

FARM REPORT



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AT MINER
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DEC. 5, 2018!**

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FROM THE PRESIDENT’S DESK: ARE YOUR COWS LEFTIES OR RIGHTIES?

Sidedness in behavior – known scientifically as laterality – is commonly observed with dairy cows. Cattle express laterality naturally when choosing which side to lie down or which side of the milking parlor to enter. Over the years we’ve realized that this preference for one side over the other actually reflects cerebral specialization of the left and right hemispheres. For instance, the right hemisphere of the brain handles fear and anxiety (i.e., negative emotions); the left hemisphere processes positive emotions and longer-term memories.

Because of this relationship between laterality and the very different functions of the right and left hemispheres of the brain, behaviorists believe that expression of a side preference is related to the cow’s emotional state and what they perceive as stressful or even threatening in a given situation.

A study on laterality led by Australian researchers caught my attention in the latest issue of Applied Animal Behaviour Science (2018. 207:8-19). They assessed the emotional state and level of stress in dairy cows using a “forced lateralization test.” This sounds complicated, but essentially the cows were asked to decide which side of a person to pass on when walking down a barn lane. The person

was someone they had never seen before. They stood in the middle of a return lane where cows exited the parlor following the afternoon milking. The lane was 14.1 ft wide and about 77 ft long.

Here’s how they interpreted the choice made by the cows: If a cow passed the novel person on the right side, viewing them with their left eye, which is connected to the right brain, that indicated that the cow was more susceptible to stress and anxiety based on the known biology. Of course, the opposite would be true of cows passing the person on the left side. Previous research shows that most cows, and especially subordinate ones, preferentially use their left eye to view a situation or person that they see as a threat.

So what did they observe during the forced laterality test? Cows that passed on the right side, using their left eye to view the novel person, were more likely than those that used the left side to be anxious and raise or tuck their tail, sniff the ground, and walk more slowly. In addition, the cows that passed on the right side were more likely to pass by without turning to look at the person, they typically passed in single file, and

See **LATERALITY**, Page 3

“CALF”ETERIA MENU CHANGES FOR THE WINTER

As the weather turns colder there’s been a more frequent addition to our daily lunch menu from the Miner cafeteria: hot soup! On those colder days I’ve seen a lot more

people enjoying a cup of soup to help warm them up after being out in the cold. Similarly, as it gets colder you might observe that your older calves are eating more of their starter to help meet their energy requirements. But what about your youngest calves?

Calves less than 3 or 4 weeks of age are probably not consuming enough starter to really contribute to their energy requirements. The youngest calves on your farm are completely dependent on the nutrients consumed in their milk or milk replacer. As the temperature drops it becomes more challenging to meet nutrient requirements for not only growth but also their basic maintenance requirements.

The thermoneutral zone of a calf under 3 weeks of age is between 59 and 77°. Below this and the heat that a calf produces is equal to the amount of heat lost and the calf experiences cold stress. Therefore, to maintain body temperature, the calf must either consume more energy or the calf will be forced to use what limited body reserves it has for this purpose. This prioritization of nutrients will always go first to maintenance (thermal regulation, immune and stress responses and then toward growth.)

The requirement for maintenance in a calf is quite substantial. Depending on your feeding program the calves on your farm could easily consume enough

Nutrient source	Temperature, °F						
	59	50	41	32	23	14	5
Whole milk	2.23 qts.	2.74 qts.	3.04 qts.	3.33 qts.	3.62 qts.	3.91 qts.	4.17 qts.
Milk replacer (20% CP; 20% Fat)	2.78 qts.	3.42 qts.	3.78 qts.	4.14 qts.	4.50 qts.	4.87 qts.	5.19 qts.

nutrients to meet their maintenance requirements. However, if you feed 4 to 6 quarts of milk or milk replacer per day then it becomes more challenging to meet maintenance requirements for the youngest calves during cold weather. As an example, the table above estimates the amount (in quarts) of whole milk or milk replacer (20% protein; 20% fat) required to meet the *maintenance* requirement of an 88-pound calf.

For calves being fed whole milk, if the environmental temperature reaches 23° or below the majority of a 4 qt. allotment is mostly going toward maintenance, leaving little to no nutrients for growth. For calves fed a more conventional milk replacer, the amount required to meet maintenance requirements per day is greater relative to whole milk. Below 41°, much of a 4 qt. allotment of a 20:20 milk replacer would be used for maintenance. As the temperatures drop below 14° almost 5 qts. or more are required for maintenance alone.

