Bread
magazine

ISSUE 21
MILLING

At the crossroads of home baking and professional artisanal baking, BREAD Magazine is an entertaining and inspiring journey that intends to foster meaning and deeper connections through bread.

BREAD is an independent magazine for bread lovers, made by bread lovers. It is a magazine for people who love and make great bread—for anyone who finds joy and fulfillment in the act of mixing a dough, the slow rhythm of natural fermentation, and listening to the crackling sound that comes from fresh loaves of bread as they cool in the quiet of the home kitchen or the bakery.

BREAD focuses on stories, biographies and narratives from the bakers, farmers, and millers'—and everyone else involved in bread—own perspective. It also puts into question popular beliefs and misconceived ideas by means of in-depth essays and technical discussions, in order to contribute to a higher awareness and knowledge of the issues that bread enthusiasts may encounter.

Cover photograph by **François Thibeault**: A miller at De La Rémy Bakery and Mill (Québec, Canada) lifts one of the doors behind which a horizontal, cylindrical screen is used to sift flour. All flour at the mill is made from locally-sourced organic grain that is ground on millstones.

Bread
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CONNECTING PEOPLE
THROUGH BREAD

INTRODUCTION

Bread is unique among foods: an everyday food with a wealth of meaning that goes well beyond its nutritional value. Whether it is a slice of sourdough rye bread served with salmon soup in Helsinki or a pita bread filled with falafel in war-torn Aleppo, bread accompanies most meals around the world—today as it has done throughout recorded history.

Bread is also a part of our celebrations. Ever since our ancestors learned to master the mysteries of grinding grain and mixing and baking dough, it has not only served to feed us but also to express our hopes, fears, and devotion. The scent of a loaf just out of the oven moves us all, reminding us of some of our fondest memories. But those memories—and the baking skills needed to evoke them—are fading.

The industrial revolution turned grain and flour into a commodity, and industrial baking alienated our societies from bread making. We lost touch with the richness of its story, tradition, and meaning. It's no wonder that consumers today have become susceptible to fear mongering writers who claim that eating wheat is an "extreme sport" akin to ice climbing, mountain boarding, and bungee jumping.

Baking bread is a way to fight back.

When bakers in their home kitchens and craft bakeries take the time to learn about the people who produce the ingredients they use, or think about their place in the long line of bakers, they participate in a peaceful but powerful revolution. A revolution that happens through rebuilding connections that once were commonplace but have since then been lost: between the grain and the loaf, the baker and the person who receives the bread, between generations.

As we participate in this revolution, we become aware of our interdependent food chains, and we may start to wonder: apart from bread, what else is there in our lives that we have externalized and disconnected ourselves from? By letting bread teach us, we become a part of a global movement in regaining not only our favorite foodstuff but also our bodies and minds.

In today's fast-moving and information-laden world, there is no need for more on-the-spot reactions and infuriated social media posts about current events. Instead, we need to put our shoulder to the wheel and make some bread. We need to learn to sit still and let things take their natural course. We need to immerse ourselves in the world around us, to learn and to understand. We need to realize that we need each other, in an interdependent but liberated communion.

We need to connect through bread. And that, we can only do together.

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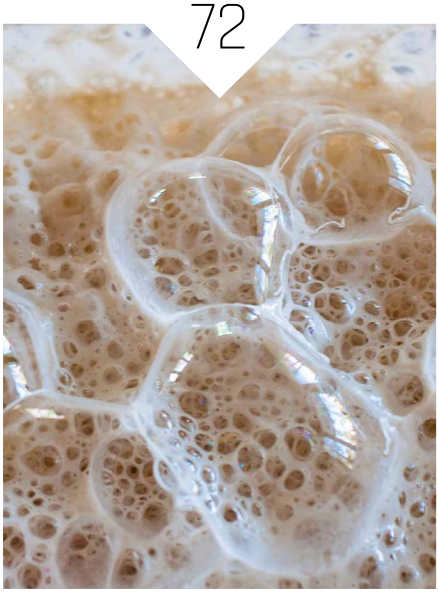

ONLINE ARTICLES

With each new digital issue, BREAD publishes free online articles for you to enjoy and share.

Starting with this issue, we also publish all articles printed in the digital magazine as premium articles on our website—available as a part of the BREAD subscription. The web versions of the magazine articles allow you to leave comments and often contain some extra content such as extended photo galleries. In the coming months, we'll also progressively bring articles from past issues online. BREAD subscribers can also immediately access all PDFs from previous issues.

TESTING THE MOCKMILL WITH ANDREW HEYN AT ELMORE MOUNTAIN BREAD

Andrew Heyn—professional craft miller and baker, and stone mills builder—tries out the Mockmill and reports.

Read online

GETTING STARTED WITH HOME MILLING

Some tips for those interested in milling their own flour. An updated version of the article originally published in Summer 2016.

Read online

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Barbara has a medical scientist's background, with a Ph.D. in medicine and double Master of Science in epidemiology and psychology in her backpack. Due to a deep interest in bread and health, she has founded Spigamadre, a health-conscious and eco-conscious mill and store that aims at making heirloom grain varieties more available and accessible to her community both near and far.

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KNEADING WORDS

EXPRESS YOUR GRAIN-TO-BREAD MOJO THROUGH WRITING

ANNOUNCEMENT

Do you want to give voice to your unspoken credo through bringing your passion for bread to life?

