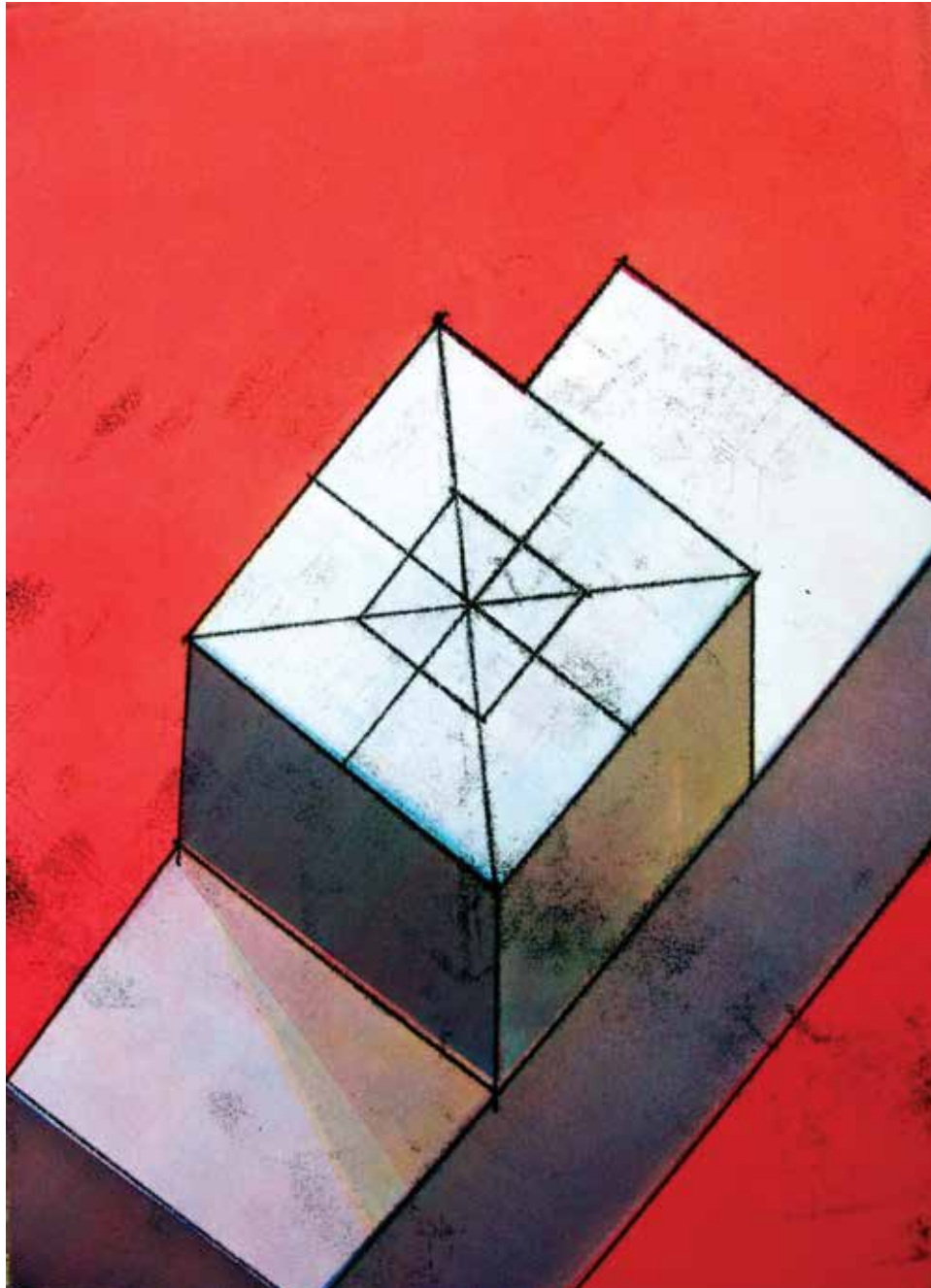
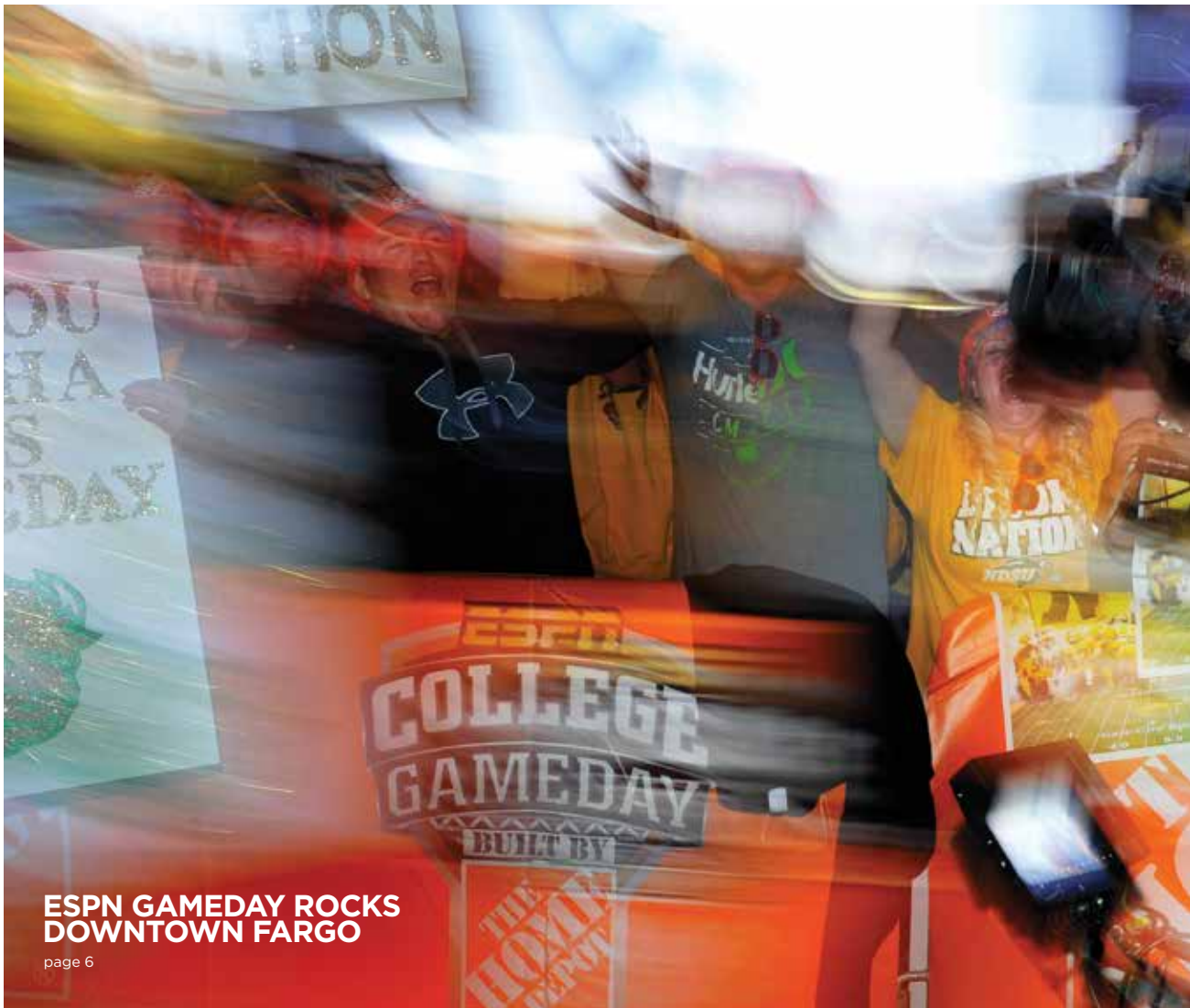


NDSU

MAGAZINE
NORTH DAKOTA STATE UNIVERSITY *fall 2013*





**ESPN GAMEDAY ROCKS
DOWNTOWN FARGO**



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Changing times, changing needs
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EDITOR'S NOTE



Earlier this year, after many months of guiltily not participating, I started using Twitter.