Meeting the maintenance requirement becomes more challenging when temperatures fall below 0°, which it often does in the North Country and in other parts of the Northern U.S. Although there are different ranges of feeding levels and milk replacer formulations, the big takeaway is making sure you’re meeting the needs of the calf so that she can meet her maintenance requirements and also continue to grow.

How can we achieve this in cold weather?

1. Increase amount of milk or milk replacer fed per day. This can be achieved by increasing the quantity, either through an extra feeding or more milk during normal feedings.
2. Supplement milk replacer with added fat or additional milk solids. With increased solids it is crucial to provide free-choice water.
3. Switch to a more energy dense milk replacer that is formulated with higher fat concentrations.
4. Increase starter intake. Make sure you are feeding a palatable starter. It is also very important to continue to provide water during the cold because starter intake is linked with water consumption.

Increasing starter intake is most likely the most challenging task in the youngest calves, so focus on the first three methods to maximize nutrients for maintenance and additional growth. Other calf management practices to keep in mind are to provide deep and dry bedding, calf jackets, minimize drafts, and make sure milk or milk replacer is fed to the calf at or above body temperature at time of delivery.

Now the big question: how are you planning to make changes to your “calf”eteria this winter?

— Sarah Morrison
morrison@whminer.com

2018 FEED DEALER SEMINARS

The Feed Dealer Seminars are specifically targeted for nutritionists, veterinarians, crop and management consultants, extension educators, and dairy producers with specific interest in nutrition-oriented topics. They are designed to blend the latest concepts in feeding and other management aspects of dairies with field level application. They have been conducted annually as a road show with multiple sites in New York for many years with an additional Vermont location held during the past several years in collaboration with the Northeast Agribusiness and Feed Alliance.

Locations: Held at 6 sites in New York and 1 in Vermont.

Speakers:

- Dr. Tom Overton, Professor of Dairy Management and Director, PRO-DAIRY program, Cornell University
- Dr. Kristan Reed, Ph.D., Assistant Professor of Dairy Cattle Nutrition and Northeast Agribusiness and Feed Alliance Partners Sesquicentennial Faculty Fellow

Topics:

- Maximizing milk fat on the dairy
- RuMUNations on nitrogen efficiency (aka, Strategies for assessing and improving nitrogen efficiency through the entire lactation)

Date	Time	Location	Contacts
Dec 10 (Mon)	6 PM to 9 PM	Chamber of Commerce, 37 Church St., Cortland, NY	Betsy Hicks or Stephanie Vitarelli (607) 391-2662
Dec 11 (Tues)	8 AM to 11 AM	Quality Inn (formerly Holiday Inn), Oneonta NY	Paul Cerosaletti or April Lucas – (607) 865-7090
Dec 11 (Tues)	1:00 to 4:00 PM	Cornell Cooperative Extension Office, Ballston Spa NY	Dave Balbian – (518) 312-3592
Dec 12 (Wed)	10:30 AM to 2:30 PM	Langevin House Vermont Technical College Randolph, VT	Sue VanAmburgh – (518) 783-1322
Dec 12 (Wed)	6:30 to 9 PM	Miner Institute, Chazy NY	Wanda Emerich – (518) 846-7121 ext 117
Dec 13 (Thurs)	Noon to 3 PM	Ramada Inn, Watertown NY	Tatum Langworthy – (315) 788-8450
Dec 14 (Fri)	11 AM to 2 PM	Cornell Cooperative Extension, Batavia NY	Linda Risewick – (585) 343-3040 ext. 138

LATERALITY, Continued from Page 1

were more likely to defecate. In contrast, cows that passed on the left looked at the person as they passed and were more likely to pass in pairs rather than one at a time. They appeared less anxious and stressed.

Interestingly, higher-producing cows were more likely to pass on the right side. It's not known exactly why this happens, but it may be that cows stressed with higher milk production levels are more anxious and prefer to view the unknown person with their left eye (which is connected to the right hemisphere of the brain that

processes fear and anxiety).

