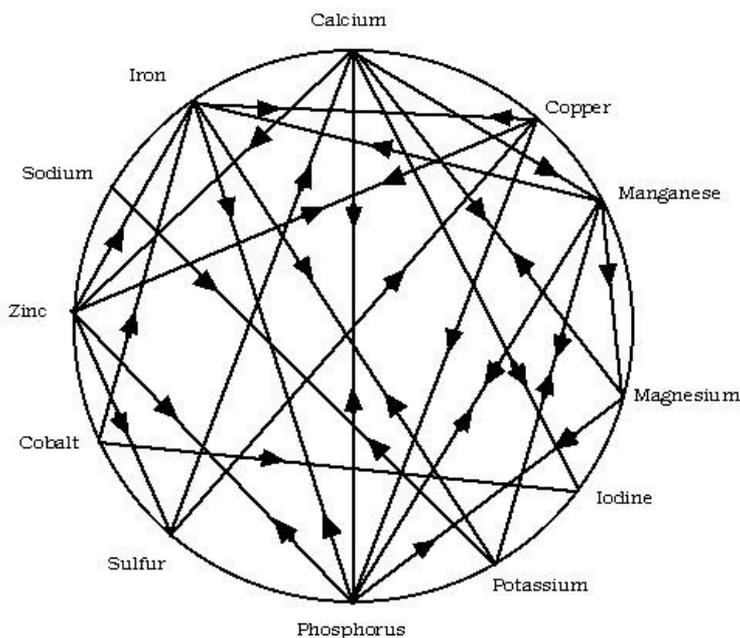
Deficiency symptoms may include general listlessness, poor growth, stiff joints and unthrifty appearance, hair loss, general dermatitis of head and neck and failure of wounds to heal properly.

## THE MINERAL WHEEL

Based on research by several investigators, these mineral interrelationships appear to be well established.

### HOW TO INTERPRET THE MINERAL WHEEL

If a mineral has an arrow pointing to another mineral, it means a deficiency of that mineral or interference with its metabolism may be caused by excesses of the mineral from whence the arrow originates.



## LET YOUR ANIMALS TEACH YOU NUTRITION

I believe that a ruminant's tongue is the finest nutritional, analytical laboratory in the world! Many experiences over the years have taught me to trust in the natural inclination of animals to seek out the best nutrition they can find and to know instantly when they have found it. Let me relate a few examples to help you discover similar occurrences in your own animals.

When I first became interested in holistic animal care, I had a client that planted a large acreage of corn (maize) in a fertile river bottom area. Everyone that farmed around him used chemical fertilizer, herbicides and pesticides. He used only a trace mineral rich, gypsum (Ca Sulfate) substance that was mined in Colorado. He experienced little damage from insects or weeds but the native deer would come from miles around to eat his organic corn, leaving his neighbor's crops untouched.

I have seen cattle escape from their pens, wander past fields of lush looking "chemical" corn, and then, right to the row, begin to eat plants that were being grown according to natural principles.

I have seen swine that were accustomed to eating organic corn, literally quit eating for 2 or 3 days until hunger finally drove them to begin eating a new batch of feed containing conventionally grown corn of inferior quality.

In their natural state American bison roamed over thousands of miles of range and thus had access to naturally occurring minerals from a variety of soil types. A "buffalo" rancher in the upper Midwest must confine his herd to a few hundred acres. To duplicate as near as possible their former range of mineral choices, he provides continuous year-around access to 12 different free choice minerals. Their consumption varies greatly, sometimes on a day-to-day basis, depending on the season, the weather and the quality of the other feeds available. His animals are extremely healthy and productive.

Finally, one last example showing that ruminants can instantaneously detect minute changes in forage quality. Research from England indicates that grazing cows prefer clover during the day and grasses during the evening, because sugar levels are highest in grass late in the day. (Research directly relating to preference of and production from ryegrass or clover in pure stands or in mixtures is found in the British Society of Animal Science, *Journal of Animal Science* 1988, 67:195-202. "The effects of including white clover in perennial ryegrass swards and the height of mixed swards on the milk production, sward selection and ingestive behaviour of dairy Cows" by Phillips and James at University of Wales Bangor.)

Mainstream nutritionists tend to downplay this ability of an animal to balance its nutritional needs ... possibly because they spend more time watching computer screens than observing the eating habits of the animals. I admit that this ability does not apply to all situations and to every type of feed. Some feed items (grain and concentrates) may be so tasty that most animals would overeat if fed free choice. Other ingredients are so unpalatable that voluntary consumption may not meet their requirements. Any attempt to increase the consumption of any one item by adding flavorings only seems to compound the problem. Nevertheless, this natural trait can be used to improve animal health and nutrition. And, in fact, there are many successful commercial suppliers of free choice mineral feeding programs wherein the major components are fed separately.

No prepared ration can match the exact needs of every animal or group of animals. In any given group being fed the same ration, some will get about what they need, some will get too much and some will get too little. This is especially true of mineral components. For example, to provide trace minerals, most nutritionists disregard any trace minerals that may already be present in the feed and add a trace mineral package that provides the total trace mineral requirements. In theory, this assures that adequate amounts will be present. However, it does not address the possibility of interference caused by any excess thus created. (See Mineral Wheel)

### **A SELF-FED MINERAL PROGRAM**

If you really want an education in mineral nutrition, and want to give your animals a chance to balance their own mineral requirements, try this program. Partition off your mineral feeder and provide the following in separate compartments on a continuous, free choice basis.

1. A mineral mix that is high in calcium with little or no Phosphorus. You could use ground limestone (Calcium Carbonate) or oyster shell flour or combinations.
2. A mineral mix that is high in Phosphorus with little or no Calcium.
3. Loose salt (not block salt), the more unrefined the better.
4. Kelp. This is a rich source of all trace minerals and iodine.

Providing Calcium and Phosphorus separately allows them to maintain the critical Ca/P ratio.

### **SOME ADDITIONAL OPTIONS**

Supplemental Magnesium and Potassium may not be necessary in all areas, but it does not hurt to make a feed-grade source available and see what happens.

Magnesium Oxide and magnesium sulfate are common sources. Both are relatively unpalatable.

They can be mixed with salt to improve palatability so long as a separate source of plain salt is also available. An alternative is to provide dolomite limestone that contains Mg carbonate as well as Ca carbonate.

In many areas, potassium is already adequate or excessive. Potassium chloride or potassium bicarbonate is commonly used in commercial mixes to supply this mineral.

Sulfur is often deficient. Elemental sulfur can be provided free choice or mixed with salt. Baking Soda or Sodium bicarbonate free choice may be beneficial, especially if a lot of grain is being fed.

If not already present in some of the other mixes, provide a source of vitamins A, D & E and some B vitamins.

At first, put out only small amounts and watch closely what they eat. More than likely, your animals will show a preference for one or two items, indicating a need. If your current ration is well balanced, they probably will not eat much. Even so, leave it out for them and watch what happens to the consumption patterns over time when pasture conditions change or when feeding hay or grain from a new or different source. I have seen daily changes in mineral preferences for no discernible reason.