In case you aren't a Twitterer, (or is it Tweeter?), it's the social media vehicle for messages of 140 characters or less. One nice part about it is it counts the characters for you, and if you find yourself blathering on past the limit, the extra characters are color coded, so you can quickly see how much you've erred.

Like other social media, you can choose other Tweeters to follow, and others can follow you. It's very easy to Retweet someone else's pithy thoughts. Those are the basics; there're a whole lot of other features and options I have yet to fully master, but I do see others using them.

I tell of this not because I have any particular insight into Twitter. My first message was about as straightforward as they come: "Great alumni event in Watford City." There just wasn't room to say how nice the meeting space was, how many interesting alumni had come to the event, including a bunch of young and very chic recent grads, and that the food was delicious, especially the spinach dip.

I have, by way of comparison, quite a few more tweets than Warren Buffet, who started a few weeks before I did, with the wonderfully succinct message: "Warren is in the house," and has tweeted twice since then. But he has approximately 717,600 more followers than I do.

I follow many of our students, and they speak this Twitterly language cluttered with symbols, such as: [@leefitting](#) [@CollegeGameDay](#) I hear the [@NDSUathletics FCS](#) Playoff game will be good... [#BisoNation](#)

Or just nonsense, such as: [Group clapping is always a good time](#). (Please note, I scanned one of our top student's Twitter feed for this example.)

The reason I'm drawn to this Twitter experience is because of the student who taught me about it. She doesn't know this, we have never met. Her messages came to my attention because she was reporting the deliberations at a public meeting. At first, I was just happy to have this way to get real-time updates. But after a while I began to appreciate how easily articulate she is, particularly in such a short space. This sentence is not quite 140 characters. I am amazed at her ability to be insightful and witty and wise. And so fast.

I don't think the moral of this story is that the younger more tech-savvy crowd is about to take over the world. They are, for sure. But I think my message is how cool it is to be able to learn a whole lot from them.

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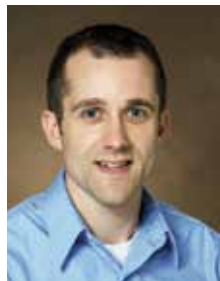
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A fourth-generation North Dakotan and third-generation rodeo cowboy, **SHADD PIEHL** grew up near the Mouse River south of Minot, N.D. He has been a ranch hand, stockyard bird, hog hide shaver, warehouse lumper, teacher, and rodeo cowboy. As a saddle bronc rider, he competed for NDSU in intercollegiate rodeo and was twice the Great Plains Region’s bronc riding champion. Shadd is a graduate of NDSU and Minnesota State University Moorhead and has taught English and literature in Belcourt, Casselton, Fargo and Bismarck, and is currently academic dean at Rasmussen College in Bismarck. He lives in Mandan with his wife Marnie and sons Owen, Wyatt and Ryder.



Although best-known as a personal columnist, **TAMMY SWIFT** found this short biography harder to write than the average assignment. She is a Glen Ullin, N.D., native who covertly read Erma Bombeck essays during seventh-grade English class. She grew up to be a word nerd/underachiever/NDSU graduate who spent her spare time interning at The Forum and telling people to take their feet off the seats at NDSU’s Festival Concert Hall. She worked at various newspapers (well, technically, two) for (mumble, mumble) years and also worked in the “civilian” sector – including NDSU’s own Publications Services department. Then, because she does nothing the easy way, she took a sharp right in her mid-40s and decided to become a social media marketing director at Kilbourne Group, a downtown Fargo revitalization group. She still has spare time, which she fills with friends, baking, reading, writing freelance columns for The Forum, watching old movies and lavishing ridiculous amounts of love on her dog, Kita.



DAVE NILLES is a 2004 NDSU graduate and now a senior staff writer in University Relations at NDSU. His first published work was an ode to the best Christmas present ever: a talking car like the one on the 1980s TV show “Knight Rider.” He’s since gone on to write about more serious – and perhaps more meaningful – topics such as the environmental impact of fuel ethanol and developments in wheat genome research. He worked for a magazine publisher in Grand Forks, N.D., owned a magazine publishing company in Fargo and did a variety of freelance writing an editing. When he is not gardening, brewing beer or sitting on a boat and not catching fish, he reads what his wife, Steph, terms “boring books,” also commonly known as nonfiction.



BARRY BATCHELLER earned an electrical and electronics engineering degree from NDSU in 1977 and has been involved in the founding of six start-up companies, including Phoenix International, Appareo Systems and Intelligent Agriculture Solutions. He holds more than 20 U.S. patents on controls, instrumentation and embedded mobile electronic devices, and has written numerous technical papers on the use of electronics in agriculture. He was awarded an honorary doctorate from NDSU in 2010. His essay for this issue was adapted from a speech he gave as part of NDSU’s Great Plains Land-Grant Summit, commemorating the 150th anniversary of the Morrill Act, which created land grants like NDSU.

ON THE COVER



KENT KAPPLINGER
SEGMENT I
MONOTYPE, 11" X 15"

ARTIST STATEMENT

My work addresses socio-environmental issues and focuses on balance, order, and regeneration initiating dialogue on the quality of life. I consider my work collaborative in nature, inspired by authors, reporters and researchers of environmental and cultural issues interpreted through my own rural-based background.



ABOUT THE ARTIST

Kent Kapplinger is a professor of art at NDSU, where he's taught printmaking and drawing since 1992. He also is director/master printer of the Printmaking, Education and Research Studio, or PEARS, institute in Fargo, N.D. He earned his MFA in printmaking from the University of Iowa and BA from Augustana College in Sioux Falls, S.D. Kapplinger's work has been shown in more than 230 individual and group exhibitions, most recently the FL3TCH3R Exhibition: Social & Politically Engaged Art, Tipton Gallery, in Johnson City, Tennessee, and Americas 2000: Best of the Best Centennial Invitational showing in Minot, N.D. He has participated in nearly 30 exchange portfolios, including East/West: Contemporary American Printmakers, Trace + Gesture, 50 Places, and Frogman Press & Paper. He has co-coordinated numerous student print exchanges including Quad 2010 and Oil and Water 2013. Kapplinger's work is included in more than 40 public and corporate collections, including McMaster University at Hamilton in Ontario, Canada; Special Collections Department and Rare Books Room at the University of Colorado, The Paul and Lulu Hilliard University Art Museum in the University of Louisiana at Lafayette, Museum of Texas Tech University, Northern Illinois University Art Museum, and Proyecto 'ace, Buenos Aires, Argentina. Kapplinger's work is available at Uptown Gallery in Fargo and online at www.kentkapplinger.com.



ON WORKING WITH NEW TOWN STUDENTS
(SEE STORY ON PAGE 10)

I've learned from previous high school visits that students aren't satisfied with simply observing a demonstration but prefer experiencing the process themselves, getting their hands into it to see what the technique can do for them. My goal for the workshop with New Town, N.D., students was that they learn about printmaking, work in a collaborative environment, and interact with NDSU Art/PEARS residents while developing personal imagery and printing it themselves. I determined an appropriate print medium for the workshop would need to be executed rapidly and could produce multi-colored imagery. I had studio residents demonstrate water-based monotype and photo-screen printing methods so that students would better understand required steps and visualize how the process might be used with their own imagery.