The decision to choose one side over the other to pass the novel person in the barn alley appears to be repeatable and consistent, and is in fact a coping strategy that allows cows to most effectively deal with an environmental stressor or source of anxiety. The researchers also assessed ear positioning as an indicator of anxiety or stress, but they concluded it was too variable to be useful on farm.

The results of this study showed that cows passing an unknown person on

the right side are more likely to be anxious and are more likely to be higher-producing cows. More work is needed on the role of laterality in dairy cow behavior and how it signals her degree of comfort with her surroundings. But it seems safe to conclude that monitoring on which side a cow routinely passes an unknown person or some other source of stress or anxiety could be useful on-farm to detect anxious or stressed cows. In the future, we may want to know if our cows are lefties.

— Rick Grant
grant@whminer.com

CORN HYBRID SELECTION FOR 2019

Seed dealers will soon be at your threshold, order books in hand. Farmers in the Northeast have access to more unbiased corn hybrid trial results than they had a few years ago, but the amount of data still isn't what it used to be. Some of the major seed companies have decided not to enter their hybrids in university grain trials. For instance, only four seed companies entered hybrids in the 2017 Cornell University corn grain trials: Albert Lea Seed, Augusta Seed Company, Dynagrow Brand (sold by Crop Production Services) and TA Seeds. These companies have some good hybrids, but the amount of seed sold in the Northeastern U.S. by these companies is quite small compared to that of the national brands such as Dupont-Pioneer, DeKalb, and Mycogen. And the data is limited to grain production.

Fortunately, Cornell and the University of Vermont are now collaborating on a series of corn silage hybrid trials, including entries from a wider range of seed companies including some of the nationally-marketed brands. The results of the 2017 trials (no information on any 2018 trial results) can be found at the following URL:

<http://www.uvm.edu/extension/cropsoil/wp-content/uploads/2017-NYVTCornSilageHybridTrials.pdf>

These include two maturity groups, with entries from both national and regional seed companies and data from five locations. If the company or hybrids you're interested in aren't included in these trials you should discuss potential use of these hybrids with the appropriate seed dealer.

Except for BMR hybrids there's often more difference in yield between hybrids than in fiber digestibility. And starch content and total digestibility are strongly influenced by the amount of grain on the plant. Therefore, it's important to select hybrids that will reliably mature on your farm, with your management. I'd rather have "a Brand X hybrid" harvested at 35% DM than one of a seed company's elite hybrids harvested at less than 30% DM. (Why do I keep hammering at this year after year, decade after decade? Because I continue to see corn chopped at less than 30% DM.)

— *Ev Thomas*
ethomas@oakpointny.com

MILK PRICE FORECAST

University of Wisconsin ag economist Mark Stephenson has issued his milk price forecast for the balance of 2018 and all of 2019. He predicts that the "all-milk" price will increase this fall and through most of next year to about \$18 per hundredweight, "a steady improvement to a 2019 average that should feel a lot like 2017".

How did you "feel" in 2017? Can you make a decent living, short-term or long-term, with milk at \$18? If not, what do you need to do to decrease your per-unit cost of production? Cutting expenses and increasing milk production are both ways to decrease the per-unit cost of milk production. Cutting expenses may seem like the quick and easy route, but many farmers have already trimmed whatever fat there was from their operation. Improved management, especially that which doesn't involve increased cost, may be a better long-term approach: More intensive crop management (early planting, timely harvest, more careful silo management) often doesn't involve additional expense but the combination of increased yield and quality can reduce feed cost, the highest input cost on dairy farms. There are agricultural professionals — Certified Crop Advisors, Extension educators, etc. — who can help you accomplish these goals, but you need to ask.

— *E.T.*

SAVE THE DATE: DAIRY DAY IS DEC. 5, 2018!

10 am to 3 pm at the Joseph C. Burke Education and Research Center, 586 Ridge Road, Chazy.
Lunch is available for \$5.

Guest Speaker will be Dr. Mike Van Amburgh.
More details coming soon!