Avoid sudden changes to the ration. If they seem to grossly over-eat any one item, it may be prudent to partially limit that item for a week or so to let them catch-up gradually. If possible, avoid mineral mixes that are flavored to increase palatability.

If you are already feeding a complete ration with minerals added, do not change the ration. Use this program as an add-on, free choice, monitoring system to let the animals tell you what they think of your ability as a nutritionist! This allows us to use our science and computers to at least get close to a balanced ration and still provide a way for the animals to fine-tune for their individual needs.

### SOME RANDOM THOUGHTS

- If you are growing crops for your animals, farm organically or as close to it as you possibly can. If you buy your feed, try to find organically grown feed or feed that has been grown on fertile soil with a minimum of chemical inputs.
- From time to time, test some of your feed, especially if you buy feed or if you suspect feed related problems. The lab test may quickly identify gross excesses or deficiencies in the feed and thus enable you to make adjustments before problems occur. It does not hurt to have two opinions ... one from the lab and one from the consumers, your animals. I will leave it to you to decide which one is the most reliable.
- Don't forget that even with the best feeds you can still have malnutrition ... if the ration is not balanced and the ingredients are not appropriate to the species, age and purpose of the animals being fed.
- Excess protein is often more common than a protein deficiency and can be more damaging. Do not add sources of non-protein nitrogen (NPN's) like urea or ammonia compounds to the ration. Test your feeds and water for nitrates. Nitrates in the feed or water, plus NPN's in the feed plus excess protein in the total ration, can all add up to nitrogen intoxication with a variety of symptoms. One of my clients experienced a devastating storm of abortions within a week after he began feeding some purchased hay that was later found to contain over 5000 ppm nitrates.
- Always feed a source of kelp ... free choice if possible. Trace mineral deficient animals will eat a lot until their needs are met. After that, they consume very little. If they continue to eat kelp at high levels, it may indicate a more severe deficiency of one or more individual trace minerals such as Zinc, Copper, Manganese, Cobalt or others. It is possible to self-feed individual sources of these vital trace minerals (usually the chloride or sulfate forms) but greater care must be taken to avoid toxicity from over consumption.
- Provide a source of probiotics ... lactobacillus, yeast or other direct fed microorganisms (DFM's). A healthy gut is the first line of defense against many bacteria. Probiotics also increase feed efficiency.

**“Hey Doc, waddya got for .....?”**

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“Hey, Doc, my cows are eating dirt. Waddya got for that?”

A few years ago, I posed this question at several dairy seminars in the Midwest: “Do your animals chew on wood or eat dirt if they have the chance?” A few said their cows would chew on wood. Almost all indicated their cows would eat dirt if available. One fellow said that he had to haul in dirt around the foundations of his buildings to replace the soil his cows had eaten over a period of years. Strangely enough, a few even told of their cows licking or drinking from urine puddles if they could get to them. As bad as that sounds, it is even more alarming when conventional opinion regards this eating behavior as being almost normal because it is so common. It’s the “everybody’s doing it, so it must be OK” syndrome. And it may be “normal” in the sense that it is appropriate, compensatory behavior for animals forced to subsist on a mineral deficient ration. Eating dirt and other abnormal appetites are attempts to secure some vital element or attain some nutritive balance that is not otherwise present in their diet. It should be considered a warning signal that something is amiss in the ration. To examine the problem from a holistic viewpoint, let’s go back in time and look at the effect of domestication on today’s dairy cattle. Most authorities agree that primitive cattle or Aurochs (*Bos taurus primigenius*) were first domesticated about 8000 years ago. Before domestication, cattle lived a lifestyle similar to that of bison in the American west. They were free to roam over wide, naturally fertile areas. Specific imbalances of soil in one area would be offset by excesses or adequacy of the same element in other areas. A multitude of different plants were available. Many plants had the ability to absorb and concentrate different minerals and trace mineral giving the grazers even greater nutrient options. Thus, over a period of time they could seek out and obtain balanced mineral and nutritional needs. Predators strengthened the genetic pool by culling the weak and unfit.

It’s a lot different today. Dairy cattle have been genetically modified to produce at levels never intend by nature, increasing their need for minerals. Ever more restrictive confinement limits their ability to seek out and consume adequate diets. In a natural grazing situation herbivores probably had hundreds of different plants from which to choose. Today they are limited to 6 or less: grass, alfalfa, corn, soybeans, cottonseed and maybe some oats or barley. Seeds and grains in the amount currently fed are detrimental to dairy cow health. Cow are ruminants and need a high-forage diet!

Crop quality has declined. Every crop harvested or animal removed from a farm or ranch takes with it a finite amount of life supporting nutrients. Major elements can be replaced but it is difficult to restore a natural balance that includes high organic matter, adequate trace minerals, and vibrant biological life. Intensive NPK fertilization results in higher yields at the expense of nutritive values and mineral content in the crops.

### **“AVERAGE” IS A MYTH!**

A total mixed ration (TMR) is the industry standard feeding strategy that purports to provide, in one total mix, all the nutrition required by the ‘average’ cow in the group. This concept fails to consider the individuality of each animal’s nutrient requirements. No two animals have the same needs. Variables such as breed, age, pregnancy, stage of lactation, weather, season of the year and others have a marked influence on the need for mineral supplementation. With a TMR probably no one animal will get exactly what it needs. A few may get pretty close but many will be lacking in some nutrients while others will have excesses. This limits their production, eventually depresses their immune response and ultimately may result in various herd health problems. Eating dirt, if available, is their way of responding to these imbalances.

Unfortunately, mainstream nutritionists tend to downplay the ability of animals to balance their nutritional needs. Anyone who doubts that cattle can make valid nutritional choices needs to watch cows graze in a mixed pasture. They do not just mow grass like a lawn mower, but pick and choose each mouthful. They avoid eating the bright green grass surrounding ‘cow pies’ in the pasture but will search the fence-rows for weeds that concentrate various essential trace minerals. Given the chance, they will balance their nutritional needs during each feeding period.

The following incident illustrates another aspect of this ability. Weather had made it a bad year for crop quality. In late winter, a good client called me about two problems. His cattle were eating excessive amounts of mineral and his heifers would abort a live calf about 10 days before they were due to calve. The calf would live, but the heifer would usually die. Focusing first on his mineral problem, he decided to try a “cafeteria” mineral program in which each mineral was fed separately. He had to carry each bag of mineral through his cow-lot to get to the mineral feeder. His first few trips were uneventful. Then suddenly several of the normally docile cows surrounded him, tore a bag of mineral from his arms, chewed open the bag and greedily consumed the contents ... a zinc supplement.

Within a week after the mineral change, consumption returned to normal and his remaining heifers calved normally. Apparently, the previous year's stressful growing season had resulted in crops that were deficient in zinc or perhaps high in zinc antagonists. His mineral mix was high in Calcium with only small amounts of zinc. Their quest for zinc impelled them to over-eat the mixed mineral. Excess calcium interferes with zinc absorption. Every mouthful they took increased the imbalance and escalated their need for zinc. Inevitably, metabolic problems began in the most vulnerable group - young, growing heifers in the last stages of pregnancy. Finally they just gave up and checked out ... all for want of a few grams of zinc.

