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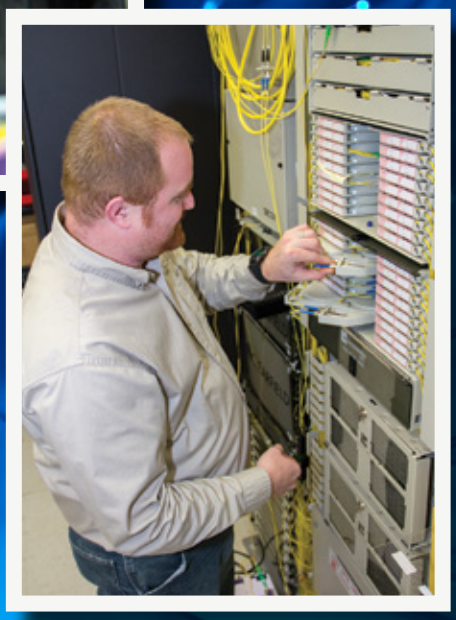
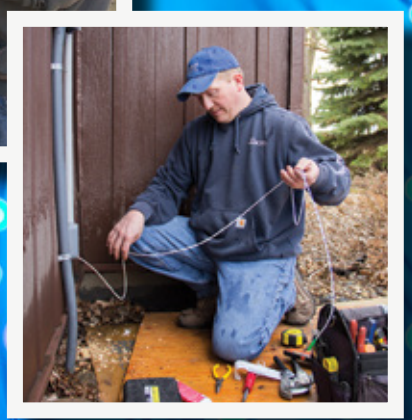
JULY/AUGUST 2017

CONNECTION





FIBER FUTURE

The story behind one of the nation's first fiber networks

EARN YOUR BADGES

Junior Ranger program teaches kids about parks

BBQ BOOT CAMP

Experts share their smoky secrets

NTCA THE RURAL BROADBAND ASSOCIATION

RURAL CONNECTIONS

BY SHIRLEY BLOOMFIELD, CEO
NTCA–The Rural Broadband Association

Lessons from our Founding Fathers

As we celebrate Independence Day, I reflect on the patriots who helped start America. We are indebted to these Founding Fathers who fought for and forged the beginnings of our nation.

I was fortunate to have two experiences this spring that put the Founding Fathers on my mind early this year — and reminded me of the important work NTCA does to represent our member telcos and the people they serve.

The first lesson came in April when I attended a seminar at the Washington Library in Mount Vernon. We can learn many things from our first president, but what struck me is how Washington made so many decisions with people's long-term interests in mind. He knew that the choices he made would have implications for decades, and he wisely considered their impact.

The second lesson came in May when I was able to attend the musical "Hamilton." The show tells the story of our first secretary of the treasury, Alexander Hamilton. One of the songs in "Hamilton," "In The Room Where It Happens," discusses the importance of being at the table when decisions are made.

The lessons from these Founding Fathers reminded me of the duty we have at NTCA to represent rural America. We deal with policy matters that have long-lasting implications for millions of Americans, and we have to make sure policymakers keep that in mind. In order to do that, it's important for NTCA to represent you and your telco in the rooms where decisions are made.

Don't let your business **get held hostage**

Imagine arriving at work one morning to find everything on your computer locked, accompanied by a message that if you want to regain access, you'll have to pay money to the people who locked it.

This is what happens when a computer is infected with a type of virus called ransomware, and in recent months, computer systems across the globe have been taken hostage.

The virus known as WannaCry or WannaCrypt gains access to computers using a security hole in Windows' server software. Small businesses are especially vulnerable to these attacks because they often can't dedicate as many resources to cybersecurity as larger companies.

Fortunately, the Federal Trade Commission recommends an easy way to protect your business from this threat: Make sure your system software is up to date.

Like any real-world thieves, hackers are always looking to exploit holes in a system's security, while software companies race to find and close them first. Many computers download and install these security updates automatically; however, if your business uses an older, unsupported version of Windows, you may need to visit Microsoft's website to download the latest update.

The Commission also suggests protecting against ransomware attacks by backing up important files.

Businesses save many important documents on computers and mobile devices, from tax forms to planning documents. Get into the habit of backing up those files in the cloud or to a hard drive. Log out of the cloud when you're finished, and unplug any external hard drives afterward so that hackers cannot use ransomware to lock them.

Avoid unfamiliar links, attachments and apps as well. The most common source of ransomware is phishing emails. You should never click on a link, download an attachment or follow an ad from a source you don't know and trust.

Because small businesses are a vital part of the economy and are often targeted by scammers, the Commission has launched a website dedicated to helping those businesses protect themselves. For more information on defending against ransomware, data breaches and other cybersecurity threats, visit ftc.gov/SmallBusiness.

Helping your kids use technology wisely begins with setting boundaries

"Mom, can I take my iPad?"

"Is there going to be Wi-Fi?"

These are two of the most frequently asked questions by my boys when it's time to go somewhere. Sometimes the answer is yes, and sometimes it is no. The truth is, I want my kids to love and use technology but not let it consume their lives. Gadgets are wonderful for kids, but only if they are used in moderation. I believe the negative effects of kids being online too much comes down to parenting, not technology. There must be balance in our children's lives, and that includes technology skills.