THE NEXT STEP IN CORN SILAGE HYBRID EVALUATION: FIBER AND STARCH YIELDS

By this time you're either finishing chopping the last of the corn silage or have already finished. Hopefully the corn silage was chopped and processed well and stored with optimal packing density, received inoculants to drive good fermentation, and has an oxygen barrier to prevent spoilage. Now is the time to evaluate how the corn silage hybrids performed and to choose hybrids for next year's crops. Some of the metrics commonly used are

yields expressed as tons per acre, starch content, starch digestibility, neutral detergent fiber (NDF) content, and NDF digestibility (NDFd) at 30 hours. These are important because corn silage provides energy to the cow from fiber and starch. In the last few years NDF has been better defined using in vitro fermentation at multiple time points, usually 30, 120, and 240 hours, and is called undigested NDF (uNDF). Undigested NDF at 240 hours (uNDF at 240-h) is the measure of the indigestible portion of the fiber and has been related to gut fill. With uNDF at 240-h and NDF we then can calculate the potentially digestible NDF by subtracting uNDF at 240-h from NDF. Better differentiation of fiber has given enhanced understanding of how the cow is able to utilize it. So in order to compare corn silage hybrids these measure should be included.

High quality forage starts with the seed

Item	Hybrid 1	Hybrid 2	Hybrid 3	Hybrid 4	Hybrid 5
Hybrid (company and number)	Mycogen F2F379 (bm3)	Mycogen F2F499 (bm3)	Pioneer PO238XR (bm1)	Pioneer PO533AM1 (non-bmr)	Mycogen TMF2Q419 (non-bmr)
2015					
Planting date	5/21/15	5/21/15	5/21/15	5/21/15	5/21/15
Harvest date	10/2/15	10/2/15	10/2/15	10/2/15	10/2/15
2016					
Planting date	5/12/16	5/12/16	5/12/16	5/12/16	5/12/16
Harvest date	9/20/16	9/20/16	9/20/16	9/20/16	9/20/16
2017					
Planting date	6/8/17	6/8/17	6/8/17	6/8/17	6/8/17
Harvest date	10/12/17	10/12/17	10/12/17	10/12/17	10/12/17

Table 1. Hybrids and planting information for Miner Institute, Chazy, NY

Item	Hybrids				
	1 bm3	2 bm3	3 bm1	4 Non-bmr	5 Non-bmr
Yield, ton/ac (35% DM)	17.0 ^b	17.3 ^{ab}	17.5 ^{ab}	18.2 ^{ab}	19.2 ^a
Starch, % of DM	33.5 ^{ab}	32.3 ^b	35.2 ^a	35.5 ^a	34.7 ^{ab}
NDF, % of DM	38.1 ^{ac}	36.9 ^{bc}	36.6 ^b	38.0 ^{ac}	39.3 ^a
NDFd 30-h, % of NDF	67.1 ^a	66.2 ^a	60.1 ^b	56.1 ^c	57.2 ^c
uNDF 240-h, % of DM	6.7 ^c	6.2 ^c	9.2 ^b	10.0 ^a	9.8 ^{ab}
pdNDF, % of DM	31.4 ^a	30.7 ^{ab}	27.4 ^c	27.9 ^c	29.6 ^b
NDF yield, ton/ac (35% DM)	6.4 ^b	6.2 ^b	6.3 ^b	6.9 ^{ab}	7.5 ^a
uNDF 240-h yield, ton/ac (35% DM)	1.1 ^c	1.1 ^c	1.6 ^b	1.8 ^{ab}	1.9 ^a
pdNDF yield, ton/ac (35% DM)	5.3 ^{ab}	5.2 ^{ab}	4.7 ^b	5.1 ^{ab}	5.6 ^a
Starch yield, ton/ac (35% DM)	5.7 ^b	5.7 ^b	6.2 ^{ab}	6.5 ^{ab}	6.7 ^a

Table 2. Fresh chop corn forage quality and yield measures for hybrids grown at Miner Institute, Chazy, NY, 2015-2017.

choice which makes corn silage hybrid selection vital to meeting the production goals of the farm. Using data from the hybrids grown on your farm and local hybrid trials can help make this decision. Brown midrib (BMR) corn silage has a mutation (bm1 or bm3) that produces less lignin and has increased NDFd. This allows for greater intakes but adoption has been slow due to seed cost and lower yields. A corn silage hybrid trial conducted at Miner Institute for 3 years (2015-2017) compared bm3, bm1, and non-bmr hybrids. The hybrid and

planting information is in Table 1 while fresh chop corn forage quality and yield are in Table 2. The non-bmr (hybrid 5) had higher yield than the bm3 (hybrid 1). This wasn't a surprise, but the other bm3 and bm1 (hybrids 2 and 3) were not different from non-bmr hybrids (hybrid 4 and 5) which was a surprise. Brown midrib-1 and non-bmr hybrids (hybrids 3 and