KNEADING CONFERENCE

Join Amy Halloran and BREAD Magazine editors at the Kneading Conference 2017 (July 26-29, 2017)!

What do you want to say about your work with grains? Flour, baking, and bread captivate, inspire, and challenge us in meaningful ways, but communicating their importance and our aspirations to customers and friends is often tough.

This discussion and a series of writing exercises with three bread-focused writers will help you explore your motivations and define your commitment to bread. We will help you find your "element" or "flow" in the path from grain to bread, discover your motto, and articulate the engagement you find in the baking process.

COLLABORATE ON A GLOBAL BREAD MANIFESTO

Do you want to help create a global bread manifesto? Join us for a working lunch immediately after the workshop to help identify and express the goals and beliefs of the wider global grain-to-bread movement.

More information

BREAD Magazine motto

REAL BREAD IN WALES

A JOURNEY INTO THE UNITED KINGDOM AND THE REAL BREAD CAMPAIGN

BREAD TRAIL

Words and Photos: FRANÇOIS THIBEAULT

Leaving Sweden in our camper van, my family and I had now entered the United Kingdom, the world of Chorleywood-processed bread and of the Real Bread Campaign, launched by Andrew Whitley in 2008.

We had driven continuously for a month, through Northern Europe, and had finally crossed into the United Kingdom at Dover, on our way to Ty'r Eithin farm (Carmarthenshire, Wales), where Tony and Sue Matthews managed an organic farm that was part of Banc Organics, a not-for-profit community supported food scheme. We had found them through WWOOF UK—World Wide Opportunities on Organic Farms—which is a great opportunity to be fed and boarded while volunteering on a farm. Fortunately, Tony and Sue welcomed children on the farm.

The nomadic lifestyle aboard a camper van hadn't been ideal for baking. I was eager to settle down for a while, help out, and continue my learning about bread.

Our camper van's clutch broke just as we neared the top of a hill, near Gloucester.

Already exhausted by the long road trip from Sweden to the United Kingdom, we halted for a week-long camping experience in a garage's parking lot. Every morning at McDonald's, we drank espresso and used the free wi-fi to search for a 1981 Bedford clutch. We spent the rest of our days strolling along the River Severn, reading books at the library, and visiting tourist attractions (including a majestic cathedral).

A docked lighthouse boat, completely painted in red, served as a Buddhist meditation center. The abbot first saw the lighthouse in a vision, and then turned his vision into a beacon of spiritual teachings to offer to the world. Alas, there were no artisan bakers to enlighten my palate during our Gloucester days! On our departure day, I changed gears full throttle and cheerfully shouted, "Yee-haw"!

> “SUE'S DREAM WAS THAT THE FARM WOULD BECOME SELF-SUFFICIENT AND PROVIDE ALL SORTS OF PRODUCE AND BAKED GOODS TO ITS MEMBERS.”

François shaping loaves at Ty'r Eithin Farm.

TY'R EITHIN, WALES, UNITED KINGDOM

Tony and Sue founded Ty'r Eithin farm in 1976, with no budget, no seeds, and no tools. They named the farm after the thorny bushes known as *eithin* in Welsh, as a testimony to the hardships endured.

For more than twenty years, they produced milk and cheese with less than a dozen of cows. In 2010, they converted the farm into an organic vegetable farm when the dairy cooperative refused to pick up their daily production, which was too small according to its standards.

Bread had always been part of the farm's plan. Sue's dream was that the farm would become self-sufficient and provide all sorts of produce and baked goods to its members.

I fed a new starter culture on the day we arrived on the farm. And in just a few days, due to the high quality of the organic flour, it developed into a very lively sourdough. Every second day, I'd cheer up the volunteers with sourdough bread, which they would feed upon with appetite.

I was quite surprised that most volunteers would snack throughout the day, eating toasts with jam and drinking tea as a formal ritual of socialization and simple living. Working on the farm wasn't easy—the crops were good but the sales weren't—but the tea breaks, mid-morning and mid-afternoon, were religiously observed.

Tony and Sue Matthews, Ty'r Eithin Farm.

One early Sunday morning, I started baking at five o'clock, in order to pull out the loaves from the oven before leaving for a group hike on the coast—Wales has some of the most beautiful coastal landscapes in the world! One of the WWOOFers, a fifty-year-old Irish bachelor who played the bagpipe marvelously, slept in the same building as the common kitchen and dining room. At seven o'clock, he burst angrily into the room, shouting at me for being such a crazy baker who wakes people up.

I smiled at him. I knew that the call of bread was a true calling, and that everyone would be happy to eat it, including him.

My two kids were incredibly happy with the goats and Kellen, a young and cheerful border collie. We had met with other alternative families from the area, and our hikes on the Welsh coasts together with them enlivened our moods.

Tony, a septuagenarian who holds a PhD in forestry, introduced me to Andrew Whitley's book *Bread Matters*. Processing the book's information about the industrialization of bread, I became aware of the cause behind the Real Bread Campaign, and saw how sourdough bread could become a movement on its own.

Tony, himself an idealist and activist, wrote about his vision of sustainability in an unpublished paper: "The main goal of this approach I'm putting forward is to repopulate the countryside with people who want to be of service for the good of others, through creating dynamic rural communities that maintain a dialogue with thriving urban communities."

As I look back and recall Tony's words, it makes me think that the progressive loss of "real" or "good" bread might have been caused by an increasing ignorance of the rural realities and roots from which our foods stem from.