If your cows are eating dirt or if you just want to experiment; give your cows a chance to participate in their own diet formulation. Do not change your current ration, but do provide separate free-choice sources of these 6 items: salt, bentonite, bicarb, a basic mixed mineral with a 2 to 1 Ca/P ratio, one with a 1 to 2 Ca/P ratio, and kelp. Cows with rumen acidosis will prefer bicarb or bentonite. The separate sources of Ca and P allow them to adjust that critical ratio. If they lack trace minerals they may also eat a lot of kelp. If kelp consumption remains high you may want to provide separate sources of some of the trace minerals. There are commercial companies that provide a broad range of separate free-choice minerals and trace minerals.

We should use our nutritional knowledge to formulate dairy rations, but also rely on the nutritional wisdom of animals to fine-tune their individual needs. It doesn't hurt to have two opinions ... one from your nutritionist's computer and one from the real experts, your cows. I will leave it to you to decide which one is the most reliable.

### **Tools of the Trade. (For Feed News)**

The other day when I had my van in for service, I noticed the fine array of wrenches and other tools available for use by the mechanic. Since I am a guy who feels fully equipped if I have more than one adjustable crescent wrench, I was impressed not only by the sheer numbers of the different tools but also by the specific applications for some of them. Given the necessary skills, the mechanic had all the tools he needed to take apart and put back together the complex engines that power today's vehicles.

I remembered then some things I learned years ago from my good friend and veterinary colleague, Dr. Bob Scott. Bob had a unique way of looking at things and could translate complicated subjects into an easy to understand broad overview using simple analogies. Here is his view of the role of minerals in plants and animals.

Plants are basically made up of air and water. If you combine carbon, as from carbon dioxide with oxygen and hydrogen (also from air or water) you have the basic building block for starch, sugar or carbohydrates. Add nitrogen to this basic formula and you have an amino acid or a basic building block for protein.

If you burn a plant thus reducing it to ash you are left with that part of the plant that came from the soil ... usually around 5 %. Therefore, 95% of the makeup of plants comes from air and water, combined together by the sunshine generated miracle of photosynthesis.

Minerals are nature's "tools" that enables this process to proceed. They are basic to the enzyme systems that catalyze the storage of the sun's energy into the chemical bonds within the plant itself. The major elements are the big wrenches and the smaller ones are the trace minerals. All are essential. Any deficiency or imbalance limits the production and the quality of the crops grown. If some elements are lacking in the soil they will be lacking in the crop. If they are lacking in the crop, they will be lacking in the animal that eats the crop.

When an animal consumes plants the same tools used by the plant to combine the CHO & N to store energy are needed to break down chemical bonds and release energy to power the metabolic processes of life and production. If the plant doesn't have enough built-in tools (minerals), extra tools must be provided. Most of our soils are so depleted in minerals that it is almost a given that some sort of mineral supplementation is necessary, especially to arrive at the high levels of productivity that we strive for today. Without the mineral tools proper digestion and assimilation of the energy in the feeds simply does not take place.

Even without computers, animals are smarter than man when it comes to balancing their individual needs for the elements of nutrition, especially the major, minor and trace minerals. Providing a choice in mineral supplementation allows the animals to pick the tools they need without being totally locked-in to only the tools recommended by the computer.

Most farmers probably wouldn't think much of a mechanic that tried to overhaul a tractor with a screwdriver, a pair of pliers and a couple of crescent wrenches. Unfortunately, in their role as animal caretakers, some livestock men seem to think that a cheap sack of high calcium minerals and a trace mineral salt block are all the tools needed by our livestock to fully utilize the energy stored in our feeds. They are wrong!

## HOLISTIC MANAGEMENT OF UDDER HEALTH

Almost everyone is aware of the basic management practices that are the foundation of animal health in general and udder health in particular. In this article I would like to explore several often overlooked principles and procedures that have a strong influence on udder health.

### CARE OF THE NON-LACTATING UDDER

Drying-off is a critical time for udder health and any extra care given at this time will pay big dividends throughout the next lactation. Prepare the cow for the stressful transition from lactating to non-lactating by using your favorite herbs, homeopathy preparation, colostrum products, acupuncture, or others to boost her immune system and help relieve stress.

After this period of preparation, just quit milking her. She must have a tight udder for about five days for her hormonal system to get the message to quit producing milk. Milking her out to relieve the pressure and discomfort before this time is up only prolongs the process.

After about five or six days, when the udder swelling begins to recede, sanitize the teats and milk out some milk. Normal appearing milk indicates a healthy udder. If this is the case, completely milk-out the udder, sanitize the teats and rejoice in the knowledge that for now at least the udder is healthy. Occasionally at this time the milk will show abnormalities such as chunks, clots, watery, slimy, bloody streaks or anything that does not look like normal milk. In that event, milk out the udder, begin your treatment of choice and rejoice that you have discovered the problem before it gets worse. Continue the treatment, check the milk and strip out the udder every few days for as long as necessary to clear up the problem. If you let her go completely dry while she has an infection, she will almost certainly have the same problem when she freshens.

If drying-off was accomplished successfully, the next critical time for the udder begins about two weeks before freshening and continues until a week or so afterwards. When she begins to “bag-up“ and has a tight udder, sanitize her teats, milk out some milk and examine it. Early in the “bagging-up” phase, normal secretion will usually resemble a clear amber fluid somewhat like honey and progress from that to regular milk as she gets closer to calving; If normal, be happy.

If the secretion is not normal ... chunks, clots stringy, slimy or bloody ... milk her out completely and begin your favorite treatment. Continue to milk her twice a day until she freshens. This “Pre-milking” procedure will save many udders that would normally be lost if the infection was allowed to go unchecked all the way to calving.

Colostrum is produced shortly before calving. Save the milk right before and after calving and give it to the calf. It will provide all the protection they need even though the volume will be less.

These procedures provide a way to check the status of the udder at key periods during the dry period and allow you to begin remedial action if and when a problem occurs. If you follow these procedures you will know 100 percent more about udder health than those that only infuse with antibiotics at dry-off and then wait until freshening to see if it worked or not.

### **INSURE A GOOD ‘LET-DOWN’**

The best stimulus to the “let-down” reflex mimics the suckling of the offspring ... warmth, moisture, some pressure or massage, and removing milk. When these stimuli are applied as the cow is prepared for milking, oxytocin is released. Within a minute, myo-epithelial cells surrounding the alveoli contract, thus forcing milk out into the duct system. If milking is delayed past one minute oxytocin begins to clear the system and the let-down reflex does not proceed to completion. If one does not “prep” adequately and does not begin milking within one minute, milk yield decreases and “residual milk” increases. Residual milk makes great food for bacteria. The more you leave in, the higher the chance for infection. (see Streptococcus below)

### **EVALUATION OF UDDER HEALTH**

One of the best way to evaluate udder health is routine culturing (bacteriologic examination) of milk from any animal either showing mastitis or lower than normal milk production. Over time, these reports will allow you to arrive at a herd profile of the type infection present. Results interpreted on a herd basis rather than on an individual basis are of great value in managing the herd for maximum health. Culture reports will not be meaningful if the samples are contaminated. If the germ that ends up in the tube comes from your hand or from a teat that was not properly cleaned, you could be misled into thinking it was the organism causing your problem. Contaminated samples are worse than no sample at all. Results of culturing must always be correlated with symptoms. If an animal has been treated with antibiotics in the previous 10 to 14 days as the results will usually be negative.