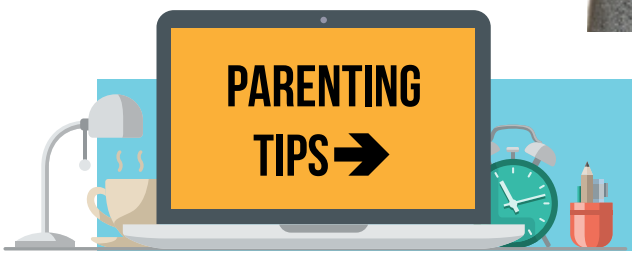
My sons, Dalton, 10, and Patton, 7, love their iPads and video games. If they had their way, they might play with them all day and all night. Luckily for my sons — whether they like it or not — they don't get that as an option. They also need to help with chores, play with toys, draw, be active in sports, talk with friends and have imaginative adventures. All of these skills are important for them to become well-rounded adults.

Technology is a huge part of my life. I live and work in a town with less than 400 people, but I have gigabit internet service to our home so I can work as a technology education consultant. My husband works on the family cattle ranch, so we don't have the option to move to the big city. I have found a way to develop the type of career I want and still live in a small town. My job is helping people use and understand broadband, gadgets and all that goes with them in today's world.

So, you might ask, how do I keep my boys from turning into antisocial, techie monsters? It comes down to parenting and setting boundaries. It's that simple. Sometimes we just have to take something away. We have rules, and we enforce those rules. We aren't perfect parents (far from it), but we are trying to find the balance that works for our family. I also have some helpful apps, gadgets and resources that help me to manage their online activity and keep them connected but safe. I look forward to sharing some of those in future issues.

> "I have long felt that the way to keep children out of trouble is to keep them interested in things."
>
> —*Walt Disney*

CARISSA SWENSON is a training and education consultant for Consortia Consulting, a Nebraska-based company. She also serves as a director for Consolidated Telecommunications Cooperative in Dickinson, North Dakota. Carissa's columns on Parenting in the Digital Age will appear throughout the 2017 issues of this magazine.



You don't have to understand how to use all the technology your kids use, but you need to be aware of what they are doing. Create rules, enforce rules and stand by your rules when it comes to using technology.

Introducing your Connection magazine

Farmers Mutual Telephone and Federated Telephone are investing in our community, and this summer we have something fresh to share. We are pleased to introduce the new Connection magazine.

KEVIN BEYER
Chief Executive Officer

Farmers and Federated are deeply committed to the people of Big Stone, Lac qui Parle, Stevens and Swift counties and the surrounding areas. In order to share the stories of those communities and our role within them, we've upgraded our member newsletter — it's now bigger and better than before.

Our goal is to improve our communication with members and customers, which will help educate and inform everyone about new industry trends, community activities and news from your cooperative. With our new format, we will send you magazines like this one six times a year. With the way we're growing and with all of the changes within our industry, we want to provide you with as much information as possible.

Through these pages we will update you on network upgrades, share information about our services, and shine a spotlight on local people and organizations who are using technology to create something special. You'll also find helpful tips, industry news and interesting feature stories from across the region in these pages.

As member-owned cooperatives, Farmers and Federated, together as Acira, are always trying to make cost-effective decisions. In the case of this magazine, we've partnered with 17 other rural telcos in North Dakota and five other states to produce this magazine in a way that makes it affordable to each company. We really hope you enjoy the new Connection.

And we have so much good news to share. We've invested millions of dollars already in a fiber-optic network throughout our territory, with plans to grow even more this year in Big Stone, Lac qui Parle and Swift counties.

The rollout of fiber brings nearly limitless possibilities. There are immediate benefits, such as faster internet speeds, high-definition channels, enhanced voice telephone services and more. But fiber also provides the potential for even more benefits because it's often the key to business growth, which can support new jobs and improve the quality of life in our communities. You'll read more about fiber and how broadband is benefiting our communities in coming issues.

Farmers and Federated committed to building the network as an important investment in our region of Minnesota. We knew building the network was a good investment because, as you will read on Page 12, fiber is a "future-proof" technology that has equipped our cooperative for whatever demands our customers may have in the years to come.

We know that with technology, change is really the one thing we can count on. Times are changing, and so are we. No longer are we just a telephone company; we are your full-service communications provider. Thank you for placing your trust in us and for allowing us to earn your business.

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acira
POWERED BY FARMERS MUTUAL TELEPHONE COMPANY AND FEDERATED TELEPHONE COOPERATIVE

Farmers Mutual Telephone Company
301 2nd St. South
Bellingham, MN 56212
farmers@farmerstel.net
320-568-2105

Federated Telephone Cooperative
201 S. State Hwy. 9 • P.O. Box 107
Morris, MN 56267
emailftc@fedtel.net
320-324-7111 or 320-585-4875

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On the Cover:

It took a big commitment from everyone at Farmers Mutual and Federated Telephone to build the fiber network that members enjoy today. *See story Page 12.*

Acira Marketing/CSR manager Donna Eul, on left, and customer service representative Shelley Evink present the $2,500 scholarship check to Ryan Dietz.

ACIRA CONGRATULATES SCHOLARSHIP WINNERS!

Congratulations to Ryan Dietz, son of Jay and Chandel Dietz. He is the Federated Telephone-sponsored winner of a $2,500 scholarship from the Foundation for Rural Service.

Dietz was one of 47 national winners selected from more than 1,500 applicants. He graduated from Morris Area High School and plans to study physical therapy at the University of Jamestown.

"We are so grateful to have talented young people like Ryan leading by example in our community," commented Kevin Beyer, CEO.

Safe and Sound

ACIRA - GOVERNOR'S AWARD

"We're proud to announce that the Minnesota Safety Council recognized Acira powered by Farmers Mutual Telephone Company & Federated Telephone Cooperative for excellence in workplace safety," Acira CEO Kevin Beyer says.