The farmers at Ty'r Eithin were putting all their efforts in making the farm thrive among thorny and spiky bushes, in the literal sense as well as the figurative: in a conservative social environment where community-supported agriculture was still in its infancy, they wanted to be of service to others.

> “THE MEMORY OF THEIR DAUGHTER AND THE THOUSANDS OF LOAVES THAT RICK HAS BAKED INFUSE THE BAKERY WITH A HARD-WORKING, DETERMINED FOCUS.”

MAIR’S BAKEHOUSE, WALES, UNITED KINGDOM

While living and volunteering in Wales, I met Rick and Maggie Coldman at a food fair in Narbeth, Wales. From the Real Bread Campaign website, I had found out that Rick had built a wood-fired oven following the methods by Allan Scott—one of the last ones that Allan Scott supervised before he passed away. I couldn’t wait to join Rick in the bakehouse, to visit his home, see the oven, and bake with him.

“Be sure to follow my instructions to get here,” Rick said, “because GPS will get you lost.”

His advice was correct. Rick and Maggie’s house was so far from any kind of network (electricity, mobile phones), that we had to find our way through trial and error. The track to their house was an off-road bed of spiky rocks, cramped between fields of all sorts. The bakery was attached to the house building and hosted a massive brick oven with a 5-by-7 foot hearth. The massive cast-iron wood stove in the dining area kept the house warm and was also used as a cooking stove.

Rick and Maggie landed in this house twenty years ago, after having been nomads for most of their adult lives while raising their nine children. They named the bakery after their daughter, Mair, who passed away at thirteen years old, succumbing to a degenerative disease. All her life, she was cared day and night by her parents, brothers and sisters. Now, her memory is enshrined in the bakery.

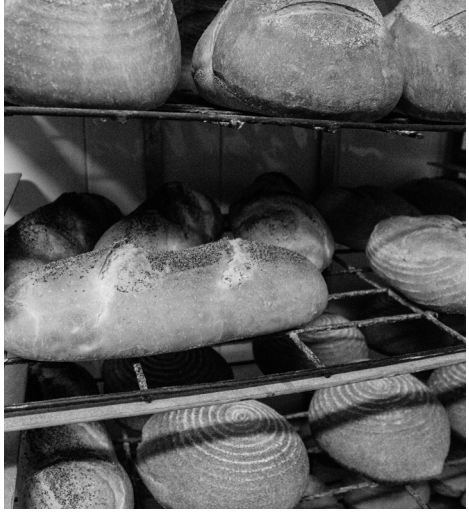
At two o’clock in the afternoon, we mixed the dough for the bread we were to bake in the evening: yeasted breads, sourdough breads, olive, walnut breads, whole wheat and whole rye breads, and country loaves.

During bulk fermentation, Rick toured us around their off-the-grid house and bakery. All the energy came from wood heating and a wind turbine. Passing right above the turbine, we could see a high-voltage line. This off-the-grid settlement was a testimony of peaceful resistance and self-sufficiency in the face of industrialization.

Back in the bakehouse at five o’clock, my two children joined us to divide and shape the loaves. One shaped a beautiful braid, while the other succeeded at shaping a nice crown. After a quick meal, we headed back to the oven, which had rested all day from a four-hour long firing early in the morning. Both the hearth and the dome were at about 260°C (500°F). Rick assured me that he could bake more than six oven-full loads with a single firing! The six thermal couples in the hearth and dome gave accurate readings of the accumulated heat and made it easier to manage the firing and baking processes.

At nine o’clock, the children came back, dressed in their pajamas, to assist the loading of the loaves. And an hour later, the first loaves came out, their crusts crackling. After spending so much time on the road, away from actual bakeries, the smell of roasted flour and caramelized crusts awoke all my best memories about bread.

The oven rested for a few minutes, allowing the heat to move from the outer layers of the hearth and dome to the inner ones, and then we loaded the second batch. It came out from the oven near midnight. We went to sleep.