### **CULTURE INTERPRETATION**

Almost any bacteria can cause mastitis under certain circumstances, but most mastitis is caused by Staphylococcus, Streptococcus, Escherichia coli and Enterobacter (Aerobacter) aerogenes. It is not known why at times these bacteria become virulent but stress is certainly a factor. If a high percentage of samples reveal the same pathogen, this is presumptive evidence of a cause and effect relationship between the pathogen and a specific environmental influence. These relationships are not absolute but they do provide clues about where to look first for answers. The following guidelines may help you match your problem to it's cause.

## STAPHYLOCOCCUS

Staphylococcus bacteria have the ability to invade living tissue. Any physical damage, however slight, to body tissues opens the door for Staph infection. Of all the bacteria, Staph seems to have the greatest ability to quickly become resistant to antibiotics. Confirmation of this lies in the high incidence of post-surgical, antibiotic resistant, staph infections in humans. This condition is even known as "a hospital staph infection."

In dairy situations, two common causes of injured tissue that may lead to a Staph infection are improperly adjusted milking equipment and the use of irritating teat dips. Frostbite, stepped-on teats and other injuries may also be predisposing factors. Don't overlook the possibility of trauma just because you milk by hand. Hard stripping or milking entirely by stripping with wet hands can also damage the teat lining and open the door for Staph infection.

If you have an ongoing problem with Staph infection, look for anything that causes injury to the teats or udder.

## STREPTOCOCCUS

Streptococci are not generally invasive but live on the surface of the udder tissue and in residual milk that is always present in varying amounts in the udder. Strep infection is generally seen when good milking techniques are lacking. It can also be associated with stray voltage or any other problem that interferes with milk let-down.

If you have an ongoing problem with Strep infection, look first for anything that interferes with "let-down", "milk-out" or anything else that increases residual milk.

## ESCHERICHIA

Escherichia coli ... known as the manure bacteria ... is found in all feces. Thus, mastitis caused by this bacteria is usually associated with unsanitary conditions. Some observations seem to indicate a higher incidence of E. coli when the ration contains excess protein, high levels of nitrates in feed or water or the addition of urea or other NPN's to the ration.

If you have an ongoing problem with E. coli infection, look for anything that causes unsanitary conditions and check the water for nitrates and the feed for nitrates or excess protein.

## ENTEROBACTER

Enterobacter (formerly Aerobacter) aerogenes is often related to contaminated drinking water especially if animals have access to unsanitary water tanks, ponds, streams or puddles in the barnyard.

If you have an ongoing problem with this infection, first check for the possibility of a contaminated water supply.

Some laboratories report E. Coli, Enterobacter and other Gram-negative simply as "coliforms." If a culture report lists any of these, I would strongly suggest culturing the water if you have not already done so. If the water is contaminated, remedial action should be taken at once.

Corynebacterium mastitis is sometimes seen in herds that have a problem with abscesses.

## **MASTITIS: TREAT THE CAUSE, NOT THE EFFECT.**

After spending so much time on bacteria, I should point that it is a mistake to approach mastitis strictly as a bacterial problem. There is no question that bacteria are part of the problem, but I believe their role to be more of an effect rather than the actual cause. Simplistic medical thought encourages us to treat the bacterial infection ... the effect, while holistic principles would have us zero in on the cause, which is usually a stress induced immuno-suppression.

I question whether anything should ever be infused into the udder, except possibly as a last resort. Even under the most sanitary conditions, the risk of introducing pathogens into the udder far outweighs any anticipated benefit. If one must infuse the udder, use a blunt infusion cannula and only insert it about one-fourth inch (just past the teat sphincter). Inserting the cannula to the full depth ... almost an inch in some cases ... is known to cause internal damage to the teat lining. Never use an injection needle.

Also consider this, any foreign substance (honey, egg-whites, lactobacillus cultures, other folk remedies and antibiotics) introduced into the udder will act as an irritant and cause a non-specific inflammatory response (NSIP), with a concurrent increase in white blood cells. The common result is that the NSIP will sweep away any mild mastitis infections along with the foreign substance that originated the NSIP. I believe it is a mistake to speak of these irritants as “cures” when actually the relief from the symptoms of mastitis is a secondary effect of the body ridding itself of the foreign substance. This is not to say that these therapies are not often effective, but I believe it is helpful to know the actual mode of action and the great risk of causing a more severe infection.

One of the best ways to treat mastitis is to strip out the affected udder as often as you can ... even as often as every 15 to 30 minutes if possible. This has the effect of removing bacteria and their toxins, reducing swellings and improving blood supply. You can augment this procedure with your favorite alternative immuno-stimulant such as homeopathy, herbs, acupuncture, refined colostrum antibodies, massage with warming liniments, hot or cold compresses, etc.

Whatever the nature of the treatment used, it will usually be unsuccessful until the adverse predisposing factors are removed. When that is accomplished the incidence of clinical mastitis and the need for treatment diminishes dramatically.

## Hey, Doc, waddaya got for \_\_\_?

Questions & Answers from a holistic point of view.

Originally printed in the June 2007 issue of the Progressive Dairyman. Used here by permission.

“Hey, Doc, waddaya got for mastitis?” is a question posed by dairymen everywhere. I wish I had a good answer. Treatments range from frequent stripping out of the udder to the newest antibiotic or immune stimulant. Fortunately, many treatments are successful. But some treatments only suppress the symptoms and when the effect of the treatment wears off the symptoms return with a vengeance. Unfortunately, any success with treatment often interferes with the need or desire to address the actual cause of the problems. Holistic veterinary medicine may have some insights into this problem, insights that are often overlooked by today’s dairymen.

I think holistic practitioners approach problems with a different mindset. They try to look beyond the immediate symptoms and look for and remove any predisposing cause or causes. They view the patient not only as an individual but also as a part of the ecosystem in which it lives. Finally, a true holistic practitioner will emphasize holistic animal health management (proactive) in addition to just treating the symptoms (reactive), whether the treatment is holistic or conventional. All dairies have constraints imposed on them by natural principles and the innate nature of the cow. One can either manage according to these principles and enhance animal health and profit or disregard these principles and reap the consequences of impaired herd health. Holistic vet medicine is not about new, high technology or old, low technology, but it is about appropriate technology. It is definitely not the conventional system, minus the drugs, nor is it just the replacement of a conventional treatment with a natural remedy.

Let me give you an actual example. I recently received a phone call from a veterinarian who has been working with an organic herd that has a mastitis and high SCC problem. Milk cultures consistently revealed strep bacteria. Since this was an organic herd his treatment options were limited. He had tried various treatments including herbs, tinctures, homeopathy and colostrum whey products ... all had little effect. He had consulted with an “organic” vet at a university and received the standard conventional recommendations; identify the problem animals, milk them last, sell the really bad ones and treat the rest with whatever their certifier allows. Good advice, but only a Band-aid. It manages the symptoms but not the cause. As our conversation proceeded, I asked him a couple of questions.