The award was presented during the Governor's Safety Awards in May. "We thank Acira for its commitment to safety," says Paul Aasen, president of the Minnesota Safety Council. "These efforts protect workers, strengthen the organization and benefit the community as a whole."

Summertime hours

Don't forget that from June 5 to Sept. 1, all Acira offices follow summer hours:

Monday through Thursday
7:30 a.m. to 5 p.m.

Fridays
8 a.m. to noon

Call before you dig!

Be sure to call 811 to have all underground utility lines marked before you start any digging project. Lines may be buried in your yard, and cutting them could cause expensive service outages.

DON'T MISS OUT — IT'S COUNTY FAIR SEASON

July 12-16
Big Stone County Fair
in Clinton

Aug. 8-13
Stevens County Fair
in Morris

Aug. 16-20
Swift County Fair
in Appleton

Sept. 7-10
Lac qui Parle County Fair
in Madison

Students explore the water bugs in the bogs at Apostle Islands.

Even 5 isn't too young to be a NATIONAL PARK RANGER

A long-running program offers adventure and education

Tired of the beach and had enough of movie theaters and playgrounds? This summer, get the kids off the couch and have them head in a new direction as Junior Rangers.

And they have fun.

Interested youth complete a series of activities during a park visit, share their answers with a park ranger, and receive an official Junior Ranger patch and certificate. Parks are open daily except on Thanksgiving, Christmas and New Year's Day. Junior Ranger programs are free with park admission and offered all year.

Junior Rangers help preserve outdoor treasures as the National Park Service's representatives to their friends, families and schoolmates back home. They share their knowledge about parks and continue to use good environmental practices.

Junior Rangers programs are offered in national parks across the Midwest. Here are a few favorites:

Mississippi National River and Recreation Area Minnesota, St. Paul, Minnesota

The Big Muddy is filled with opportunities for adventure, and Minnesota's Mississippi National River and Recreation Center offers a chance for kids to learn more through its Junior Ranger program. Families can stop by the visitors center and pick up a book filled with activities that can be completed at the center or by walking around the park and discovering the park's 54,000 acres. Then, children take their Junior Ranger oath, get their badges and are officially welcomed into the fold. Junior Ranger status can also be achieved during park-sponsored family outings, such as fishing, snowshoeing, biking and geocaching.

"We attach the Junior Ranger program to all park family activities," says Park Ranger Brian Valentine. "The program gives kids a chance to see the river and learn more about it, and some become volunteers, coming back later to help clean up the park. We want to get them interested in being outside."

Park admission: Free. Please note that the Mississippi National River and Recreation Area is a partnership park. Some partner parks, museums and historical sites within the park do have

admission fees. These include Historic Fort Snelling, Mill City Museum and Fort Snelling State Park.

Information: 651-293-0200 or www.nps.gov/miss.

Theodore Roosevelt National Park, Medora, North Dakota

There's plenty to keep kids busy while earning their Junior Ranger badge, including hiking, family campouts and watching a plethora of wildlife — bison, elk, birds and prairie dogs (the kids' favorite) in one of many prairie dog towns around the park's 70,000 acres.

Pick up an activity book at one of the park's visitor centers. The books are age-appropriate and will have young ones enjoying word searches and drawings, while older kids will get out in the park to play games, such as bingo, which has them look for animal signs.

"The point of the program here is to get kids out into the park," says Eileen Andes, chief of interpretations and public affairs. "We like to encourage families with children to explore."

A favorite activity at the park is September's annual Astronomy Festival, which offers child-focused events such as building a telescope or constructing and launching rockets. This year's festival is Sept. 15-17 and is a fun way to introduce children to the stars and get their Junior Ranger badges, too.

Park admission: $25 per vehicle (1-6 people).

Information: 701-623-4466 or www.nps.gov/thro.

Minuteman Missile National Historic Site, Philip, South Dakota

Back in the 1960s, at the height of the Cold War, there were more than 1,000 missile silos across the Midwest. South Dakota had 150, but now there is just one remaining. It's in a federally recognized historic site in the heart of the state. The Minuteman Missile National Historic Site gives visitors an opportunity like no other: Viewing a nuclear missile and learning about the arms race. A visit can teach children lessons about the duties required of Air Force personnel, as well as how service members lived while working at Minuteman sites.

Junior Rangers are sworn in at Apostle Islands.

Photos courtesy of NPS.

The site's Junior Ranger program is somewhat different from that of most other parks. There are two pathways kids can take to earn their badges.

The standard program has age-appropriate activities for ages 4-14. Some are as simple as park bingo for very young children. Other activities have kids take a more active role with museum visits, including participating in activities that ask deeper questions and encourage them to draw conclusions, says Joe Brehm, chief of interpretation and resource education.

An additional Junior Ranger program, the Junior Missileers, is now in its second year and takes place two weekends each month. In order to get a badge, kids work with their families and a park ranger to build and launch a paper rocket. "They can see how well their rocket goes, and if they don't like the launch, they can change their rocket's design," Brehm says.

Missileman's Junior Ranger program, he adds, "engages kids and gets them to start thinking about the dynamics of rockets — the physical forces that take place."

Park admission: Free (Delta-01 Launch Facility tours $4-$6).

Information: 605-433-5552 or www.nps.gov/mimi.

Apostle Islands National Lakeshore, Bayfield, Wisconsin

There are 21 islands along 12 miles of mainland that make up the chain of Apostle Islands on the Wisconsin shore of Lake Superior. The waters are filled with wonders, and the land is filled with history.

Kids get hands-on demonstrations at the Mississippi National Recreation Area.