In monotype an artist makes a one-of-a-kind printed image or unique impression. The word comes from the Greek "monos," meaning single, and "type," meaning model. The process involves drawing or painting on a flat surface and then transferring the image by means of pressure onto a sheet of paper. The process requires artists to draw a design in mirror image, so when transferred, it will read correctly. Monotypes date back to the mid-17th century when Italian artist Giovanni Castiglione rolled a thin film of oil-based etching ink onto a clean copper plate, then wiped areas away with rags or brushes and created linear effects with a pointed stick. The process was used by William Blake, Edgar Degas, and Paul Gauguin in the 18th and 19th centuries and more recently by Michael Mazur, Nathan Oliveira, Ruth Weisberg, Michelle Martin, Jaune Quick-to-See Smith, and Ron Pokrasso to name a few.

Each New Town student sketched their images onto newsprint. Then a piece of frosted Mylar was placed over top and drawn again in water-soluble materials rather than oil-based inks. They picked from various colors, layering them to achieve rich complexity throughout. Once drawings were completed, they were placed on an etching press, covered with damp paper and etching blankets, then pressed by press rollers. Moist paper liquefied the drawing material and press pressure transferred the image onto the paper. Some did a second printing without redrawing that produced a lighter impression called a ghost impression. Many artists relish the spontaneity of monotype but Degas was known for using pastel over ghost impressions.



ARTWORK AND COLLABORATION

'Segment I' differs from the student work because several press runs of transparent ink were used on each impression to build luminous and unique color. The black lines were done as a trace monotype where the impression was placed on an inked surface then traced on the backside for a frayed string-like quality. There are several (segments) or sections in the image and one can see parts into which the object (whole) is divided. The piece was a collaboration with my father during one of his visits to Fargo. Though he was a dreamer and designer, he shied away from fine art. Yet he often made plans and schematics for projects to enhance our family farm. Things like bin sites, building remodels, and machinery innovation. When he came to the print studio I asked that he draw something and after some coaxing he did the basic isometric design you see. The printing and color aspects of the piece simply became play for me. The piece was the only artwork we did together so it remains very special to me.

ESPN GameDay rocks downtown Fargo

You may have heard about this, it was a pretty big deal: ESPN College GameDay brought its very popular three-hour show to Fargo a few weeks ago.

If you're not a sports fan, or not a sports fan of this level, it might help to know that only three other schools at NDSU's level in football have ever hosted, the last one was in 2008.

They set up in downtown Fargo, on Broadway with the Fargo Theater sign perfectly in the backdrop. It took several semis full of equipment and two days to set up for the big show. There were two stages at the corner of Broadway and Third. Four ESPN anchors used the north stage for much of the show, and they did interviews on the south one, so fans could fill both ends of the street.

And people were everywhere, hanging out of apartment windows and lining rooftops, holding up fun signs and having a blast.

The biggest moment seemed like it would be when the football coach was driven through the wildly adoring crowd in a golf cart for an interview, but that excitement was eclipsed by the dramatic finale. It's a tradition for the anchor named Lee Corso to put on the mascot



head of the team he thinks will win the game that day, but this time he took it to another level – he emerged from the lobby of the Fargo Theater with a live baby bison to indicate his prediction that NDSU’s Bison would win.

The baby bison hadn’t been given a name — until his national television debut. He is now called Corso, a fitting memento of a big day in the national spotlight.

It sounds like they liked us, and enjoyed learning how we say Bison. They’ll be back, soon, if their Tweets after the show are to be believed.



Chris Fowler @cbfowler, 21 Sep
 Huge thank you to Fargo and **#NDSU** for one of our favorite **@CollegeGameDay** ever! Bye-Zun fans are incredible. Love to do it again!



PHOTO COURTESY OF BISON ILLUSTRATED



INTRODUCING TIM BROOKINS

Tim Brookins is a doer. You can see it when you talk to him, he's always watching how things work and thinking of better ways. The quintessential engineer, but with a bit of mischief and maybe a little too much caffeine.

He graduated from NDSU in 1987 and again in 1990 with a master's, both in electrical engineering, and sort of bumbled into a job at what would become the worldwide company Microsoft. (He has said that when he took the job at what was then Great Plains Software in 1990, he thought it sounded boring but better than McDonald's.) He is now one of the most senior employees in the company, valued for his natural curiosity and drive.

Brookins also enjoys Bison football, traveling to away games and chatting at tailgating. Naturally when he noticed that other fans were interested in connecting during those activities he came up with an app for that, aptly named Bison Tracker.

The app allows NDSU fans to check in at all games, and has a GPS locator feature so you can find your pals at tailgating or in their seats in any stadium the Bison are playing. Brookins worked with a group of NDSU computer science seniors to get some of the project rolling, and the Windows and Apple versions were released at the beginning of the season. He worked like crazy to get the Android version released a little deeper into the season. You can check it out at Bisontracker.com.



WHAT DID YOU WANT TO BE WHEN YOU WERE A LITTLE KID?

An astronaut.

WHAT WAS YOUR COOLEST HALLOWEEN COSTUME?

Frankenstein.

DID YOU FIGHT WITH YOUR SIBLINGS?

My sister was four years younger. She frightened me, so I kept my distance.

WERE YOU ALWAYS SUCH A POSITIVE, PROACTIVE KIND OF GUY?

I used to be a mean person, with low tolerance for people who didn't share my views. I've made it a lifelong goal to do a 180.

DO YOUR SIBLINGS AND PARENTS UNDERSTAND WHAT YOU DO FOR A LIVING?

My dad routinely tells people that I run Microsoft. So, no, they do not understand my humble role.

DO YOUR WIFE AND KIDS?

Yes, surprisingly, my kids probably have a better grasp at what I do than my parents!

DO YOUR WIFE AND KIDS THINK YOU WORK TOO MUCH?

I drive my wife crazy when I get in her hair. She dreads the day I retire!

HOW DO YOU DESCRIBE YOUR CREATIVE PROCESS?

Understand the problem. I believe there is no absolute truth. Everyone sees the problem to be solved in their own uniquely distorted way, including myself. If the problem was simple, someone else would have already solved it. I will invariably spend far more time thinking about the problem than your average person. I actively consider that my view is distorted and try to include the viewpoints of others to improve my understanding.

When I switch to working on the solution, no one will outwork me. Edison comes to mind:

"Genius: one percent inspiration and 99 percent perspiration." Nothing is easy.

WHAT DO YOU DO TO GET OUT OF A CREATIVE BLOCK?

It's a sign that I haven't fully understood the problem.

WHAT'S THE BEST ADVICE SOMEONE'S GIVEN YOU?

Life is imperfect. Deal with it.

You can't control other people's actions... you can only control how you react.

AND WHAT'S THE BEST ADVICE YOU'VE OFFERED?

Make your choices and live with the consequences. Every choice has pros and cons. Do your best to pick the best option and *own* the cons. Owning the downsides of their choices is the true test of an ethical person.

WHAT DO YOU DO TO RELAX?

I do projects like Bison Tracker! And I love to go to Las Vegas! The best is when I can do both at once! (Write code by the pool).

MOST INTERESTING TRAVEL EXPERIENCE?

Eating lamb testicles in Moscow.

Not quite a travel experience, but we did the blow up doll at graduation.

www.youtube.com/watch?v=xgmjFGqLRPw

VICES?

Arrogance. I am working to overcome it.

VIRTUES?

I know that I am flawed and work every day to improve myself.

I can wiggle my ears.



THE ART OF TEACHING



David Walsvik, assistant principal at Edwin Loe Elementary in New Town, N.D., appeared slightly ruffled. Early '60s, bald, heavy-set and dressed casually in shorts and a T-shirt, he had been travelling for workshops and training, and though it was still summer break, the life of an elementary principal seemed to weigh on him. Teachers had resigned, the new term was starting soon, and they still needed to hire replacements.