Have you checked for stray voltage?

How long after prepping begins are the units attached?

He had not checked those items but he did his homework and later reported that their electrician did not find any stray voltage. However, he had timed the interval between initial prepping and putting on the units to be somewhat over 4 minutes ... way too long!

All good dairymen know how important it is to properly prep cows. The best stimulus to the “let-down” reflex mimics the suckling of the offspring ... warmth, moisture, some pressure or massage, and removing milk. When these or similar stimuli are applied as the cow is being prepared for milking, oxytocin is released. Within about a minute, myo-epithelial cells surrounding the alveoli contract, thus forcing milk out into the duct system. If milking is delayed much past one minute oxytocin begins to clear the system and the oxytocin reflex does not proceed to completion. If one does not “prep” adequately and does not begin milking within one minute, milk yield decreases and “residual milk” increases. As a general rule, anything that interferes with the initiation or completion of the oxytocin reflex results in excess residual milk in the udder. Residual milk is not milk that could be removed by extra stripping but milk that has not been fully expressed from the alveoli.

Residual milk provides an ideal medium for the growth of bacteria. If culturing reveals, streptococcus as the predominant bacteria there are two main areas that need to be checked ... stray voltage and improper milking procedures especially prep time. If there is stray voltage present and the cow anticipates getting shocked when she enters the milking area or when the units are attached she will be stressed and fearful. The resulting release of adrenalin interferes with the initiation of the oxytocin reflex, the animal does not 'let-down' her milk, production goes down and residual milk is increased. If cows are jumpy in the barn or have a high incidence of strep mastitis it is wise to check for stray voltage. If you can measure it, then take steps to get rid of it. The results will speak for themselves.

If milking procedures are not choreographed to insure that milking units are attached to the cow and taking away milk within about 60 seconds after the start of prepping the oxytocin reflex will be impaired, residual milk will increase and thus 'open the door' for strep mastitis.

Here's another example. An older couple was milking cows in a double 12 parlor that had been built when the kids were helping with the dairy. The kids were now gone and the dairyman fed and cared for the cows and his wife did the milking. They were plagued with strep mastitis. They had tried a multitude of antibiotics and many natural products without much success. I visited the dairy at milking time and watched the milking routine. With only one person milking they would load only one side of the parlor with 12 cows. Then this wonderfully meticulous lady would thoroughly wash and prep all 12 cows before attaching the unit to the first cow prepped ... about 12 minutes later. I was able, after a time, to convince her to adjust her routine so that each cow had a unit attached in about 60 seconds after prep started. In only a few days their strep problem was much abated.

Many factors are involved in managing and treating mastitis. In the above instance the overriding predisposing cause was failure to understand and conform to the basic physiological makeup of the cow. When that was corrected the problem corrected itself. In addition to the most obvious predisposing factors, we also need to consider anything that puts the animals under stress or depresses the immune system. No treatment will be really effective until the cause is removed or reduced.

"So, Doc, waddaya got for mastitis?" Oddly enough, if the cause of the problem has been removed, the same natural therapies that did not work before will probably now be effective. Colostrum whey products, acupuncture, tinctures, herbs and homeopathy are all effective when applied by knowledgeable practitioners in herds reasonably free from stress.

The thoughts expressed here are my opinions based on almost 50 years of experience in veterinary medicine, both as a conventional veterinary practitioner and as a holistic dairy consultant. I know some folks will disagree. That is their privilege. I only try to explore options from a holistic mindset and then look for confirmation from the real experts ... in this case the animals in our charge. If we are attentive in our observations and interpret what we see with a holistic mindset we can learn a lot from cows. And always remember ...

"No problem can be solved until all its causes are understood."

## EVALUATING RESPONSE TO TREATMENT

An ocean storm had caused hundreds of starfish to be stranded on a beach where they would soon perish. A man walking on the beach would stop every few steps, pick up a starfish and fling it back out into the waves. His companion ridiculed his efforts and observed that statistically his puny efforts would make little if any difference to the starfish population as a whole. Undaunted, the man tossed yet another starfish into the sea and replied: "It'll make a big difference to this one!"

I believe this same attitude should apply when treating animals. Even though a negative statistical analysis of one alternative treatment modality may cause some to scoff at and demean all holistic endeavors ... the fact remains, most of the time they work, and "It makes a big difference to that one!"

Research statistics aren't really all that useful anyway. Most drug research is akin to insurance company actuary tables, which can project how many houses will burn down in a given time period and area but cannot tell you exactly which houses will be destroyed. In the same way, drug advertisement may tout a 60% effectiveness but only the response to treatment will tell you if your animals are in the 60% group or the 40% group. In my opinion, the only valid way to evaluate the success of any treatment is ... did it work for you or didn't it.

I did not arrive at this pragmatic outlook in the sterile confines of a library, a laboratory or a classroom but in the rough and tumble arena of a general farm veterinary practice. Your success as a vet was judged on the basis of results ... did the animals get better or did they not? If you were called to treat an animal and it got better the owner would probably consult you again should the need arise. If it did not get better, the next time they needed a vet they'd probably call some one else. It didn't help at all to quote figures from the latest drug company research that indicated that the drug should have worked at least 60 percent of the time.

Then, as now, a plethora of veterinary drug salesmen called on veterinary clinics to offer the latest fruits of modern veterinary science ... a new more powerful antibiotic, the broader spectrum vaccine, a better insecticide with fewer side effects. Being more gullible in my younger days, I fell for their sales pitch. Occasionally their products would perform as promoted and I would continue to use them. Unfortunately, a lot of the pharmaceuticals and vaccines were not consistently effective and many caused a variety of side effects guaranteed to make a practitioner look bad. Needless to say, these were seldom used again.

After a few years of less than optimum results with conventional medicine I began to take a closer look at alternative folk medicine as practiced by animal husbandmen for centuries. Some were out and out quackery ... but many were based on years of sound empirical observation and made a lot of sense. As I cautiously began to use some of these old folk remedies in my practice I found that many of them worked as well or better than conventional treatments and were a lot less expensive.

Let me give you an example. A short time after I graduated from Vet school, a good friend called me about his mare. Her front legs were so grossly swollen from the knees down that they looked more like tree stumps than legs. Confidently, I opened my

medicine bag of modern drugs and began treatment. I used antibiotics; I used anti-histamines; I used enzymes; I used steroids ... alone and in every combination imaginable. I gave it all I had for over a week and nothing worked, if anything she got worse.

Finally we took her to the University Vet Clinic. One of my former instructors (one that I had always considered to be old-fashioned and outdated) was assigned to the case. He looked briefly at the mare and gave me a bottle of an old-time remedy, "Dr. X's Leg Brace." His instructions were, "Wet her legs down with this, and cover it with cotton batting and a leg wrap. Do it again in 24 hours, if you need to. She'll be OK in a couple of days."

As we were leaving, his good-natured parting shot to me was that I must have missed his class on the day he lectured on this condition.