Ojibwe Native Americans fished its waters and farmed the land. Sailors traversed its shores and died beneath the waves. Lighthouse keepers protected ships. "We're surrounded by a spectacular lake with so many different stories," says Park Ranger Caroline Stedman.

Junior Rangers at Apostle Islands learn about the islands through an activity book with age-appropriate chapters. Choose from simple word searches and mazes to matching excerpts from a lighthouse keeper's logbook.

Kids will also enjoy a replica lighthouse in the Bayfield Visitor's Center. It has an original lighthouse lens looking out over Lake Superior, so visitors have the sensation of standing at the top of the Michigan Island Lighthouse.

"The Junior Ranger program really gives kids a chance to learn about not just this park, but also the unique features of all the different national parks," Stedman says.

Park admission: Free (nominal fees for beach use and parking, camping and docking).

Information: 715-779-3397 or www.nps.gov/apis.

Don't let Wi-Fi barriers ruin your online experience

More and more people depend on Wi-Fi. Whether you're working from home, trying to complete school projects or just doing some online shopping, it's frustrating to lose your internet access because of a faulty Wi-Fi connection. There are several things to consider if you have issues with your connection, and most fixes are straightforward.

One key is the Wi-Fi router, which takes your hard-wired internet connection and beams it throughout your home or business. This one device is critical to wireless online satisfaction. But physical barriers can quickly dampen the signal. For example, metal walls or supports are unforgiving. As a result, metal buildings are particularly difficult environments for Wi-Fi. So, if there is a metal barrier between the Wi-Fi access point and your computer, consider relocating the router.

But metal is not the only troublemaker. Several wall materials, particularly concrete and plaster, can interfere with Wi-Fi, and that's not all. The list of barriers also includes water, microwaves and foil-wrapped insulation. Even mirrors can create interference that is difficult for signals to pass through.

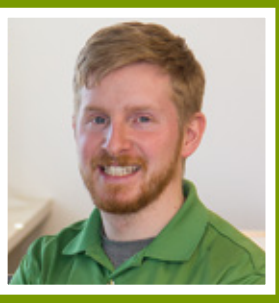
Distance also matters. Often, people want to access Wi-Fi in their backyards or in shops or other buildings on their properties. However, Wi-Fi routers have limited reach. So consider the size of the space you're trying to cover.

One of the most common causes of Wi-Fi trouble is an old, underpowered router. Two key considerations to remember when choosing a router are: 1) the size of your home and 2) the total number of devices that you will connect.

Also, if you are having network issues and your router is more than four or five years old, it may be time to consider a replacement.

Heat can damage your router's internal components over time, and this may affect performance. Another source of issues could be that your router does not offer dual-band wireless access, meaning that other products in your home, like a cordless phone, operate on the same wireless band as your router. Again, an upgrade may prove to be an affordable, effective solution for these concerns.

A solid, fast Wi-Fi signal can improve your connection, no matter how you use the internet. A few simple fixes, like repositioning your router or upgrading to a new model, can make a world of difference in the quality of your online experience.



HI, I'M JOHN WEEDING!

I'm an IT specialist at Acira's office in Morris. In this column, my fellow team members and I will introduce to you technology and give simple tips to get the most out of our electronics. For more help with your devices, stay tuned to this column in upcoming issues.

DEVICE OF THE MONTH

Amazon Fire Stick

Looking for a media streaming device that's voice activated? Then consider the Amazon Fire Stick. It's an inexpensive option to access online programming. The Fire Stick also includes the Alexa Voice Service, which allows you to use voice prompts to find a popular movie or series.

Acira employees serve pulled pork sandwiches at the Farmers Mutual annual meeting.


CEO Kevin Beyer details Acira's progress during his report at the Federated annual meeting.


Leo Kleespie, left, and siblings Maecy and Jax show off their construction hats handed out by Acira employees.

The road to success is always under construction

Farmers Mutual and Federated Telephone keep growing

Farmers Mutual Telephone Company and Federated Telephone Cooperative stayed busy in 2016 with continued expansion and the addition of new subscribers, company leaders told members in June during 2017 annual meetings.

"The board and I are proud of our exceptional team of employees," General Manager Kevin Beyer stated. "We thank them for all their time and efforts, which result in exceptional service to our members. We also extend our appreciation to all of the members who continue to support their cooperative."

FARMERS MUTUAL

Beyer and Farmers Mutual Board President Scott Wittnebel explained to the members that the company added new members in 2016, helping to ramp up the company's financial health.

Also, the Farmers board has approved upgrades to critical central office electronic systems. This process is scheduled to start in late 2017 and be completed in late 2018. When the new electronics upgrades in the ILEC are complete, all members will have the option of taking IPTV from the cooperative.

FEDERATED

Beyer and Federated Board President Lynn Swenson say the cooperative expanded in 2016 with new service territories and new subscribers.

The company added 316 new customers in Big Stone County, continuing the expansion of the popular broadband network made possible by the Border-to-Border funding.

By the end of 2016, fiber-optic lines had been installed as part of Swift County's border-to-border project, and customer connections will continue throughout this year.

Also, Federated completed renovation of the old Valu Ford building, which will be used for office, warehouse and customer service space.


The board members of Federated after the 2017 annual meeting in June. From left, Lynn Swenson, Tim Danielson, Dan Smith, Roger Gerdes, Michael Schroeder, Marcia Greiner and Nancy Taffe.


The board members of Farmers Mutual after the 2017 annual meeting in June. From left, Scott Wittnebel, Jerome Kallhoff, Michael Sorenson, Gerald Stensrud, Dean Olson, Troy Hoyles and John Plathe.