4) had higher starch content than bm3 hybrid (hybrid 2). Brown midrib-3 hybrids (hybrid 1 and 2) had higher NDFd at 30-h than bm1 and non-bmr hybrids (hybrids 3, 4, and 5) and the bm1 (hybrid 3) had a higher NDFd at 30-h than the non-bmr hybrids (hybrids 4 and 5). Brown midrib-3 hybrids (hybrid 1 and 2) had lower uNDF at 240-h than bm1 and non-bmr

hybrids (hybrids 3, 4, and 5). Potentially digestible NDF (pdNDF) content was higher for bm3 hybrid (hybrid 1) than bm1 and non-bmr hybrids (hybrids 3, 4, and 5) and bm3 (hybrid 2) and non-bmr (hybrid 5) hybrids had higher pdNDF than bm1 and non-bmr hybrids (hybrids 3 and 4). Based on the quality measures the bm3 hybrids have higher NDFd 30-h with lower uNDF 240-h than the other hybrids.

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THE START IS EDUCATION

In 1915, William Miner stated, “No other occupation is so vitally important to the human race, nor requires such a wide range of practical and technical knowledge, as farming.” Over a century later, the truth and significance of this statement lives on through the growing effort from the agriculture industry to feed the world’s growing population. Current agriculturalists are striving to fill the plates of 7.6 billion people. By 2050, a projected 9.1 billion people will populate the world, creating a need for 70% more food than today. How does the agriculture industry fill that void? Technology and efficiency will play a major role in the coming years, but to accomplish the mission we must start with education.

The “practical and technical knowledge” of farming that William Miner referred to was once a skill set taught and adopted by young men and women growing up on farms. With fewer young people growing up around farming, this is something in modern society that few millennials have had the opportunity to experience. Without providing education for millennials to gain knowledge and hands-on experience, meeting the increased food demand in 2050 will be nearly impossible.

In the past several years there has been a push for STEM programs throughout schools. STEM is a program which integrates science, technology, engineering, and mathematics into real-world applications. Although the discrete subjects that collectively

create the STEM program are involved throughout the agricultural industry, little connection to agriculture has been made within STEM programs. To meet the rising demands in the future, schools must create a connection between STEM and agriculture. The technology and engineering required in modern agriculture is needed for the next generation to face the challenges of feeding the growing population, controlling climate change, and addressing social challenges that agriculturalists face.

Currently there are 8,568 agricultural education programs in U.S. schools that implement the three-component classroom curriculum made up of classroom instruction, Supervised Agricultural Experience (SAE), and FFA. The classroom portion includes lectures, discussions, lab experiments, greenhouse and field learning experiences, and in-barn animal experiences. During this portion of the course, students have the opportunity to build a foundation of knowledge and experience in several areas of agriculture. It’s easy to read information from a book or watch it on a screen, but when a student has the first-hand opportunity to take the knowledge learned in the classroom and apply it to real life, that is when professional skills are developed.

These skills uncovered in the classroom can be displayed and improved through the SAE component of the curriculum. Each student’s SAE’s will vary as students can participate in six experiences which include ownership/entrepreneur,

placement, research, exploratory, school based, and service learning. Through student’s participation in SAE’s they have the opportunity to explore career options, gain hands on experiences in the industry, meet industry leaders, learn record keeping, develop professional skills, and apply knowledge learned in the classroom.

FFA rounds off the third component to agriculture education by cultivating leaders. Through FFA, members have the chance to attend state and national conventions, providing them with the opportunity to engage with industry professionals and connect with other FFA members from across the country. Furthermore, Career Development Events such as Leadership Contests and Skills Contests provide students the possibility to acquire leadership strength through working with others while engaging in understanding and applying information associated with agriculture.

Together this three-component curriculum attracts middle and high school students with varying agricultural experience levels and social backgrounds, providing them with the opportunity to get involved in agriculture. Educating today’s youth and exposing millennials to agriculture is only the beginning to solving the challenges the industry will face in the coming years.