So, as a last resort, I followed his instructions. By the next morning, only 12 hours later, the swelling had diminished so dramatically that the bandages had peeled off like a loose sock and were laying loose in the stall. I treated her one more time and she made a complete recovery.

What was in the medicine that worked after every modern pharmaceutical had failed? ... Fluid extract of Belladonna, witch hazel and glycerine in a base of rubbing alcohol.

To this day, I don't know the cause of the swelling nor can I explain how or why the old remedy worked, but I do know this ... "It made a big difference to that one!"

Critics might say, "Why, that stuff couldn't have done anything, she probably recovered on her own." or "The original drugs finally began to work." To them, any possibility, no matter how far fetched, would be more acceptable than admitting that an old folk remedy had actually worked.

The truth is that conventional medical science today is not far enough advanced to critically evaluate most alternative treatments. Holistic modalities, by their very nature, cannot be analyzed or explained using conventional thinking. Unfortunately, many so called scientists disparage anything they cannot explain. The bottom line is; whether animal or human, holistic or conventional; patient response is the only meaningful way to evaluate the efficacy of any treatment.

## TREATMENT RESULTS

An old drug response rule-of-thumb states that 25% of recipients will show no response, 50% will show a beneficial result of one sort or another and the remaining 25% will show a greater than normal response (adverse reaction). Obviously, these percentages can vary considerably. Holistic therapy may show a marginally greater incidence of no response but compensate by having almost no side effects. Let's take a closer look at the 5 possible outcomes of any treatment.

1. NO RESPONSE. It is rare for treatment to have absolutely no effect. I believe there is almost always some effect even though it may be so slight or subtle that it does not manifest itself by any observable change in the patient's symptoms or condition.

2. SUPPRESSION OF SYMPTOMS. At first, this sudden cessation of symptoms may make the Doc or the drug look pretty good. The casual observer may even believe that a cure has taken place. However, in the long term, the patient fails to fully recover and other, more serious symptoms may appear later on. Some Vets may consider this new set of symptoms to be a separate condition but a holistic care giver recognizes them as an indication that the underlying problem has not been corrected but only covered up. Do not confuse suppression of symptoms with the diminution of symptom as true recovery takes place.

3. PALLIATION or ALLEVIATION is considered by some to be the most common response to treatment. The severity of the symptoms is reduced or abated, but only as long as treatment is continued. When the treatment “wears off” or is discontinued, the same old symptoms reappear. To maintain relief, it is often necessary to repeat the treatment at more frequent intervals and at higher doses. No cure takes place and the patient fails to do well overall. This response can be very costly to the owner but lucrative for the practitioner.

4. A COMPLETE CURE is the ultimate goal. When this does occur, the results are astonishing. The response is much more than can be explained merely by the removal of symptoms. Health, vitality and productivity are improved even in areas seemingly unrelated to the original condition. Even with this increased vitality, some symptoms may linger for awhile longer. Remember it takes time for a complete recovery to take place. Chronic disease doesn't develop overnight nor does the body heal itself over night. When a complete cure does occur, the transformation in the vitality of the patient often exceeds all expectations.

5. ADVERSE REACTIONS or SIDE EFFECTS. Adverse drug reactions are common with modern pharmaceuticals and range from mild allergic reactions to anaphylactic shock and sudden death. More and more long term detrimental effects to individuals and the environment are also becoming apparent. According to a recent article in the Journal of the American Medical Association, adverse drug reactions are responsible for 140,000 human fatalities in the U.S. every year. If livestock owners continue to use modern drugs I would suggest that they obtain a supply of epinephrine from their Vet along with instructions on how to use it to treat drug reactions.

Adverse side effects from holistic medicines or procedures are uncommon. Those that do occur are mild and non-fatal, unless, of course, they are the result of gross negligence or ignorance.

Keep in mind that occasionally, what appear to be adverse side effects may occur as part of the normal healing process. Many times the recovering patient will go through a ‘healing crisis’ before complete recovery takes place. During this ‘crisis’ symptoms may intensify as the body begins to rid itself of toxins as healing progresses. An example of this is often seen when treating mastitis. As the udder begins to heal and the swelling recedes, the formerly dammed-off abnormal milk, pus and tissue debris is released. The sudden appearance of this “gargot” in previously normal looking milk causes the

uninformed to think the mastitis is getting worse when in actuality it is only the body's way of cleansing itself.

### **IN CONCLUSION**

Practitioners of the healing arts need to be skilled in the use of a variety of therapies and sensitive enough to know which ones will best serve the needs of each individual patient. When making this choice it is also their responsibility to take into consideration the short term and long term effects on the patient, as well as the ultimate effects on the local and global environment.

The real challenge to a good practitioner is to know how to choose the treatment that will be of most benefit to each individual patient.

The real challenge to the owner is how to realistically evaluate the response to treatment.

For each of them, this is an art more than a science.

## A WAY WITH ANIMALS

Everyone in the county seemed to know that Jim had “a way with animals”. He was the herdsman for a large purebred beef cattle ranch on the edge of town. His ability to raise calves was legendary.

People started telling me about Jim soon after I began practice in the area. As a young, new graduate from vet school, I didn't expect to be called to such a grand operation anytime soon. But shortly after I opened my office, Jim called me to come out and as he put it, “help him with a sick calf”. It developed that he had already done about everything that could be done but he opined that maybe I could give the calf an IV or something to keep his strength up. To this day I do not know if he called me because he might be able to glean a bit of useful knowledge from a new graduate or because he just wanted to give me a trial run. If it was a test, I must have passed because he continued to call me as the need arose. Over the years, I learned a lot from Jim. He didn't have any secret potions, no magic herbs, no tricks up his sleeve ... he just had “a way with animals!”

Looking back, I am thankful that he gave me a chance to further my own veterinary education by watching a real animal “healer” at work. Jim's most important lesson was that there is a lot more to healing than surgery, drugs, antibiotics, IV's vitamins, herbs or anything else on the physical plane. He showed me that there is another whole dimension to healing ... that of a caring touch that carries with it an inexplicable transfer of healing energy from the healer to the patient. I can't explain it, I don't even have a good name for it, but I know that it exists, for I have seen it at work.

Our modern medical science has not yet advanced far enough to quantify or explain this type of healing. Without “scientific proof” many will scoff, ridicule and label as quackery anything that they cannot explain. So be it. To any one who has experienced this phenomenon, no proof is necessary: and to those who have not experienced it, no proof would be acceptable anyway.

## MIND/BODY CONCEPT

The first book I read on this subject was “An Anatomy of an Illness” by Norman Cousins, in which he explores the role of humor and a positive mental attitude in his own recovery from a serious disease. Since then there have been many investigations into this mind/body relationship showing that the mind can influence the body in which it resides. If you can accept that, then it's not too great a stretch to accept that it is also possible for a mind to influence a body in which it does not reside.