Through the LOOKING GLASS

The story behind revolutionary optical fibers

BY DREW WOOLLEY

Eric Parsons wore two hats when he worked as a sales manager for Corning Inc. in the 1970s. By day, he sold the manufacturing company's glass and ceramics products to industrial and scientific customers. In the evenings, he and others on the sales staff would help with products being developed in the lab.

Parsons still remembers the day a group working on a new communications technology appeared and told them to drop everything.

"One day they came in and said, 'Fellas, quit working on this altogether. This is dead,'" he recalls. "'Box all your information up and put it in the archives. There's a new technology called fiber optics.'"

Since that day in 1979, fiber has become a household term, and millions of miles of line have crisscrossed the globe, connecting people continents apart almost instantaneously, supporting high-definition video and enabling lightning-fast internet.

COMMUNICATION IN A FLASH

With exposure to so much technology, we've grown used to the idea that information can travel in many ways. Landline telephones convert the sound of a voice on one end of a call into electric signals transmitted across lengths of wire. Cellphones ditched the wires in favor of radio waves that travel through the air.

Corning scientists looked at those methods and took them a step further. "They said, 'Hey I've got an idea. What if we transmit light through glass and use that for telecommunications?'" says Pat Turner, the director of marketing operations for Corning Optical Communications.

Imagine you and a friend are on opposite ends of a long, straight tunnel and both have a flashlight. If you worked out a code, you could send signals with the flashlights that would reach the other person almost instantaneously.

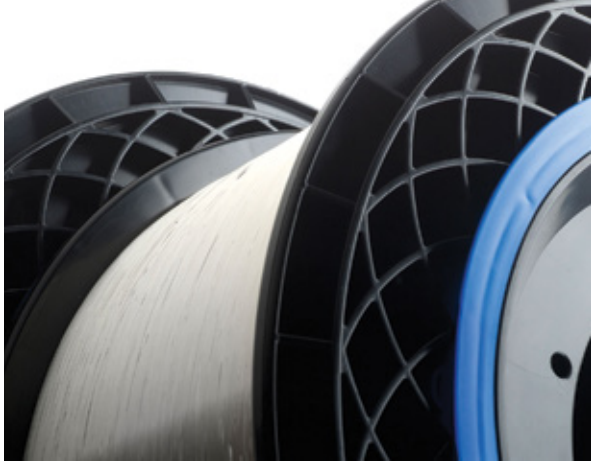
But what if the tunnel curved and changed direction multiple times? To send messages back and forth, you would need mirrors to bounce the light around corners.

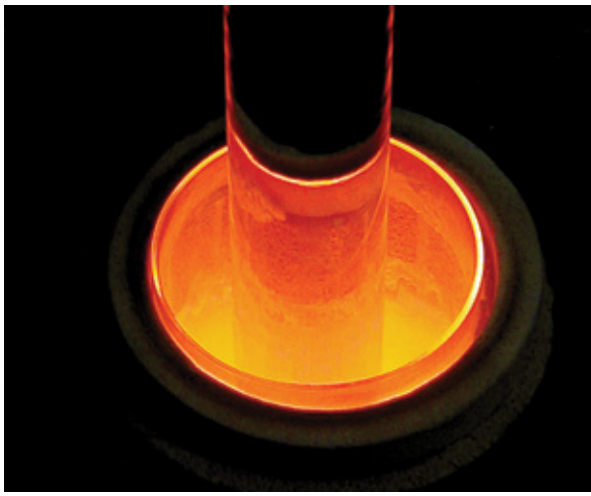
The same concept is at the heart of fiber optics. Each fiber strand is made up of a glass core thinner than a human hair. Light signals are transmitted through the glass, just as you might send a signal down the tunnel. To keep the light from simply passing through the glass when it changes direction, the core is surrounded by a cladding that reflects light back into the glass. This works similarly to the mirrors in the tunnel, bouncing the signal from side to side until it reaches its endpoint.

Since each fiber is much thinner than a traditional copper wire, fiber optics make it possible to transmit large amounts of information simultaneously. And a single cable can bundle hundreds, or even thousands, of fiber strands.

ACTUALLY, IT IS ROCKET SCIENCE

Despite being incredibly thin, fiber is far from brittle. A single strand is three times stronger than steel and more durable than copper, yet light and flexible. In addition, to prevent the light signal from degrading over long distances, the glass core has to be extremely pure. So pure, in fact, that if the ocean was made of the same glass, you could stand on the surface and clearly see the ocean floor miles below.





To most people, it would seem almost impossible that such a material exists, much less that it could be manufactured on a large scale. "Making fiber is rocket science," says Parsons. "Precision is everything."

He's not exaggerating. The first step in manufacturing fiber requires mixing oxygen with liquid forms of silicon and germanium inside a glass tube. If that mixture isn't just right, the resulting glass core might not be as durable or clear as necessary.

As these chemicals mix, the tube is heated to extreme temperatures. The ensuing chemical reaction leaves a white soot on the inside of the glass tube, which the heat fuses into what will become the glass core of the fiber. The tube itself will become the reflective cladding surrounding the core.

The process takes several hours to complete, with the tube eventually collapsing on itself to form a solid glass rod called a preform.

While the preform has the internal structure needed for an optical fiber, it's too thick and bulky to be useful across long distances. To stretch it out, the preform is hung from a drawing tower, where one end of the rod is heated in an oven to 3,600 degrees Fahrenheit. From there, gravity takes over.