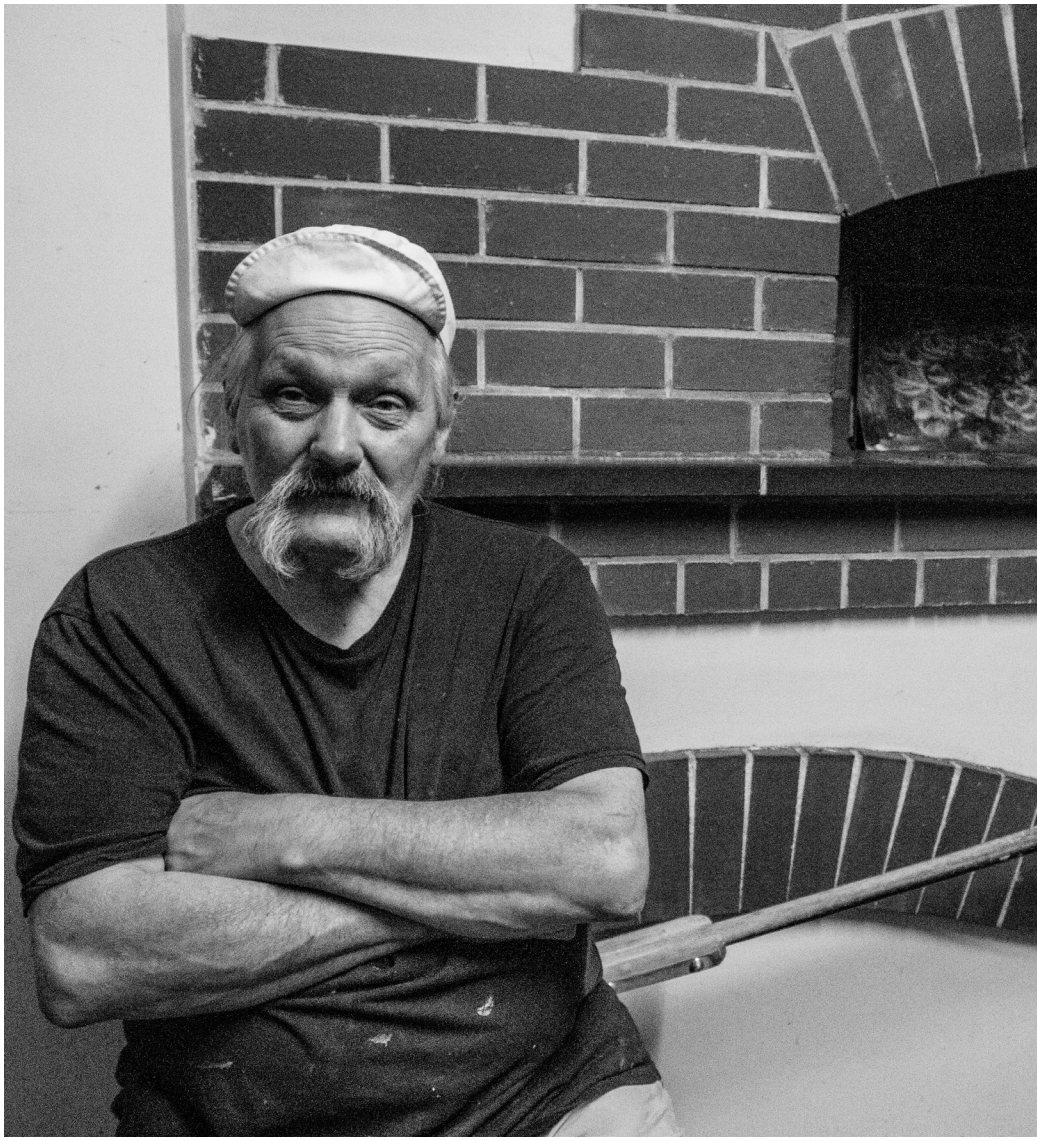
Back in the bakehouse at five thirty the next morning, we started a new fire in the oven. The heat radiated while we prepared the deliveries. Rick was already figuring out the logistics for the day, with more than six bakes awaiting him in the evening. The baking schedule was exhausting.

"I have the mindset of a twenty year old," Rick said, "but my body is sixty-three!"

Rick was looking forward to baking once or twice a week, and finding someone or a group of people who could take over. He and his wife hoped that they could transfer their domain to people who would create a community, bake bread, and take care of people with disability.

The memory of their daughter and the thousands of loaves that Rick has baked infuse the bakery with a hard-working, determined focus, along with a peaceful, loving, and kind presence.

Rick Coldman, Mair's Bakehouse, Wales, United Kingdom.



As our journey in West Wales came to an end, we hit the road once again to find a new refuge: a co-housing community near the Forest of Dean with a late summer goal to build a wood-fired clay oven. I was happy to offer my help for the project.

Read and comment online
(more photos in online version)

A FEW BAKING DAYS WITH ANITA ŠUMER

BAKING DIARY

Wednesday evening—It's late at night when I prepare my sweet starter/levain to be used in my 100% sourdough Danish pastry. Leave to ferment and double overnight on the kitchen counter.

Thursday morning—I prepare the milky dough and put it in the fridge till late at night. Meanwhile I feed my good companion Rudl with 50% stone-ground wheat and 50% bread flour to keep him nice and strong. It's cold outside, so I warm a cup of water in the microwave, then put the fed starter into it. After he reaches his peak, I make two *levains*, one again sweet that I'll use in my 100% hamburger buns and the other one with 100% stone-ground wheat flour that I'll use the next day for bread.

Thursday evening—I mix the sweet *levain* into hamburger brioche dough and put to rest overnight in the fridge. Before going to sleep, about 10 pm, I start laminating the Danish pastry dough. It's nice and calm in the night, not to mention a bit cooler than during the day. I do two series of folds. It's nearly midnight when I go to bed.

Anita Šumer is a passionate self-taught 100% sourdough home baker and teacher, based in Slovenia. Follow her on Instagram @sourdough_mania.

Friday morning—I take out the hamburger brioche dough and leave it to proof for about 30% increase in volume. During that time, I hand-mix 2.5 kg stone-ground wheat flour with water to be used for bread. After 30 minutes, I add salt, *levain* and a bit more water. The standard procedure follows—namely stretch and folds.

Friday afternoon—While the bread dough is bulk proofing, around 1 pm, I roll out the Danish pastry dough, cut it and form various shapes, egg-wash and cover with foil.

Friday evening—I shape buns, preshape and final shape boules and batards, everything to be baked on Saturday morning. I almost run out of baking trays, this bake will be one of the biggest up to date. Hoarding bannetons—you know you can never have enough, right?—has come very handy today. Covered bannetons are put outside on the balcony, at about 9-11°C for a slow cold rise until tomorrow morning. Buns are left covered on the kitchen counter together with Danish pastry that takes ages to proof due to all the butter.