But this weary man grew suddenly animated when he started speaking of teaching and students. He began gesturing with his arms, the volume of his voice went up and the tone deepened, he leaned in and said, "You know the best teaching lesson I ever got was from a professor at North Dakota State. He asked, 'Was that enough? Do you think you should've done more? Do you think you did enough?'"

The professor Walsvik credits with that lesson, Shubel Owen, taught vocational

agriculture at NDSU from 1938 until 1975. "On a scale of one to 10, he was a 12," said Walsvik.

Walsvik's first teaching job was in Wahpeton, N.D. Towards the end of his first year teaching, Owen contacted him and said he would like to come down and see him. "He didn't have to do that, and I was excited," Walsvik said. He readied lesson plans and projects to show Owen, but that type of detail wasn't what he seemed interested in.

Owen was more interested in looking over the facilities in general and seeing his former student in his new role as a high school VoAg teacher. He told me, Walsvik recalled, "My job was to make you think, to keep you wondering. Now your job is to make it work."

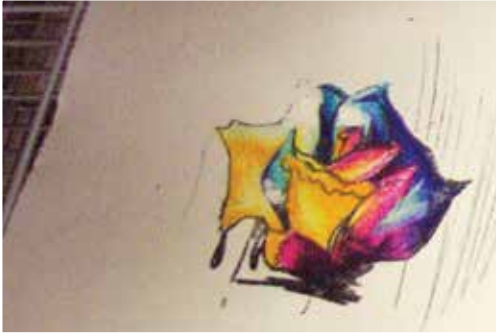
Walsvik has been trying to do exactly that in the 40-some years since. Doing more and making things work were the drivers behind Walsvik reaching out to NDSU last spring and ultimately coordinating a trip that took

eight students, ranging from grade six to 12, from New Town to Fargo in April so they could spend a day in workshops conducted by NDSU's Visual Arts Department.

"We need to give these kids a reason to come to school, a creative outlet," explained Walsvik. "So many of these kids are creative and often don't have a vehicle to express that. If we can get kids channeling that creativity into art, interested in it, it can affect their academics. What keeps a kid in school? It has to have a purpose in it, even if it is for pleasure."

The eight New Town students attended three two-hour workshops, beginning the day with digital design/Photoshop with Su Legatt, followed by drawing with Kim Bromley, and finally printmaking with Kent Kapplinger.

Kapplinger, whose workshop was titled "Drawing on the Wild Side," said the day was rewarding for him and he hoped eye-opening for the students. "I truly believe they discovered something inside themselves



“I TRULY BELIEVE THEY DISCOVERED SOMETHING INSIDE THEMSELVES I DON’T THINK THEY THOUGHT WAS THERE.”

KENT KAPPLINGER,
PROFESSOR OF VISUAL ARTS

I don’t think they thought was there,” he said. “With guidance from the workshop they created personal and dynamic images. They seemed to discover art can be fun.”

Walsvik believes the workshops opened the eyes of his students and that they left wanting more, even though the day was a long one with the first session starting at 9 a.m. and the last ending at 5 p.m. New Town’s 4 Bears Casino sponsored the trip, paying expenses and giving each student a \$100 stipend. “The Casino doesn’t want to put all its money into sports,” Walsvik said wryly.

To choose which eight students would travel to the workshop, the New Town Public Schools held a judged competition in which students submitted a work based on a holiday theme or an animal as subject matter. The artwork included paintings, drawings and sketches. Selected students, who also needed to have passing grades,

included three sixth graders, three seniors and a freshman and sophomore.

Braiden Jay Standish, a high school freshman, said the Photoshop workshop with Su Legatt was the most interesting for him, but that he “found absolute enrichment” in all the workshops.

Senior Joshua Bad Hawk thought the workshop brought out skills that he didn’t know he had. While sophomore Frannie Lockwood liked learning new things about painting and printmaking and said she was much more interested in art now.

Walsvik hopes New Town Public Schools will continue building upon the workshop experience and the relationship with NDSU with workshops either on campus again or perhaps even bringing faculty to New Town. “If NDSU came to New Town, we would have 25 to 40 percent of the kids interested.”

This is something Michael Strand, NDSU’s visual arts department head, would also like

to happen. “We have some potential funding to do a workshop out there and a lot of the work we are focusing on is community outreach,” he said.

It is a reflection of the legacy of an instructor like Shubel Owen that one of his former students is still wondering if he has done enough, and recognizing untapped talent and the creative impulse. “We live in a world where you can’t just keep teaching the same way that you’ve done it for 40 years anymore,” Walsvik stressed. “You have to grow and change.”

— SHADD PIEHL



Baking the best of it

ARCHITECT FINDS TRUE VOCATION AS A BAKER

Casey and Matt Steele's October wedding looked absolutely perfect.

Hair swept up in a swirl of curls, Casey wore a strapless, A-line dress fashioned from white lace. In wedding photos, she flashed a luminous smile alongside her new husband. Family and friends posed for photos and laughed with the handsome young couple.

But the bouquet of sunflowers Casey clutched hid a painful fact. Casey's right thumb was blistered and raw. In a fit of pre-wedding enthusiasm, she'd decided to make all her own flowers, decorations and desserts for the wedding. And because Murphy's Law loves to foil such ambitious aspirations, Casey had burned her thumb — badly — while stirring the caramel cake filling on the night before the big event.

Of course, the cake turned out wonderfully, the day turned out even better and the story of Casey's scalded thumb became part of the couple's wedding lore. A lesser woman might have sworn off ever subjecting herself to such stress again. Instead, Casey Steele had found her true vocation.

It wasn't long before Casey launched her own side business, Love in the Oven Bakery. The Fargo-based business provides sweet and wonderful treats for everything from weddings and birthday parties to corporate meetings. Casey loves what she does, although she knows it's an unconventional choice for someone who graduated from NDSU with an architecture degree in 2009. Back then, the self-proclaimed "bookworm" liked her architecture classes and loved school, but she sometimes felt like it wasn't exactly the right fit. >>

It didn't help that she graduated in the midst of an economic slow-down, which made it tough to find a job in her field. Instead, Casey took a position working in the YWCA Child Care Center. She was more apt to color-code crayons than do CAD design, but it indirectly led her to what she really wanted to do.

While growing up in Zimmerman, Minn., Casey had loved helping her mom bake. The family kitchen filled with the wonderful smells of pumpkin pie, sugar cookies or lemon poppy seed bread as they mixed, whisked, rolled and frosted their way to each big holiday. Casey carried that zest for baking into her young adult life. Whenever she wanted to wish someone a happy birthday at work or thank someone for a kindness, she made them a baked treat. People started telling her she should sell her goodies. Initially, she thought they were just being nice, but after a while the compliments became hard to ignore. She figured they might be on to something.



After getting the proper licensure in August of 2009, she began baking after work in the Y's commercial kitchen. She chose the name "Love in the Oven Bakery," to drive home the message that these were not mediocre, mass-produced goods, but personalized, from-scratch treats — many made from her mother's and grandmother's recipes.

Accordingly, her specialties were tasty and pretty — but simple. Some might expect an architect to build structurally complex, 12-layer cakes, but Casey will seldom plan a cake taller than three tiers

high. "I tell people my car isn't tall enough, which isn't true," says Casey, demonstrating a wry, deadpan charm.

The fact is that Love in the Oven doesn't aim to compete with the already impressive roster of wedding cake artisans in Fargo-Moorhead. Instead, the business specializes in distinctive, carefully made confections like cake bites — cunning little cake rounds enrobed in a hard, petits-fours-style icing.