This knowledge goes back into antiquity. In Biblical times there was the admonition; “Is any sick among you? Let him call for the elders of the church; and let them pray over him, anointing him with oil ..... and the prayer of faith shall raise him up.” (James 5: 14-15)

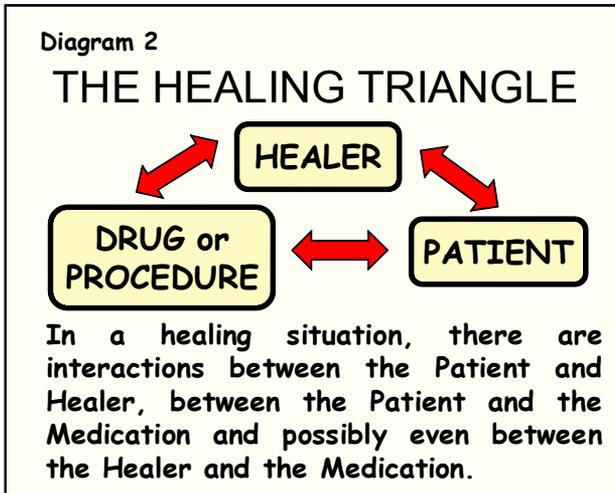
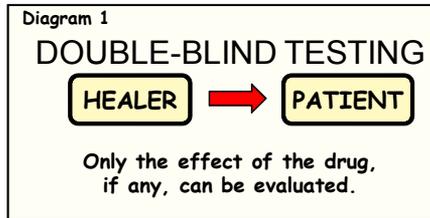
Over twenty centuries ago a Roman treatise on agriculture, ‘De Re Agricola’ used the phrase ... “The master's eye doth fat the ox, his foot doth fat the ground”. I interpret this to mean that in order to have healthy and productive animals or crops the master must be intimately involved in caring for both.

On a more modern note, Dr. Marvin Cain, a renowned equine acupuncturist, made this short but sage statement ... “Thoughts are things.” He went on to explain that the positive intent or attitude of the practitioner toward the patient was, at the very least, an aid to any treatment and at best a powerful healing force in it's own right. He also cautioned that a negative intent or attitude could be deleterious to healing.

## THE HEALING TRIANGLE

or the fallacy of double-blind testing.

An essential part of modern medical research is the double blind test to establish a drug's effect. Everything is done to eliminate any bias on the part of the researchers. The results of the test group compared to the control group (which may or may not have received a placebo) gives an accurate indication of the drugs usefulness ... or so it would seem. In reality, the test only establishes the relationship between the drug and the patient. See Diagram 1.



A more complete picture of healing is shown in Diagram 2, which portrays the influence of the practitioner on the patient, on the medication and ultimately on the entire healing process. If a Doctor treats a patient and administers the drug with the same clinical detachment present in the test, s/he has failed to utilize a most important assist to healing. And if s/he relies only on tests and sight and never touches the patient, s/he is missing one of the best modes of communication, diagnosis and treatment.

This explains why some practitioners have great success using a drug or procedure that has been "proven" by double blind research to have no effect.

It could also explain why folks who believe in the beneficial effects of DE have good results using it as a wormer, while those with a negative attitude toward DE have negative results. Unfortunately, for some "scientific" types, knowledge often gets in the way of wisdom.

It also explains why retroactive studies of patients who received a particular drug as part of a treatment program by a caring physician may show a markedly greater success rate than would be indicated by the double blind study.

### **Some random observations ...**

People that have 'a way with animals' tend to employ a more hands-on approach to healing such as chiropractic, massage and acupuncture. Acupuncture diagnosis, is based in part on noting the response when touching certain points on the body. It is a sort of a Braille reading of the animal's state of health.

I believe that this gift of healing is somewhat species specific. A Vet could be fantastic with cattle and lousy with horses, not because of a lack of knowledge but because of a lack of empathy. Most people (vets included) have differing levels of affinity for different species. I know I did ... I could do almost anything with horses but would frequently get clawed by my cat patients.

I have heard livestock owners occasionally complain that their Vet doesn't like or isn't real good at treating certain species, such as horses, goats, pets or others. This may be true, not because they don't like these particular animals but because their inexperience with them may make them uncomfortable or even apprehensive when they are called upon to treat them. A fearful or suspicious attitude on the part of the owner only increases the Vet's feeling of discomfort or inadequacy. For whatever reason, if your Vet feels uncomfortable or even mildly fearful treating certain species his/her results will probably suffer.

Whether a person has a positive or negative attitude towards animals is especially important when hiring someone to care for your animals such as a vet, a herdsman, a milker or a trainer. If a person is locked into a position dealing with livestock and is apathetic or has negative feelings toward his job, the animals will sense this and that person will probably never be a good herdsman or develop any intuitive healing skills.

### **CAN A HEALING TOUCH BE DEVELOPED?**

I believe that almost everyone has an innate healing ability, but not all at the same level. Some, such as horse whisperers and natural born healers have this gift at a very high degree. Others may have this talent at lower but still very effective levels. This ability will probably never surface if you do not believe in it or if you never have occasion to need it. As with many skills, this one is enhanced by use.

### **TO CULTIVATE "A WAY WITH ANIMALS"**

You must have as least a partial acceptance of the concept that a positive mental attitude can affect the health of your animals and you must have a positive expectation that you can develop this ability.

You must eliminate all fear or negative attitudes towards your animals. It is well known that animals can detect fear in humans and will often take advantage of this fear by becoming more aggressive. If you are fearful you will not be able to develop the rapport necessary for a healing touch. You must be at ease around animals and enjoy working with them.

You must watch and study your animals as they relate to members of their own species. To the extent that you can mimic their intra-species body language they will be more comfortable in your presence and you in theirs.

You must establish a physical bond with your animals by grooming them, touching them and petting them as often as possible.

Above all else, to have "a way with animals" you must remember that "thoughts are things"!

## A Holistic Veterinarian Looks at Equine Nutrition

In the 1950's they didn't teach much about animal nutrition in veterinary school. At that time, mineral supplementation, if any, was generally in the form of salt blocks; mostly white but some were yellow or brown and contained low levels of some trace minerals. For those that did provide extra minerals, a mixture of equal parts of ground limestone, steamed bone meal and salt was considered adequate.

In the early 1960's the feed store next to my Veterinary office began marketing minerals that were formulated to be fed individually and free choice in a 'cafeteria' style feeder. The salesman for that company spent a lot of his time trying to convince me how good that program was but most of his wisdom fell on deaf ears. Finally, he offered to provide some minerals for my small group of horses and cattle as a trial. I agreed and the next day we went out to the farm and put out several different minerals into some wooden compartments we installed in an old feed bunk in the pasture. I checked the feeder a couple of days later and was astounded that while some of the minerals were relatively untouched, others were totally consumed, some of the wood used in the partitions had been chewed on and the animals were hanging around the feeder as if waiting for the next course.

These results were interesting enough that I decided to provide the entire mineral program. Consumption was high at first but tapered off as the mineral reservoir was filled. The amount eaten and the preference for different minerals changed with the season as the nutrition provided by other feeds changed. A change in the source of hay would result in changes in the consumption pattern within a day.

At this time I had a stallion standing at stud and I would board the mares until confirmed pregnant. Upon arrival they would eat a lot of minerals in the first week or so as they replenished their mineral reserves. All these mares had a very successful conception rate.

From these early experiences, and observing this method of mineral feeding over the decades, I am convinced that free choice feeding of individual minerals and trace minerals should be the foundation of all livestock nutrition and mineral balance is indeed, one of the main foundation stones for animal health and productivity.