As the tip of the rod softens, a glob falls slowly toward the ground, forming a long, thin thread not unlike honey stretching as it is poured from a spoon. But because of the strength of the glass, the fiber can become incredibly thin and stretch to great lengths without breaking. As it cools, the fiber is threaded through pulleys and receives a series of protective coatings before being wound onto a spool, ready to be tested and then used.

ENDLESS POSSIBILITIES

Perhaps the only thing more impressive than the process behind fiber optics is the range of ways it's being put to use. The convenience of blistering internet speeds or being able to carry on a crystal-clear phone conversation with someone on the other side of the world is apparent, but that's just the start of how fiber is improving people's lives — especially in rural areas.

"The true value of fiber is what we can do from a human aspect," says Turner. "The ability to do distance learning for people who wouldn't otherwise have access to a university environment, or telemedicine, or allowing families to connect — that's what is truly changing the landscape of the global community."

Fiber optics are even being used to provide tiny lights for improved nonintrusive surgery techniques and in the development of prosthetic limbs that can produce the sensation of feeling for the user. Almost five decades after its discovery, it still blows Turner's mind to think scientists are uncovering new and innovative applications for fiber.

"If you think about how that concept started from nothing, to what we have today, it's mind-boggling," he says. "They had the vision to see the potential of fiber. Then they had the technical capacity to make it happen. I'm in awe of the reality of what we have today because of the changes fiber has created."

FIRST ON FIBER

Farmers and Federated celebrate the anniversary of a communications milestone

BY ANDY JOHNS

Driving through the community of Alberta in Stevens County, most people would never guess it's where a technological revolution began two decades ago. That's because the history made there is underground in the tiny strands of fiber-optic cable.

This year marks the 20th anniversary of Federated Telephone turning on fiber-optic service to Alberta in 1997, making it one of the first test sites for technology that has become the industry standard today.

"With Alberta, and then the network that expanded from there, Federated Telephone was truly a pioneer in the world of fiber optics," says Kevin Beyer, CEO of Farmers Mutual and Federated Telephone. "That took some bravery and foresight from our board of directors that a lot of boards wouldn't have had. I'm proud that we're maintaining that legacy of innovation today."

Around the nation, many companies are just now replacing their networks with fiber optics. Both Farmers and Federated were quick to embrace fiber optics, with Federated gaining recognition as the first telephone cooperative in the United States to have a 100 percent fiber network. Farmers Mutual Telephone Company and Federated Telephone Cooperative have served customers with 100 percent fiber since 2008 and in recent years have expanded the fiber into Big Stone and Swift counties.

In April, crews removed what is believed to be the last stretch of old copper lines in the Farmers and Federated territories. The lines, located in downtown Morris, hadn't been active for some time.

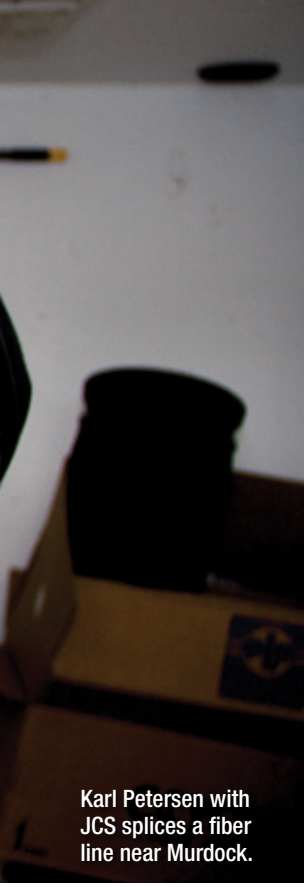
"While the copper lines connected our customers for decades, we're proud to have closed the door on 20th-century technology and excited by the ways our members will use our fiber network to improve their quality of life now and in the future," Beyer says.

ADVANTAGES OF FIBER

A fiber network is fundamentally different than the conventional copper networks communications providers have relied on for decades. The fiber network has some distinct advantages.

While traditional networks send electrical signals over copper lines, fiber optics send bursts of light over tiny strands of glass. Fiber has such amazing capacity that the information in an entire set of encyclopedias could be sent three times in a single second over just one strand.

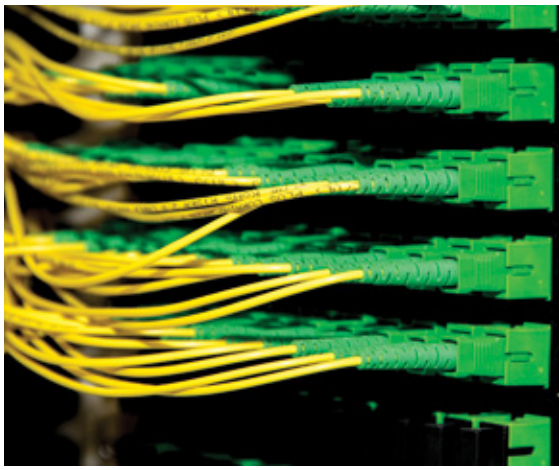
Not only does light move faster than the electrical pulses, but also the signals travel much farther over glass than over metal.



Karl Petersen with JCS splices a fiber line near Murdock.

Brad Motz, left, and Shaun Ripley finish up a new installation in Big Stone County.

In April, contractors removed the last lengths of copper lines from downtown Morris.



"With fiber everybody can get the same quality service, whether you're in town or 20 miles out of town," explains Acira Operations Manager Tom Lorenz.

Additionally, the glass lines are not conductors of electricity, meaning they will not get interference from lightning strikes or power surges. The network has also been designed with multiple and redundant connections for added reliability.

But the biggest and most obvious benefit to customers will be the broadband speeds available with fiber. On a fiber connection, top speeds are astronomically higher than the speeds available on copper lines.