Casey's handiwork also demonstrates an eye for detail, which harkens back to her design background. Cake pops are swirled with perfect little curlicues of icing. Buttery shortbread flowers sprout from little shortbread pots filled with rich ganache. Fruit-studded, triangular scones are generously coated in a glossy glaze. "It's the only area in my life in which I'm precise," she says, laughing.

The world of architecture has proven surprisingly relevant to the world of the professional baker. Casey believes the former discipline's emphasis on problem-solving and out-of-the-box thinking can benefit anyone with an entrepreneurial streak. And she actually did get to design her own space when Love in the Oven relocated to a 3,200-square-foot, wood-framed building in an industrial neighborhood near downtown Fargo in 2012. Backed by the financial and emotional support of Matt, a software engineer, they transformed the large building into Square One Rental Kitchen and Event Center, a commercial kitchen available for rent, as well as Love in the Oven's headquarters. "Though I'm the one here all the time and Matt has a full-time job, he hears all my stories and concerns and offers up mindful solutions for our business," Casey says. "He keeps me sane."

Today Casey's growing business has become kitchen central to numerous start-up caterers who needed Health Department-blessed preparation space. It's a busy place, filled with lots of activity and the smells of fresh bread. Amid all this, Casey continues doing what started it all: building masterpieces that aren't house-sized, but mouth-sized.

"I like simple things. It took me five years to figure that out," she says.

— TAMMY SWIFT





MINARD HALL REOPENS

The charm of original woodwork and metal ceiling tiles combine with modern updates to technology, design and accessibility in the recently completed \$18 million renovation to Minard Hall. The project added nearly 34,000 square feet of space to one of the largest and busiest academic buildings on campus. Now surpassing 142,000 square feet, the facility holds 1,023 seats in 13 classrooms and expanded and improved laboratory facilities where undergraduate and graduate students conduct research with faculty.



The building houses the English, communication, emergency management, history, philosophy and religious studies, sociology and anthropology, and modern languages departments from the College of Arts, Humanities and Social Sciences. It also houses the mathematics and psychology departments from the College of Science and Mathematics as well as the deans' offices for both colleges.

Originally named Science Hall, it was built in three stages in 1901, 1918 and 1929. The first section cost about \$25,000 and was home to the biology, geology, horticulture and mathematics departments. The building was renamed Minard Hall in 1951 to honor Archibald Ellsworth Minard, who started as an English and philosophy instructor in 1904 and held several leadership positions during his long career. He was head of the English department, served as dean of the School of Arts and Sciences for 30 years and served as acting president from July to September 1929.



NORTH DAKOTA STATE
BISON



SNOW





Sport and recreation leadership major works hard on game days

As a cool September sunrise greeted the ESPN College GameDay set in downtown Fargo, thousands of NDSU students and fans crowded Broadway and the buildings surrounding it. They were there to support their team while the popular Saturday morning show was making its first visit to North Dakota.

Scott Maher wasn't with his friends and fellow students, however. He was 15 blocks north preparing for a football game.

Maier is a first-year student pursuing a degree in sport and recreation leadership. And he's one of eight student managers in the NDSU football program.

He exudes passion about the team and his role, which provides hands-on learning for his major. "People in the professional world like seeing good grades, but they also look for individuals with experience in their field," Maher said. "While this might not be a shoo-in for what I want to do, it already is paying off."

The experience is made easier when his team's success makes ESPN take notice.

On Friday night, Maher visited the TV set and met on-air personalities Chris Fowler and Lee Corso, among others. He noted the behind-the-scenes efforts. "It was cool to see everything for GameDay in relation to sports management," he said. "The effort into pulling off an event that size was impressive."

Maier is doing much of the same for the NDSU football team. This summer he arrived at NDSU on July 29, ready to begin his role as student manager. He arrived before the team hit campus, and each day has brought something new.

The managers begin setting up equipment an hour before practice starts and more than 100 players arrive. Broken chinstraps are replaced. Helmet air bladders are adjusted. The slick film covering new footballs out of the box is scrubbed off. Each act, as minor as it might seem, adds up to build a winning tradition.

Each manager then assists during drills with a specific position group – Maier focuses on the fullbacks and tight ends. The routine carries over into Saturdays.

GameDay started as any other game day for Maier. Kick off was set for 2:30 p.m., but his duties actually began Friday, helping ready the player's game uniforms and equipment. On Saturday, he arrived early in the Fargodome to prepare the sideline – wheeling out extra gear, setting up white boards, towels and the coaches' headsets.

As the players arrive, Maier helps with any last-second equipment needs before helping his position group warm up. During the game he fixes broken equipment and makes sure the kickers have space to keep loose. He also retrieves the kicking tee after each kickoff. >>



IT CAN FEEL LIKE
A FULL-TIME JOB.
IT'S SOMETHING
YOU DO BECAUSE
YOU LOVE IT.

**SCOTT MAHER,
NDSU FOOTBALL STUDENT MANAGER**

After the first quarter, the managers return to the locker room to get things ready for halftime. After the game, they wheel everything back to the equipment room and start laundry. The managers rotate schedules, and this Saturday Maher stays late to wash and air-dry game jerseys and set out practice gear. He leaves the dome around 8:30 p.m.

Away games follow a similar routine, with the exception of loading equipment onto a truck for the trip. Each week also features "helmet night," where helmets are washed and torn decals are replaced. It's all part of making

sure everything behind the scenes runs smoothly, and the team performs at its best. "It can feel like a full-time job," said Maher, who is taking 15 credits. "It's something you do because you love it."

The work experience meshes well with his academics. Maher's sport and event management class teaches the aspects of managing sporting events. He volunteers time scheduling events for the Fargo YMCA. In addition, he's an active member of Saddle and Sirlain, Chi Alpha and the Sport and Recreation Leadership Association.



Maher plans to pursue a master's degree in sports administration with hopes of becoming an athletic director or professional football scout.

Raised as a self-described "ranch kid" near Timber Lake, S.D., he is used to hard work. He grew up as a hired hand each summer, cutting hay and branding beef cattle. "It hasn't always been easy," Maher said. "You just have to be in the right place at the right time."

Maher has strong family ties to NDSU. His grandfather, Alan Woodbury, is a 1970 animal science graduate who lives in Dickinson, N.D.,

and saw NDSU's first back-to-back national football championships as a student. Maher and Woodbury attended the 2012 championship game in Frisco, Texas. "We both have a passion for NDSU football," Maher said.


"In order for him to see that now — how far we've come — to be able to share that experience with him was amazing."

Growing up about 120 miles south of Bismarck, N.D., put Maher squarely in enemy fan territory. His classmates gave him a lot of grief for being an NDSU fan. Many of his friends rooted for South Dakota State

University. Maher and his co-workers traveled with the team to SDSU to watch a 20-0 win in September. He hopes to make one more trip to Frisco in January.

"However the season goes, it's been rewarding," Maher said. "I give a lot of credit to my fellow managers and boss."

— DAVE NILLES



COSTUMING Catherine the Great

Kelsy Hewitt made this Catherine the Great costume for a fall theater production. More specifically, she was the pattern maker, draper and stitcher, technical terms in her field, for which she is pursuing a Bachelor of Fine Arts in Design and Technology with an emphasis in costume design. She spent about 110 hours of shop time completing the piece, starting from just a sketch. The outer jacket alone took seven yards of fabric, and the entire piece involved four fittings, a couture technique of creating the gown directly on to the figure. It was mentally, physically and emotionally challenging, she says, but a good exercise in problem solving.



Anna Pieri is the actress who wore the gown in NDSU's fall theatre production of "Handing Down the Names."