Saturday morning—I get up early, at about 5 am, to preheat my oven with the granite stone. First bake will be Danish pastry, followed by buns, and then finally seven batards and boules.

Saturday afternoon—I don't usually bake in such large quantities but on Saturday there's a special Plant exchange. As I haven't got any plants this year, I decided to bake sourdough bread and goodies in exchange for the plants. Everyone is super happy, me included. Sharing my love and passion for sourdough is one of the things I can't imagine my life without.

Read and comment online

BEESHAM SOOGRIM

THE MAKING OF A SOURDOUGH MISSIONARY

BAKER PROFILE

Words: JARKKO LAINE. Photos: LIN HAOYI and JARKKO LAINE

> BEESHAM'S SOURDOUGH BREADS AND NATURALLY FERMENTED PASTRIES ARE THE TYPES OF PRODUCTS YOU WOULD NORMALLY FIND ONLY AT THE FINEST OF ARTISANAL BAKERIES. BUT HE HAS NEVER WORKED AT ONE.

At noon on September 27, 2016, I stood in the main hall of the Puratos Centre for Bread Flavour, eyeing the surroundings. The Quest for Sourdough event was about to start. After an early morning flight from Helsinki to Brussels followed by a two-hour taxi ride to St. Vith, an idyllic town in Southern Belgium, I was a little dizzy, but eager to meet the other participants.

I noticed a baker I knew well from social media but had yet to meet in person. Slightly below average height, with brown skin and the bulky appearance of a weightlifter, Beesham Soogrim vibrated a friendly, approachable energy. As our eyes locked, he made his way to me. He grabbed my hand, put his other hand on my shoulder, and greeted me with a broad grin, "Jarkko, finally we meet!"

In the past few years, Beesham has become an ambassador for sourdough bread, inspiring professional and home bakers to adopt the traditional method of fermentation. He is a traveling teacher who leads workshops around Europe, the Middle East, and Asia, and whose international retreats in Sweden attract people from as far away as the United States and Mexico.

Beesham's artistic sourdough loaves and naturally fermented pastries are a common sight on the Facebook group Perfect Sourdough and on his Instagram profile. They are the types of products you would normally find only at the finest of artisanal bakeries. But Beesham has never worked at one. When not teaching, he cooks vegetarian food for Emiliaskolan, a Waldorf school in Höör, a small town in Sweden's southernmost province, Skåne.

The school children are the ones who get to enjoy his creations!

> “BEESHAM SEES HIMSELF AS A SELF-TAUGHT HOME BAKER WHO HAS ALWAYS WORKED IN LARGE QUANTITIESDOUGH EVERY DAY.”

THE LONG JOURNEY TO NATURAL FERMENTATION

Beesham was born in St. Pierre, on Mauritius Island, the “jewel of the Indian Ocean.” It is an island with a breathtaking seascape—Beesham is an avid diver himself—but no home-baking culture. People buy their French-style baguettes from bakeries; most homes don’t even have an oven.

In his early twenties, Beesham left the island for a journey of self-discovery that led him to India and South Africa, before he settled in Scandinavia in 1987. In India, he lived in temples where, in exchange for his upkeep, he cooked vegetarian food (as well as traditional Indian bread such as puri, chapati, and naan) that was given freely to those in need. This experience, and seeing the vast gap between the rich and the poor, taught Beesham respect for life and to see the world from many perspectives. What he didn’t realize at the time was that by learning to cook, he was also taking his first steps towards bread making!

Ever since those early experiences, Beesham has worked in the realm of vegetarian food, helping set up and run vegetarian restaurants in Sweden and Norway. It is also in this setting that Beesham learned to bake bread. He sees himself as a self-taught home baker—but one who has always worked in large quantities, mixing fifteen to twenty kilos of dough every day.

“I didn’t go to baking school,” Beesham says, “What I’ve learned, I’ve learned by myself because I’m very interested in it.”

Beesham Soogrim and Manfred Enoksson at dinner at the Quest for Sourdough event. Enjoying the camaraderie and mutual respect I saw in the two bakers' eyes, I pulled out my camera to take a photo to post on my Facebook wall.

"The master and his disciple," Beesham told me to write as the description.

Beesham read books—the internet was still in its infancy—and practiced a lot.

"In bread making, there's no right and wrong," he says, "Everything comes through experience. A recipe is a starting point, and it always needs to be adapted to the environment before you can use it to make good bread. This is what differentiates a professional from a beginner: a professional can analyze the dough and decide how to adapt to the changes in the ingredients and the environment, and make great bread regardless."

Beesham's conversion to natural fermentation happened in 2004 and 2005 as he assisted sourdough baker Manfred Enoksson on two bread-making courses at Holma, an organic farm where Beesham was working at the time. The first course left Beesham curious. By the end of the second one, he realized that he was eager to get his hands dirty.

The taste and looks of Manfred's bread impressed Beesham, and he noticed the bread felt good in his stomach. As he read more about the health benefits of natural fermentation, he became convinced that it was the right challenge for him: "I wanted to prove to people that it's possible to do everything naturally," Beesham says.

THE POWER OF CONNECTION

Beesham created his first bread photo gallery on his personal Facebook profile in 2009 as a way to share his passion for sourdough baking with his friends. In 2012, he found out about Facebook groups dedicated to bread. Eager to try them out, he joined Perfect Sourdough, soon followed by Artisan Bread Bakers and UNIVERSALBREAD.