In your home, that means faster, more reliable streaming for movies or music. It means faster downloads for homework and research as well as smoother video calls with loved ones around the country.

For health care providers, the network allows better consultation with regional specialists in the Twin Cities. Beyer says some of the first beneficiaries of the network were patients of local doctors, who were able to upload finely detailed X-rays to radiologists for a timely review. "That was the first time we realized that the upload really mattered, too," he says.

But perhaps the biggest benefit of the new network goes to businesses, where fast internet access can mean the difference between success and failure. Communities with cutting-edge broadband, like those in the Farmers and Federated territories, is attractive to businesses, which in turn create jobs.

"Access to high-quality broadband internet service is absolutely vital for small businesses seeking to grow their operations," says Rick Schadelbauer, an economist with NTCA–The Rural Broadband Association. "It allows small business owners to cost-effectively promote the unique aspects of their operations and provides access to customers and markets that would be otherwise unattainable."

FIBER WAS A SMART BET

Back in 1997, the pilot project in Alberta launched, along with similar projects in small communities in Nebraska, Texas, Kansas and Colorado. At the time, a Minnesota Public Radio story touted high-speed broadband as possibly "the economic future of rural areas." But in the same news piece, critics said "cost makes fiber to the home unrealistic on a wide scale."

Beyer said the board took a risk in building the network. At the time, running fiber lines directly to a home or business cost 22 percent more than running fiber to a regional hub with copper as the last link to the customer. "There was some ridicule at what we were doing within the industry," he says. "Our board took a very forward-looking leap of faith and then stuck behind their decision. I think the network we have today, with other providers scrambling to catch up, proves it was the right call."

Morris was equipped with a fiber network by 2000. When Beyer began managing the cooperative in 1998, the board asked for a plan to have the entire service area connected as quickly as possible.

Today, most networks around the country still do not provide the 100 percent fiber-optic service that Farmers and Federated customers have enjoyed for 10 years. "In our area, we were never behind when it came to broadband bandwidth," Beyer says. "It took careful planning, a challenging schedule and a lot of work from our team, but we're proud to have always been ahead of the industry."

The art of low and slow

2017 BBQ BOOT CAMP

The next BBQ Boot Camp will take place on Aug. 19 at 2702 Eighth St. SW, Washburn, N.D. It is a fundraiser for the North Dakota 4-H Camp. Overnight camping is available. Registration: BBQ Boot Camp Facebook page and at www.ndsu.edu/4h/camp.

In the Midwest, the lid never closes on grilling season, says Dr. Eric Berg, a professor of meat sciences at North Dakota State University. But things really start smoking around North Dakota come summertime when the BBQ Boot Camp rolls into town.

The boot camp began in 2008 as an event for the local Agriculture Extension Agency in Carrington, North Dakota. Berg partnered with co-worker and fellow barbecue expert Austen Germolus, who is the meat laboratory manager in the university's meat science department.

It took just one year for the smoke to spread into other towns. Now, the men host camps in six towns, both large and small, but it takes an army to make it happen.

"The BBQ Boot Camp is something that we all do on top of our regular responsibilities at NDSU, so the tricky part is finding blocks of time in between our regular job responsibilities," Berg says, adding that it takes almost a dozen people to pull off an effective camp. "So besides the faculty, all of whom have research and teaching appointments, we utilize our graduate students. The BBQ Boot Camp provides a great opportunity for the graduate students to improve their communication skills. Both domestic and international students benefit from this nontraditional experience, and the audience gains from the unique background that these students bring to North Dakota."

Even in the Midwest, where agriculture plays a strong role in the nation's economy, Germolus cites statistics showing that people today are four generations removed from the farm.

"We wanted to provide a program that teaches people about agriculture while making it fun," he says. "We knew that food would create a great venue to tell the agriculture story. It would be a program that paired learning about agriculture with something fun and entertaining — barbecue and food."

So each summer, Berg and Germolus load up their 18-wheeler and hit the road, visiting communities to spread the love.

Spencer Wirt, assistant meat lab manager and another member of the BBQ Boot Camp team, says campers ask a lot of questions, but many questions fall into the category of gas versus charcoal.

Wirt appreciates both. "It's charcoal for the purist in me and gas for convenience. There is something about an open flame that you get using charcoal and wood that makes the grilling experience special. Gas is great too because if I am in a hurry, I still get to enjoy the process; it's just expedited."

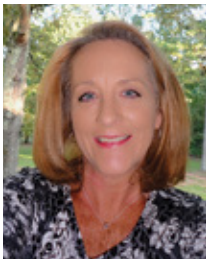
BBQ Boot Camp is divided into stations: spices, rubs and marinades; slow-cooking and barbecue grilling; grill selection and meat cut selection; degree of doneness; meat nutrition; and grilled side dishes.

The degree of doneness may be considered the most important station, as the only way to judge if a meat is "done" is by using a meat thermometer. The experts can't stress enough the importance of having one. "There should be no excuse not to use a thermometer when it comes to the cooking of a delicious cut of meat," Berg says. "The most common mistakes one can make are over- or under-cooking. That can lead to a bad eating experience or a food safety issue. Always cook to temperature and not according to time."


Dr. Eric Berg enjoys teaching and inspiring other cooks.

The class is not all about meat science, though. There's food — and lots of it. Although smoked prime rib is occasionally on the grill, the menu for most BBQ Boot Camps includes spare ribs, pulled pork with Kansas City dry rub, barbecue blue cheese burgers, brisket, leg of lamb, grilled vegetables and even grilled fruit with ice cream for dessert. Suffice it to say, campers never go home hungry.