This is the centennial season for NDSU's theatre program, originally known as Little Country Theatre and now LCT Productions.

CLASS NOTES

To read the most current class notes and obituaries, and to submit information, visit ndsu.edu/classnotes.

'60s

JOE ISAKSON, FS '61, agriculture, food systems, and natural resources, was recognized as a distinguished alumnus for the South Dakota State University Department of Journalism and Mass Communication. A retired agricultural journalist, he was assistant agriculture editor for the NDSU Extension Service from 1960-61. He later worked for the Forum of Fargo-Moorhead, Dakota Farmer and The Farmer. He lives in Sioux Falls, S.D.

DON BARTLETTE, MEd '66, counseling and guidance, has written his upcoming autobiography, titled "Macaroni at Midnight," and a movie about his life is in consideration. He has experienced a 40-year career in public speaking and the ministry. He lives in North Canton, Ohio.

JANE (BALE) EMISON, BS '68, design, received the Gamma Phi Beta Philanthropist Award, which honors outstanding endeavors outside the organization. She served 16 years as a national trustee of the Boys and Girls Club Foundation of America, is a trustee of the Minneapolis Institute of the Arts and is treasurer of Hillwood Foundation. The award is the highest honor presented by Gamma Phi Beta Foundation. Emison lives in Deephaven, Minn.

AL GUSTIN, BS '69, agricultural economics, published a book, "Al Gustin's Farm Byline - Reflections on North Dakota Agriculture 1974 to 2013." Gustin, who retired from full-time farm broadcasting in December 2012 after a 45-year career, was named Farm Broadcaster of the Year by the National Association of Farm Broadcasting and received the National Farmers Union Milton D. Hakel Award for Excellence in Agricultural Communications.

ELLIOTT HAUGEN, BS '69, mathematics, German, retired as senior vice president at Kaludis Consulting, a leading higher education consulting firm, where he led the company's information management and technology practice. He previously worked at NDSU and St. Louis University. He and his wife, Vicki, live in Falls Church, Va.

'70s

DANNY R. HOFFMANN, BS '74, animal science, was named the 2013 North Star Classic Livestock Honoree. A lifelong farmer and livestock producer from Wheatland, N.D., he was honored for his commitment to the livestock industry in the state and a supporter of the North Star Classic since its beginning.

GREGORY W. THOMPSON, BS '76, MS '89, agricultural education, completed his term as 2012-13 president of the American Association for Agricultural Education. He is the department head in the College of Agricultural Sciences at Oregon State University, where he has been a professor for 17 years.

BARBARA (GREMBOWSKI) WHEELING, BS '76, animal science, was named dean of the College of Business at Montana State University, Billings.

'80s

DENNIS WALSH, BS '80, agricultural economics and agricultural communication, was named Honorary American Farmer at the National FFA Convention in Indianapolis. The National FFA Organization has 540,379 student members in more than 7,000 local chapters. He previously served on the N.D. FFA Foundation board for six years. He lives and farms in Harvey, N.D., and is chief credit officer at First International Bank and Trust.

DAVID NELSON, MS '81, entomology, received the James A. Graham Award for Outstanding Service to Agriculture from the National Association of State Departments of Agriculture. He joined the North Dakota Department of Agriculture as a plant protection specialist in 1982 and was appointed state entomologist in 1992. He retired in 2012.

SCOTT MATTHEW WILLIAMSON, BUS '81, university studies, completed 30 years of service as a certified registered nurse anesthetist for The Permanente Medical Group in Vallejo, Calif. He lives in American Canyon, Calif.

MARK WATNE, AD '82, agricultural mechanization, was elected president of the North Dakota Farmers Union. He is a self-employed farmer in the Velva, N.D., area and lives in Jamestown, N.D.

JONATHAN CRUMP, BS '84, BArch '84, architecture, joined the Tulsa, Okla., office of Dewberry, an architectural, engineering and consulting company, as the design director. With more than 25 years of experience in architecture, he previously was a principal for Leo A Daly, where he worked on higher education projects.

KATHY (COOK) HELMING, BS '84, botany, joined Blue Cross Blue Shield of North Dakota as director of continuous improvement and performance in health network innovation. She previously was executive director of the office of continuous improvement at Sanford Health, Fargo.

DOUG WILD, BArch '87, architecture, BS '87, architectural studies, was named a principal of BWBR, a design solutions company in St. Paul, Minn. He joined the firm in 1998 and has worked on facilities for the Minnesota National Guard, 3M and Minnesota Department of Transportation, among others.

KEVIN NELSON, BS '89, civil engineering, joined Larson Engineering Inc., in Bismarck, N.D., as regional manager to oversee the firm's North Dakota operations.

'90s

KELLY JAMES HOLWAGNER, BS '90, business administration, was named vice president of operations at Western Computer. The company is a global Microsoft business solutions reseller and implementation company. He lives in Fargo.

MICHAEL KITHCART, BS '90, mass communication, joined the Baily Group in Minneapolis as a senior consultant and executive coach. She specializes in executive onboarding, change management, board relations and business development.

PHIL HANSEN, BS '91, agricultural economics, joined the board of directors of the Impact Foundation, a non-profit organization that teaches charities to develop fundraising and leadership skills. The former National League Football player owns a landscaping business in the Detroit Lakes, Minn., area.

WAYNE LAGORIN, BS '93, petroleum engineering, is the CEO of Spartan Engineering, Tulsa, Okla. The company was recognized at the first annual Oil and Gas Awards ceremony as the Engineering Company of the Year. The company was established in 2009.

MELISSA REARDON OLSON, BS '93, food and nutrition and corporate and community fitness, joined Noridian Mutual Insurance Co., Fargo, as director of worksite wellness in the company's human resources and development division. She previously was director of Healthy North Dakota at the North Dakota Department of Health in Bismarck, N.D.

JENNIFER (SKALICKY) SATTER, BS '93, business administration, was promoted to Noridian Administrative Services employment manager in human resources and development at Noridian Mutual Insurance Co. She has been with the company since 2001.

MARK STRONG, BS '93, electrical and electronic engineering, was named vice president of research and development for HeartWare International Inc., based in Framingham, Mass. At HeartWare, he leads the company's research and development efforts in the area of miniaturized implantable heart pumps or ventricular assist devices. He previously was a vice president for the Boston Scientific Corp. Cardiac Rhythm Management business unit.

STACEY ACKERMAN, BA '94, English and sociology, was promoted to senior regional fiduciary manager for Wells Fargo Private Bank. She is responsible for investment and fiduciary services business in North Dakota, South Dakota, Nebraska and Kansas. She also is a board member for YMCA of Cass-Clay and is active in the Moorhead Rotary Club.

ROSS MANSON, BS '94, accounting, MBA '04, business administration, was named to the board of directors of Eide Bailly as principal-in-charge of its Fargo office practice. He is one of the co-creators of Eide Bailly's proprietary Health Care Reform analytics tool, which provides businesses with information regarding current and future health insurance plan costs. Manson joined the firm in 1994.

THOMAS ENGEN, BS '97, business administration, joined Spearfish Motors in Spearfish, S.D., as the company's finance manager.

'00s

CATHERINE A. JOHNSON DUTCHER, MEd '01, counseling, joined Catholic Charities of North Dakota as director of counseling. She lives in West Fargo.

SEAN SAFRANSKI, MEd '01, education, was named assistant principal at Davies High School in Fargo.

JENNIFER MILLER, BA '02, mass communication, MBA '08, business administration, is the global programs/marketing representative for Roll-A-Ramp, West Fargo. The company received the Presidential "E" Award for exports from the U.S. Commercial Service. Miller accepted the award from Deputy Secretary of Commerce Rebecca Blank on behalf of the company at a ceremony in Washington, D.C.