Through the groups, Beesham connected with people from around the world who shared a similar passion for bread.

As he posted his creations, other enthusiasts saw his dedication and began asking for advice. Answering the questions led to discussions, ideas, and ultimately, opportunities. "From there, everything just exploded," he says.

FRUIT WATER

One of Beesham's favorite fermentation methods is using a fruit ferment. Here's how you too can give it a try.

1

Mix 100 g of dried fruit (e.g. raisins, apricots, or figs) or fresh fruit (apple, grapes, or berries depending on the season) with 200 g water and 20 g honey in a plastic bottle.

2

Leave the mixture in a warm place (26-28°C/78-82°F) for 5-10 days depending on the speed of fermentation. Shake every day. When you open the bottle, it should be like a champagne bottle with a lot of gas.

3

Strain the water and use it to make a quick starter, or keep for up to 2 months in the fridge.

4

To make the starter, mix 100 g of the fruit liquid and 100 g of flour. Leave at room temperature for 10-12 hours or overnight. Use just like you would use a normal sourdough starter.

But opportunities, unless acted upon, are just opportunities. At the Quest for Sourdough, I watched Beesham present his fruit-based natural yeast method to our little group of bakers. Even though some of the audience was composed of professionals with years of experience, he didn't seem nervous. This confidence, earned through countless hours of practice, coupled with an innate curiosity and an interest in connecting with people, has made Beesham willing to act on opportunities when they come his way.

One of these opportunities grew out of a discussion at the Perfect Sourdough Facebook group. Barbara Elisi Caracciolo, a passionate home baker from Stockholm, brought up the idea of a sourdough event. Beesham, realizing that he had access to just the right kind of facilities at Holma, was intrigued and the two started developing the idea. All the while, other group members followed the public discussion and cheered, expressing their interest in participating.

In the summer of 2014, the first international group of participants gathered for a weekend of baking and talking about bread in a beautiful Swedish countryside setting.[1] The first course led to the next and, by now, Beesham has organized five of them—with people joining from Mexico, the United States, Singapore, Kuwait, Israel, and many European countries.

These courses are unique in that they are like a baking retreat. Beesham says: "Participants want to meet the people they have been chatting with on Facebook. In the summer, we'll have an open fire outside, and then we can sit around it and talk about our shared interest."

1 See BREAD no. 16 (July 2015) for Barbara's story about how the first Holma retreats came to be.

> “I WANT TO SHOW PEOPLE THAT THEY DON'T NEED TO BUY BAD BREAD FROM THE SUPERMARKET. WITH JUST A LITTLE PATIENCE AND A LOT OF EFFORT AND LOVE, THEY CAN MAKE GOOD BREAD AT HOME.”

THE TRAVELING BAKER

A baking retreat for a small group of participants is just one of the many ways people can experience the joy of baking together. As bread making is gaining in popularity, the demand for courses is also on the rise. In the United Kingdom alone, the Real Bread Campaign lists over one hundred bakeries and schools that teach their communities to bake bread.

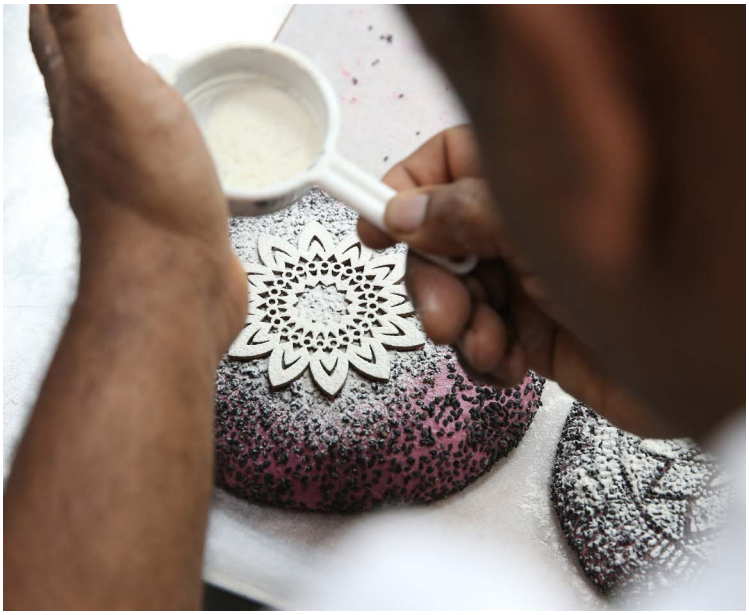
For Beesham, teaching bread making courses around the world followed naturally from the Holma retreats. As participants returned home, they saw a need for similar courses and events in their hometowns and countries. They started inviting Beesham to teach. He was happy to accept the invitations—to see the world, to meet new bakers, and to spread the word about natural fermentation.

“I want to show people that they don’t need to buy bad bread from the supermarket,” Beesham says, “with just a little patience and a lot of effort and love, they can make good bread at home. You know what you put in it, and it’s nutritious and more digestible because it’s made slowly—the natural way.”

Beesham believes that hands-on courses give participants something they cannot get from books or even videos. “On a course, as you make the dough yourself, you get to experience the process of bread making in a much more complete way. You see the consistency; you see what the dough looks like—you see the whole process in front of you,” he says. “I try to teach people to use all of their senses to understand the process: to watch, to taste, to smell, to hear.”