Horses as we know them today evolved in or were adapted to rather severe survival environments. As prey animals their survival depended upon their ability to quickly identify and flee from the predators that plagued their daily lives. Their diet consisted of forages that by today's standards would seem to have little nutritional value, yet they thrived. Today, we consider that we have improved their diet, in fact, equine rations as currently fed often result in poor health and lower life expectancy. [There are several reasons for this.](#)

[Most feeding recommendations are made for the "average" horse, which means that it is probably not really optimal for any individual. Then too, equine rations are often formulated according to "open" as opposed to "closed" formulas. In 'closed' formulas the ingredients are set and do not vary from batch to batch, thus insuring a consistent product even though the price may vary according to market forces. On the other hand, 'open' formulas allow ingredients to be changed at will to maintain the lowest cost that will still result in the same guaranteed analysis listed on the tag. Horses do not produce an abundance of digestive enzymes and a constantly changing, low-cost diet is not conducive to healthy and efficient digestion. As a final insult, the disadvantages of this "open formula" feed and the "one-bag-fits-all" concept are further compounded by the fact that the ingredients used are usually commodity by-products.](#)

As noted above, we tend to provide too much of what we think they need (many times leading to too rich of a diet and/or one not suited to their needs) and often neglect the essentials ... minerals and trace minerals in natural balance.

In addition to a diet composed of natural feedstuffs, minerals and trace minerals should be provided free choice, individually and separate, so that horses may satisfy their individual needs. [A source of pre-biotics to supply needed digestive enzymes is also beneficial.](#)

To fully understand the why we need mineral supplementation in today's livestock we have to examine the changes wrought upon them by modern animal husbandry. Although the focus here is on horses, these principles discussed apply equally to all species of domestic animals.

In the wild, horses were free to roam over wide and divergent areas. Soils in each area were about as fertile as nature could make them limited only by the mineral content of the underlying soil strata. The animals that inhabited these areas were ideally adapted to the plant life upon which they grew and thrived. There were a multitude of different plant species available and the individuality of these various plants in their ability to absorb and concentrate different minerals and trace mineral gave the grazers another opportunity to balance their nutritional needs. Specific imbalances or deficiencies of minerals in the soil in one area would be compensated for by excesses or adequacy of the same element in other areas. Thus, over a period of time they could seek out and obtain balanced mineral and nutritional needs.

The environment of our animals today has changed a great deal from their wild state. There are 4 major factors that contribute to the need for mineral supplementation.

### Soil Depletion.

Every crop harvested or animal removed from a farm or ranch takes with it a finite amount of life supporting nutrients. Unfortunately, our attempts at replacement of these elements fall far short of being complete. Some of the major elements are replaced but trace elements, organic matter and biological life are drastically depleted. As soils become depleted more need for minerals, especially trace minerals, was apparent. After WWII the rate of soil and crop mineral deficiencies accelerated along with the rapid growth of NPK (nitrogen, phosphorus and potassium) fertilizer. Higher yields were achieved but nutritive values and mineral content declined.

### Confinement.

The ability of an animal to seek out and consume suitable diets has become more and more restricted. Some animals are in total confinement and hardly ever see the light of day. They are totally dependant on their owners to provide everything they need. It is difficult, if not impossible, to provide a truly balanced ration without some input from the animals involved.

## Lack of nutritional diversity.

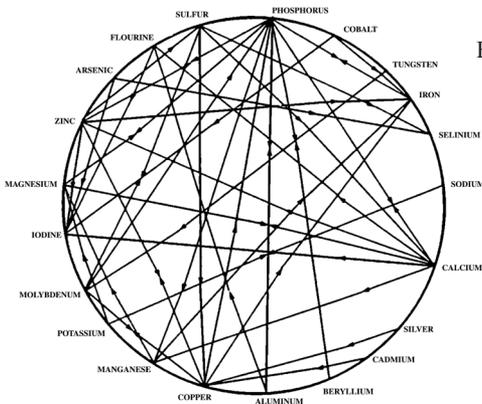
In a natural grazing situation herbivores had hundreds of different plants from which to choose. Most modern rations today are limited to 6 or less: grass, alfalfa, corn, oats, barley or processed or manufactured feeds. Seeds and grains in the amount currently fed are not suitable for all horses.

## Forced reproduction or performance.

No two animals have the same needs. Variables such as breed, age, pregnancy, relative balance of other nutrients in the basic ration, weather, season of the year and many others have a marked influence on an individual animal's need for mineral supplementation.

Mineral imbalances are difficult to correct. True, we can add various minerals to our rations but hoping that the computer will balance a ration for individual needs is wishful thinking. It is a common practice for nutritionists to use a blanket approach to mineral and trace mineral supplementation. Any gross excesses thus created can result in relative deficiencies of other trace minerals. Either excesses or deficiencies can have serious metabolic side-effects. For example, high Iron ties up Copper, Cobalt, Manganese and Zinc ... all essential to immune response.

An illustration of the complexity of these relationships can be seen in the accompanying "Mineral Wheel."



## MINERAL WHEEL

Based on research by several investigators, these mineral interrelationships appear to be well established.

**How to Interpret the Mineral Wheel**  
If a mineral has an arrow pointing to another mineral, it means a deficiency of that mineral or interference with its metabolism may be caused by excesses of the mineral from whence the arrow originates.

## “AVERAGE” IS A MYTH

Perhaps the best reason for providing a free-choice individual mineral program is to move away from the “all-in-one-bag” concept. Each bag contains the industry standard feeding strategy that purports to provide, in one total mix, all the nutrition required by the ‘average’ horse. Probably none will get exactly what they need. A few may get pretty close but many will be lacking in some nutrients, while others will have excesses.

The all-in-one-bag concept fails to consider the individuality of each animal’s nutrient requirements. This not only limits their performance but also eventually limits their immune response and ultimately may result in various animal health problems. The main benefit of a Free- Choice individual mineral program is that it allows each animal to satisfy it’s own specific needs for a balanced intake of minerals, vitamins and trace minerals.

### Why Guess What Your Horse Needs?

The variations of condition and stress have shown that the demand for micronutrients is constantly changing. Force feeding micronutrients often overloads the liver and kidneys, which need to be at full capacity during high physical output. Anyone concerned about the wellbeing of their animals and especially the serious competitive horse owner should not guess at the micronutrient requirements of their horses.

To achieve the ultimate in equine health and performance:

- Provide a daily source of digestive aids such as natural enzymes and beneficial bacteria.
- Provide free choice minerals and trace minerals.

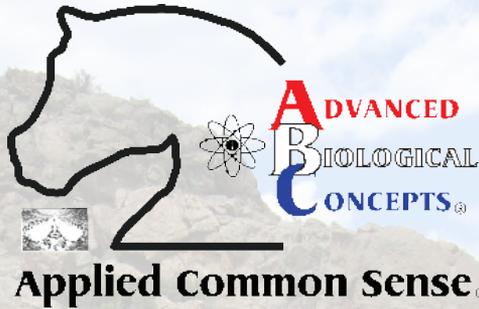
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