BRANDON PHILIPCZYK, BS '03, political science, was named operations director with the Texas Democratic Party. He lives in Austin, Texas.

RICHARD L. SHEA, BS '08, economics, is an attorney in Alexandria, Minn., at Shea Law Offices PA, a general practice law firm serving west central Minnesota.

BRIDGET (CURLEY) BULLINGER, BS '07, dietetics, was honored as the Recognized Young Dietitian of the Year by the North Dakota Academy of Nutrition and Dietetics at the North Dakota Long Term Care Association Annual Convention. She is director of culinary services for St. Benedict's Health Center in Dickinson, N.D.

MICHELLE BEACH, PhD '09, education-institutional analysis, was nominated for the 2013 International Distance Learning Award – Outstanding Leadership by an Individual by the United States Distance Learning Association. She is a faculty member at Southwest Minnesota State University, Marshall, Minn.

GRETA (LOEN) EVENSON, MEd '09, educational administration, was named assistant principal at Fargo South High School.

Aaron Knodel receives 2014 North Dakota Teacher of the Year award

Aaron Knodel is an English language arts teacher at West Fargo High School, and this fall was named North Dakota's 2014 Teacher of the Year.

North Dakota Gov. Jack Dalrymple and State Superintendent of Public Instruction Kirsten Baesler made the announcement in September at a ceremony at West Fargo High School.



"Aaron exemplifies North Dakota's outstanding teachers who are dedicated to education excellence and to helping our young people achieve their full potential," Dalrymple said.

Knodel is a 2001 NDSU graduate in English education, and has taught at West Fargo High School since 2004. He teaches senior English, advanced placement language and composition, debate and argumentation, and the fundamentals of public speaking. He also is an adjunct professor at NDSU and the North Dakota State College of Science, teaching courses in public speaking and the methods of teaching writing. He also serves as president of the North Dakota Council of Teachers of English.

"I am honored and humbled by the opportunity to represent this noble profession," Knodel said. "The interactions I have with my students and the interactions they have with each other have the potential, on any given day, to significantly impact their lives."

The program recognizes and honors the contributions of America's classroom teachers. Nominations must come from a teacher, school administrator, school district trustee, local education association, student or parent. Knodel was named Teacher of the Year for West Fargo High School in 2011-12 and 2013-14, making him a candidate for the state award. Knodel will now advance to the national Teacher of the Year program.

'10s

SHAWN CROWLEY, MArch '10, architecture, received the 2013 Early Career Architect Award from the North Dakota chapter of American Institute of Architects. Crowley is an architect with EAPC Architects.

SARA BAKKEN, BS '12, marketing and retail merchandising, is the traffic coordinator with Absolute Marketing Group, Fargo. She had started with the company as a client relations intern and moved into her new role.

ADAM FULLER, BS '12, marketing, joined Flint Communications, Fargo, as an account coordinator to support the company's account services team and strategic planning.

KRISTEN OLDYN, BS '12, business marketing, joined Absolute Marketing Group of Fargo as a client service representative. She had begun with the company as a media buying intern. She also recently completed her first year as assistant coach with the NDSU Dance Team.

WESTON MCGRUDER, BS '13, civil engineering, joined Advanced Engineering and Environmental Services Inc. as an engineer in training in the firm's Moorhead, Minn. office.

FAISAL MOHAMED, BS '13, management, has begun Ecolab's Supply Chain Leadership Development Program. He is a production supervisor in Martinsburg, W.V.

ESSAY

by Barry Batcheller

Changing times, changing needs

ALIGNING TWENTY FIRST CENTURY OPPORTUNITIES WITH A NINETEENTH CENTURY IDEAL

When I was a young boy growing up in Freeport, Long Island, I had the most amazing fifth grade science teacher. His name was Mr. Smith, and he really loved his job. He once told me that he thought his primary job was to awaken the sense of curiosity that is latent within all of us, and to show us how to wake up that muse any time we wished, throughout the rest of our lives.

I have long forgotten most of what took place in those fifth grade science classes, but I remember being exposed to the magic and mysteries of science there, as can only be seen through the eyes of a ten year old. And Mr. Smith was right, I have never forgotten how much fun it is to probe the nature of the universe and try to coax from her the secrets she holds dear.

I'm absolutely sure that the year I was exposed to Mr. Smith was the year I decided what I wanted to be when I grew up. From that point on, being a scientist or engineer sounded like much more fun than being a fireman or policeman. Seven years later, I graduated from Freeport High School and decided that North Dakota State University was where I wanted to pursue my dream of becoming an engineer. I chose NDSU for two reasons — the first was that NDSU would allow me to carry 23 credits a quarter and pursue a double major in aerospace and electrical engineering, and the second was that when I talked to the dean of electrical engineering at NDSU he informed me that they were working on a project for Skylab; and if I was a good student I'd get to work on it too. This was in

1969, and men were shortly to walk on the moon. Everyone I knew wanted to play some sort of role in space exploration, and I was determined to start my journey in Fargo.

By 1974 the space race had ended and I was married to a farmer's daughter from Ada, Minnesota. I'll never forget the first time I went to Ada and meet my future father-in-law. We were sitting around the dining room table when Julien told him that I was from New York, and I watched his eyebrows go up. He later found out that I could weld — courtesy of the welding course I took at NDSU — and things were OK from there on. Following graduation I almost accepted a job offer with Texas Instruments in Dallas, Texas, but was persuaded by a fellow NDSU graduate to join him at Steiger Tractor, a young tractor manufacturing



company in Fargo founded by the same folks who had started another successful business in North Dakota, Melroe Bobcat.

When I joined Steiger I was the only electronics engineer in the company. It was an amazing place. There were about 40 people in the engineering department, and they had this incredible entrepreneurial spirit. At a time when four-wheel-drive tractors were fairly new upon the plains, they were experimenting with two-engine tractors, three-engine tractors and electrically controlled power shift transmissions. Over the next four years, they allowed me to create an electronics engineering department, design a fully integrated on-board computer that controlled every major component of the tractor and spin off a wholly-owned electronics subsidiary.

This little company pushed the state-of-the-art in control and display technology for agricultural machinery far beyond what was then accepted practice in the industry, and was a principal reason that Tenneco purchased the company in 1986.

Having acquired a taste for the advancement of electronics in agriculture, I struck out on my own in the spring of 1987, and along with two other former Steiger executives, founded an electronics company in Fargo focused on the development and production of electronics for mobile equipment. We called the new company Phoenix International. “Phoenix” because we were rising from the ashes of Steiger Tractor and “International” because there were about a million companies named Phoenix in the world and we thought international sounded

impressive. Twelve years later, when we sold the company to John Deere, we were indeed an international firm with offices in Paris and Cologne and a factory in Denmark. I stayed on at Deere as their director of technology for six years after the acquisition. I retired from Deere in 2005 and founded my current company, Appareo Systems. Phoenix is now one of the largest high technology firms in Fargo.

I share this background with you — 35 years in the development of advanced technologies for mechanized agriculture — as a preface to the remainder of my essay, which follows the evolution of the land-grant university concept from an agricultural-based ideal in a country where agriculture was the primary industry, to the expanded role that land-grant universities might play in the 21st century.

JONATHAN TWINGLEY



American companies today desperately need talent with degrees in STEM — Science, Technology, Engineering and Math — in much the same way that 1867 America needed farmers and agronomists.