In recent years, Beesham has traveled to Taiwan, Singapore, Bulgaria, Spain, Italy, Belgium, the Netherlands, Israel, and many more countries to teach both professional and home bakers. He does not do a lot of marketing: the courses are put up through connections and word of mouth. People hear about him, get in touch on social media, and invite him to teach.

Thanks to this global presence in the world of bread making, Beesham



has also been able to give back to his country of origin. Last December, the coach of the Mauritian team for the Coupe du Monde de la Boulangerie competition got in touch with him, asking for tips on sourdough baking. Beesham replied that he was coming to Mauritius for Christmas and would be happy to help. He ended up taking two days of his holiday to organize a workshop with the team. The workshop was successful, and he will be helping the team again in the future, "To exchange experiences," Beesham says.

The speed at which things have developed still amazes Beesham. "This is how my story goes: starting from almost nothing as an amateur baker and then, because of social media and a lot of hard work, I have come to this point where I can teach people around the world. All the roads are opening, but nothing comes overnight," he says.

A NATURAL BALANCE

Earlier this year, the story of a Mauritian-Swedish school cook who travels the world to teach sourdough bread making caught the Swedish media's attention. The interest for sourdough fermentation in the country is on the rise, and people are curious to learn from Beesham. So, after passing his message of sourdough baking to enthusiasts around the world, the traveling baker is now also returning home.

Since 2014, Beesham has been involved with a project called Our Beloved Bread ("Vårt älskade bröd"), based on the work of Hans Larsson, the recently retired cereal scientist best known for popularizing the Swedish heritage wheat variety, Ölandsvete. The project encourages farmers in the Skåne region to grow ancient grain varieties. Holma is at its center, and every summer, you can find over two hundred different species growing on its fields.

Beesham bakes bread with these crops, experimenting with their flavor and baking

properties. And in support of the heritage grain movement, all his courses in Sweden are organized using ancient grains from the region.

"Not forgetting the local community brings a beautiful balance to my work," he says.

Inspiring and teaching bakers around the world about the benefits and methods of natural fermentation has become Beesham's mission. Visibly excited, he tells me how bakers are slowly adopting sourdough baking in Asia, where the whole concept of bread other than soft buns is still new. "You cannot just go and change your whole business," he says, "but you can slowly introduce something new, something healthier."

He is applying the same approach to planning his future, letting things develop in their natural order—guided with the conviction that he is onto something valuable. "When you bake good bread for your family, with organic flour, using natural fermentation, you get fulfilled," Beesham says.

And he still cooks nutritious vegetarian food for school children every day.

Read and comment online
(more photos in online version)

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BREAD Magazine can thrive as an independent magazine through the support of its loyal subscribers and dedicated partners.

We are proud to work with partners who share our goal of connecting people through bread and whose messages contribute to our mission.

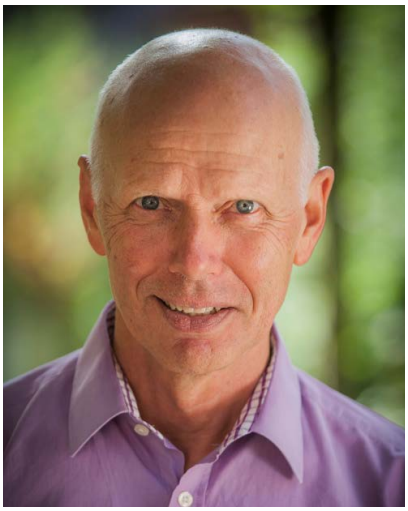
Putting whole grains in the hands of the consumer is the beginning of a transformation that will fix our broken food system.

Since I began milling my own flour in 1975, I have been convinced that the best way to consume a grain is to use all of it. When eaten fresh, without removing the bran and germ, a grain is a perfectly balanced, natural package of nutrients and flavor worthy of "middle of the plate" position in your family's menu.

Learning to recognize, differentiate, appreciate, process, and savor nature's plethora of grains is eye-opening and empowering. It will enable you to make informed choices in selecting them, based on nutritive composition, flavor profile, and baking characteristics. It always fills me with joy when, after giving just-in-time milling a try, a baker tells me, "Now I understand what flour is."

When selecting your grain, you also get to choose to support small-scale, local growers in their efforts to sustainably grow chemical-free, identity-preserved grains adapted to your climate and terroir, and play a part in deciding which crops we grow and eat, and how.

We believe that just-in-time milling is the perfect means for achieving this and that it should be affordable and available to everyone, worldwide. That's why I am very proud to introduce two powerful new stand-alone mills to join our Mockmill lineup this summer. Stay tuned!



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The Kneading Conference celebrates real bread.

The Kneading Conference encourages more and more village bakers to open their doors, more small farms to cultivate grains for local bakeries, and more producers to master the skills of the wood-fired oven which—we believe—produces a superior loaf of bread.

The Kneading Conference brings together grainiacs and bread buffs from all over the United States and Canada—and beyond. Once a year, farmers, professional and home bakers, brewers, chefs, cooks, grain researchers, maltsters, food entrepreneurs, and wood-fired oven enthusiasts gather to educate one another about the art and science of growing and milling grains, baking artisan bread, and brewing delicious beer.

The conference's success led to the creation of the non-profit Maine Grain Alliance, whose mission is to preserve and promote grain traditions, from earth to table. The Maine Grain Alliance provides opportunities to learn and share how best to grow and use grains, using a combination of traditional, innovative, and sustainable techniques. The Maine Grain Alliance promotes beneficial uses of grain for good health, food independence, and purposeful jobs within viable communities.