– Lynn Olthof
2018 Summer Experience in Farm Management Intern



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SILAGE INVENTORIES

Silos full? With the recently-ensiled corn crop they should be as full as they are all year. Do you know what's in each silo, and if so, is it written down? This is especially important if you grew both BMR and conventional corn for silage, or if some fields were affected by disease, drought or some other problem. It's not good enough that you know where everything is, since unforeseen events (accident, sickness, etc.) could result in someone else needing to know what's stored where. "If you don't know where it is you don't own it." That's not quite true with silage, but you get the idea.

If you ensiled your corn crop in two or more silos, note which fields (and therefore which hybrids) went into each silo. That way if your herd production takes a bounce or a dip you might be able to relate it to a change in forage quality — and perhaps to the hybrid(s) represented in the silage you're currently feeding. Obviously, this is trickier in bunker silos or drive-over piles than in tower silos or silage bags. One of the advantages of silage bags is that as you fill the bag you can mark the location of each field's crop on the plastic. As you feed out you can match the forage analysis to the specific hybrid. If you plant all conventional corn hybrids you might find more quality differences associated with % dry matter than with the genetics of the hybrid.

— E.T.

HYBRIDS, Continued from Page 5

Going one step further by calculating fiber and starch yields will allow better differentiation of corn silage hybrids. The fiber and starch

yields are calculated by multiplying the yield by the nutrient fraction (NDF, uNDF 240-h, pdNDF, and starch) and presented on 35% dry matter basis. Non-bmr hybrid (hybrid 5) had higher NDF yield than bm3 and bm1 hybrids (hybrids 1, 2, and 3). The bm3 hybrids (hybrids 1 and 2) had lower uNDF 240-h yield than bm1 and non-bmr hybrids (hybrids 3, 4 and 5) and the bm1 hybrids had a lower uNDF 240-h yield than non-bmr hybrid (hybrid 5). The pdNDF yield was higher for non-bmr hybrid (hybrid 5) than the bm1 hybrid (hybrid 3). The starch yield was higher for non-bmr hybrid (hybrid 5) than the bm3 hybrids (hybrids 1 and 2). Based on the yield measures, the bm3 hybrids provided similar pdNDF yields as the other hybrids

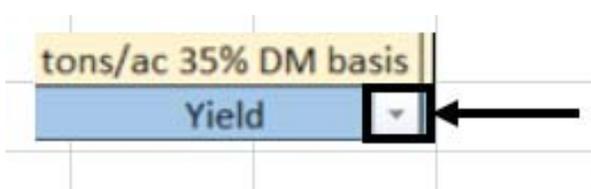


Figure 1. Example for sorting hybrids.

by having less indigestible fiber. Using quality and yield measures will help when making corn silage hybrid selection.

Miner Institute has created a spreadsheet to help with calculating fiber and starch yields that's available online <http://whminer.org/dairy/> under "Dairy Management Tools" called "Corn Silage Hybrid Fiber and Starch Yields Calculator". There are 3 sheets: "Instructions", "Insert data", and "Yields". To calculate the fiber and starch yields insert yield and forage analysis in the "Insert data" sheet, but make sure that the units are same as the column headings. Once the data is inserted then go to the "Yields"

sheet and the fiber and starch yields are calculated and to sort hybrids based on one of the measures use the little drop down box next to the measures name shown in Figure 1. These instructions are also on the first sheet.

Corn silage is a major feed component in dairy cow diets, so making the best choice for which hybrids to plant is a big decision for a farm. Since corn silage provides energy to the cow from the fiber and starch fractions these should be used in evaluating different hybrids. To better evaluate the hybrids, the quality measures should be on a yield basis and these can be easily calculated using the "Corn Silage Hybrid Fiber and Starch Yields Calculator" located on our website.

— Michael Miller
mdmiller@whminer.com



Change Service Requested



Some Miner Institute staff members recently participated in a charity kickball tournament. **From L to R:** Damiano Cavellini, Charlie Hacker, Amber Bornt, Sarah Morrison, Laura Klaiber, Mark Haney, Adam LaCount, and Dan Belrose.

Closing Comment

Politics is the art of looking for trouble, finding it, misdiagnosing it
and then misapplying the wrong remedies.

www.whminer.org

518.846.7121 Office
518.846.8445 Fax