America was a vastly different place back in 1862 when Justin Morrill, a U.S. Representative from Vermont, proposed legislation which ultimately established land-grant colleges. The legislation he proposed was strongly influenced by the social constructs of the time, in which agriculture played a dominant role. Subsequent legislation that built upon the land-grant college foundation — the Hatch Act of 1887 and the Smith-Lever Act of 1914 — were similarly influenced by circumstances affecting American society at the time of their creation.

In the mid-1800s, it was unusual for an individual in this country to have a college degree. Higher education, for the most part, was reserved for those of substantial means. Justin Morrill, the son of a blacksmith in Vermont, left school at the age of 15 because his father could not afford the tuition required to send all his sons to college. Mr. Morrill went on to become a prosperous store owner and became very active in public life. In 1855 he was elected to congress, and became an outspoken advocate for the ideal that a college education should be available, at low cost, to all who desired one.

The Morrill Act states that “the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

The emphasis on education in the agricultural and mechanical arts must be interpreted in the context of the times. In 1860 the United States was still predominantly an agrarian society. The population of the country was 31.4 million people, of which 15.1 million people, or about 48 percent of the total population, lived on about two million farms, principally located east of the Mississippi River. The average farm size was less than 200 acres, and farmers represented about 58 percent of the labor force. Agricultural exports that year were \$189 million, which represented about 81 percent of the

total exports of the United States. The health and vitality of the nation was to a large extent dependent upon a strong and vibrant agricultural industry, and had been so since first becoming an independent nation. In fact, the first census of the United States, taken 70 years earlier when the population was just under 4 million people, showed that more than 90 percent of the populous was involved in agriculture. So in 1862 an emphasis on education in the agricultural and mechanical arts made a great deal of sense.

By the time the Hatch Act was passed in 1887, the population of the United States had grown to approximately 58 million people, and the number of farms to more than four million.

Agricultural exports had more than doubled since the passage of the Morrill and Homestead Acts of 1862, and now represented more than 75 percent of the total exports of the country. Nevertheless, at this time in America’s history many of the nation’s farmers were in great debt, which congress attributed to a deficiency in general practical knowledge of agricultural methods, and the absence of productive, reliable agricultural machinery. These deficiencies were seen as direct contributors to the lack of prosperity for America’s farmers, and they needed to be addressed. So the stage was set for the government to intercede and accelerate innovation in agriculture. The industrial areas of the economy had already received significant money for the purposes of research, and Congress felt a need to create and maintain an equitable balance among all sectors. It was felt that creating such an equitable balance would, in turn, increase the economic security of the nation.

With the passage of the Hatch Act, the federal government for the first time reached out to support research and discovery in the nation, and took an additional step in stimulating economic growth. The stated purpose of the Hatch Act of 1887 was “to establish agricultural experiment stations in States that had established colleges under the Morrill Act, in order to provide funding to those States willing to conduct research in the area of agriculture.”

Research conducted at these stations needed to be related to the physiology of plants and

animals; diseases and remedies of diseases in plants and animals; comparative advantages of crop rotation; capacity of plants to acclimate; analysis of soil and water; analysis of various types of fertilization and their comparative effects on crops; digestibility of foods for farm animals; and any other research deemed directly related to and beneficial for the United States agriculture industry. Like the Morrill Act before it, the Hatch Act was intended to provide support for agriculture, the nation’s leading industry, this time in the form of impetus for research with the goal of fostering economic growth.

By 1914, farm population in the United States was approaching its peak, but was already showing signs of decay. Life in rural America could be difficult, and the urbanization of the country was underway. Secretary of Agriculture David Houston believed that nothing short of a comprehensive attempt to make rural life attractive, comfortable and profitable would solve the chronic problems of agriculture and rural life. He viewed the Smith-Lever Act as the mechanism through which the intellectual and social aspects of rural life could be improved. Specifically, the Smith-Lever Act facilitated the distribution of information on agricultural research spawned by the Hatch Act to the user group for which it was originally intended — the American farmer.

The Smith-Lever Act provided for cooperative financing of the present-day county extension agent system under the direction of land-grant colleges and universities, and in cooperation with the United States Department of Agriculture. Not only did this system communicate new research findings from the agricultural experiment station’s staff to farmers and others, it encouraged problems identified on farms and ranches to be brought to the attention of the station’s staff for research, study, and resolution. By virtue of the Smith-Lever Act, not only did Congress mandate a third mission for land-grant institutions, but it also established a new funding arrangement. The Extension Service was to be funded through a three-way partnership between the federal, state and county governments.



With these three sweeping legislative acts the foundational tenets of the land-grant university were established — accessible, practical education for all, research in the public interest, and connectedness to the citizenry.

The number of farms in the United States rose slowly over the next 20 years, peaking at 6.8 million farms by 1935. However, the next 40 years witnessed a rapid decline in American farm population, falling from 6.8 million farms in 1935 to 2.8 million farms in 1975. Since 1975 the rate of decline has moderated somewhat. Today there are approximately 2.2 million farms in the United States, and the composition of American farms has changed dramatically since the Morrill Act was passed in 1867.

American production agriculture has become bipolar, with both very small farms and very large farms growing in size, while the quantity of “middle-sized” farms is decreasing rapidly. If advancements in agricultural productivity continue at the rate seen during the last 20 years, by 2037 one hundred thousand American farmers could feed the entire United States. Production agriculture, although certainly a critically important part of American industry, is no longer what it was when the Morrill Act was passed in to law in 1867.

If Justin Morrill were alive today, he would probably recognize that there is a significant gap between the kind of graduates American universities are producing today and what America actually needs to stay relevant in a global economy. American companies today desperately need talent with degrees in STEM — Science,

The needs of society have changed substantially over the past 150 years, but the foundational tenets for the formation of the land-grant universities — accessible, practical education for all, research in the public interest and connectedness to the citizenry — all are just as relevant as they were 150 years ago.

Technology, Engineering and Math — in much the same way that 1867 America needed farmers and agronomists. STEM-based jobs are increasing at three times the rate of other jobs in our economy. However, these positions are the hardest to fill because of the shortage of native-born Americans with these degrees. Only 4.4 percent of U.S. born undergraduates are enrolled in STEM programs, whereas 33.9 percent of students in Singapore, 31.2 percent of students in China, 12.4 percent of students in Germany and 6.1 percent of students in the U.K pursue these degrees. As the U.S. workforce ages, employers will face even more significant shortages of skilled workers. For example, more than half of all scientists and engineers in the workforce are nearing retirement age. An estimated three million Americans will turn 60 each year, many of whom are skilled in science and math. As a result, the United States will face a shortage of almost a quarter million hi-tech workers by 2018.

In today’s knowledge economy, almost all jobs require some level of computing or information technology skill. Policymakers, businesses, community leaders, educators and

other stakeholders must work together to ensure that students and workers have access to the education and skills development they need to succeed, and that the U.S. can compete in the dynamic global economy. Policymakers should draw on the experience of the private sector and build on their current investments in workforce training and development to create more effective workforce development solutions. In particular, the experience and involvement of business leaders on state and local workforce boards is essential. Working together with our land-grant university partners and drawing on their experience in extension education, we may be able to better close the gap.

The needs of society have changed substantially over the past 150 years, but the foundational tenets for the formation of the land-grant universities — accessible, practical education for all, research in the public interest and connectedness to the citizenry — all are just as relevant as they were 150 years ago. It is the obligation of today’s citizenry to use these resources appropriately to address the needs of our modern society.

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ANN ARBOR MILLER

BREATHING EASIER Researchers in veterinary and microbiological sciences are studying environmental exposures and the effect that the exposures may have on preexisting asthma. Scott Asbach, a molecular pathogenesis graduate student, is part of a multidisciplinary team of NDSU scientists and students that uses a model of mold-induced asthma to assess the risks that agricultural exposures present for workers and identify potential remedies.