"It's a feast," Germolus notes.



FOOD EDITOR **ANNE P. BRALY** IS A NATIVE OF CHATTANOOGA, TENNESSEE.

THE PROPER WAY TO COOK A BUTT

Fat equals flavor, but it will also protect against a cut of meat becoming dry during long-cooking, so the best cut to use for pulled pork is pork butt because of its good lean-to-fat ratio. Most fat will melt away when a cut is either grilled or barbecued.

Rub the pork butt generously with your favorite rub. Let that rub soak in for 30 minutes to 1 hour in a refrigerator or cooler. Regardless of what kind of grill you use, the temperature should not be above 250 degrees. We recommend 225 degrees during cooking. Place the butt on the cooking apparatus over indirect heat. Humidity is important, so if your meat doesn't have a lot of fat, make sure to have a pan of water under the meat while it cooks. This will provide humidity.

Add wood chips or chunks 30 minutes into cooking and smoke for the next 2 hours. After 4 hours, take the butt off the grill. At this point, you can add additional dry rub or liquid. Tightly wrap the butt twice in heavy aluminum foil and put back on the grill. Cook for an additional 2 to 4 hours or until the internal temperature reaches 190 degrees. If you are cooking with a bone-in pork butt, you should be able to grab the bone with tongs and pull it away from the meat without issue. Regardless, the meat should fall apart with little effort. Pull the meat and serve with your favorite sauce.

Photos courtesy of BBQ Boot Camp.

Carnivore's rub

Universal base for a variety of uses.

- 1/4 heaping cup salt
- 1 heaping tablespoon black pepper
- 1 teaspoon granulated garlic

Combine all ingredients and store in tightly covered container. Note: For ethnic flavor, add a teaspoon of allspice (Caribbean), a teaspoon of basil or oregano (Mediterranean), or a teaspoon each of dried celery and onion powder (Cajun).

Stuffed boneless pork loin

- 1 (4- to 8-pound) boneless pork loin
- Carnivore rub (see recipe above)
- 4 ounces crumbled feta cheese
- 1 packet or jar of sun-dried tomatoes
- 1-2 large cups of fresh spinach (rinsed)

You can butterfly the loin at home or have the butcher do it for you. Cut through the horizontal center of the loin, about 3/4 of the way through. Open the meat up and lightly pound it so it flattens out a little. Sprinkle the carnivore rub on both the inside and outside of the loin. Working with the inside of the loin, lay out a bed of feta cheese and sun-dried tomato, and then cover with fresh spinach. Roll the loin back to together and tie. You can either tie using a regular knot or butcher's knot. All you need to accomplish is keeping the ingredients inside the loin during transfer and cooking. Heat the grill to 275-325 degrees. It will take up to 1 1/2 to 2 hours to cook the loin, depending on the size of the loin. When checking the temperature of the meat, place the thermometer through either end of the loin and only in the meat. Placing it in the center may skew the reading. Cook to an internal temperature of 145 degrees, pull off the grill and let sit for 10 minutes.

Tip: Butcher knot examples can be found online, and you can purchase food-grade string at grocery stores.

Cinnamon chipotle rub

A good rub for ham, pork roast, pork chops and chicken.

- 2 cups brown sugar
- 1/2 cup chili powder
- 1/4 cup cinnamon
- Dash cayenne pepper (to taste)
- 1/4 teaspoon coarse ground black pepper
- 2 tablespoons crushed chipotle pepper

Mix well and store in a sealed jar. Liberally rub meat surface before grilling.

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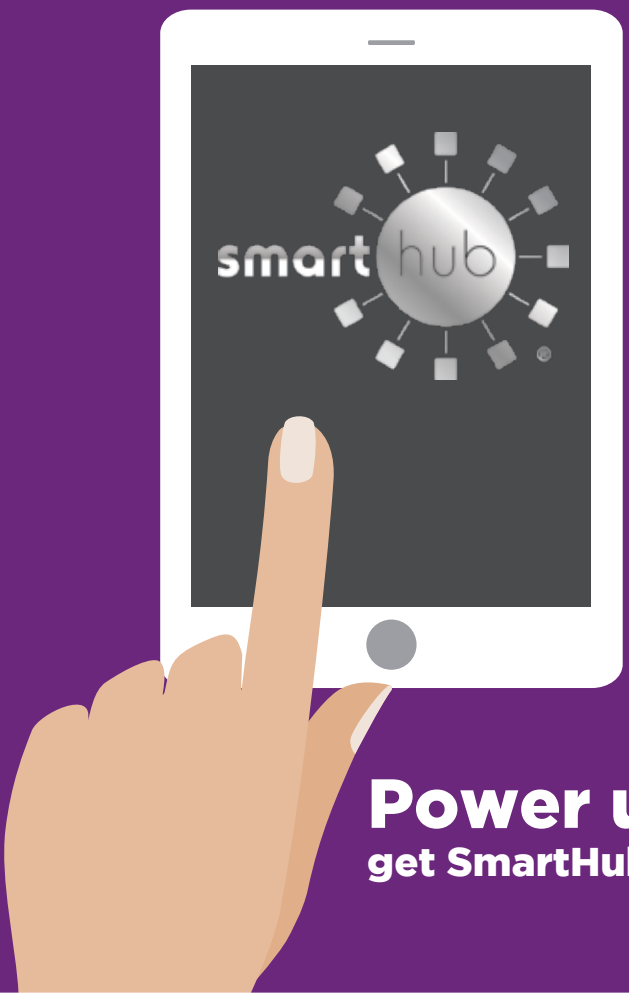

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