Kneadingconference.com,


MAINE GRAIN ALLIANCE
KNEADING CONFERENCE

FEATURE: MILLING

What is fresh and local bread? Ask the majority of bread eaters and consumers, and they will tell you it is bread hot from the oven, made in a nearby bakery, or at home by a relative or a friend. Bread that tastes fresh—that is, not stale.[1]

However, a growing number of chefs, writers, researchers, bread enthusiasts, commercial craft bakers, and even industrial bakeries have a different answer. They tell us to look upstream at bread's most important ingredient: flour.

This is where milling comes into the equation. As one of the most decisive factors in making good bread, milling is not only about flour, its resulting product, but largely about grain. Bread begins with flour, and flour begins with grain. Making bread is a process from earth to hearth.

Wild grains (e.g., barley, einkorn, and emmer) were collected by hunter-gatherers living in the Fertile Crescent more than 22,500 years ago, long before the invention of agriculture. Archeologists have found numerous grindstones in pre-agricultural settlements.[2] Grain and bread played major roles in hunter-gatherer cultures and civilizations in Mesopotamia, Egypt, Greece, and Rome, in pagan traditions and monotheistic religions, and in Medieval and Renaissance cultures that led into European—and now global—industrialization and modernity. None of this would have been possible without agriculture, grinding, and milling.

The industrialization of farming and milling has radically altered the availability and nature of grains of bread-making quality, principally wheat. Industrialists have forsaken the nutritional value of wheat, and consequently of bread, in the pursuit of productivity and standardization.[3] All of this came also at the expense of people's health and of local sustainability, at the farming, milling, and baking levels.

Milling is an essential link between the grain we sow and harvest, the bread we make and eat, the people we relate to from farm to table, and how we think about ourselves as humans living on a planet with limited resources. Putting industrial roller-milling into question and reclaiming transparency, integrity, and autonomy concerning an ingredient as basic as flour are a means to a greater end: craft bread made with fresh stone-ground flour, with locally-sourced grain that was bred and grown with terroir—not commodity—in mind.

From earth to hearth, the art of bread engages us—with the heart—in a deep exploration of the connections that support us and the know-how that empowers us. In this feature, BREAD Magazine looks at milling from the perspective of people who have found a cause in grain and flour, and who wholeheartedly drive the grain-to-bread movement to new heights.

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1 Abdu Gnaba, in his book *Anthropologie des mangeurs de pain* (Paris: L'Harmattan, 2011), and Steven L. Kaplan, in his book *Good Bread is Back* (Durham: Duke University Press, 2006), have interpreted and analyzed the Frenchs' desire to eat freshly-baked bread.

2 William Rubel, *Bread: A Global History* (London: Reaktion Books, 2011), 10-38.

3 Ferris Jabr, "Bread is Broken," *The New York Times*, Oct. 29, 2015, https://www.nytimes.com/2015/11/01/magazine/bread-is-broken.html.

THE FLOUR AMBASSADOR PLEDGE

FEATURE

Words : AMY HALLORAN

Dear friends and fans of flour, I invite you to become Flour Ambassadors. Since you are reading this, I know you are already representing our unnamed country. Loaf by loaf, pie by pie, baking escorts flour back into the good graces of people who are doubting gluten[1].

I invented this campaign to shine a light on the wonders of fresh stone-ground flour and help build regional grain economies. Like farmers' markets, mills are the levers that growers need to put something new in the ground. Commodity systems set the stage for farmers, millers, and bakers—determining what seed varieties are grown, how they are sold, and how they are milled.

If eaters and bakers want more choices, like alternative grains, heritage grains, and stone milling, we have to support regional systems all the way back to the field.

At The Kneading Conference in Skowhegan (Maine), in July 2016, two hundred people stood up and put their hands over their hearts to proclaim the Flour Ambassador Pledge. Now, I'm inviting you to join the movement. Together we can build an appetite for—and awareness of—flours that come from somewhere and someone.

Your Civil Servant in Grains,
Amy Halloran

P.S. Please join me in tagging images with #flourambassador, and @flourambassador on social media. Name your farmer or mill, too.

Read and comment online

1 Please note that I am not being flip about the real challenges people face with bread and wheat. Rather, I am addressing the tendency I see in America to huddle around food fears. I grew up as the food industry, fueled by nutritionism, nudged people to doubt eggs, fat and salt; now these foods are coming back into vogue, as is bread.

I do solemnly, happily swear,
that I am going to tell everyone I see
that it's okay to love flour!

Bread is not poison,
Invisibility is poison.
I will try to make visible
all the labor in bread,
from seed to mill,
from mill to loaf.

Mills are the levers farmers need
to get more interesting grains in the ground,
and on our tables,
and under our butter.

Because butter is terrific and bread is our family tree,
It is time to put the family pictures back in the album,
put the album back on the mantelpiece,
and get acquainted with grains and flour again.

ELMORE MOUNTAIN BREAD

BUILDING CONNECTIONS FROM FIELD TO LOAF

FEATURE

Words and Photos: FRANÇOIS THIBEAULT

The landscape changed when I drove from Eastern Canada into Vermont (United States). I left behind large, agricultural fields, spreading across valleys and hills, and entered Vermont's Green Mountains. Winding through countryside roads, I contemplated a lush, mixed forest, and the Appalachian mountain range as it embraced valleys, lakes, and rivers. I was on my way to meet millers and bakers Blair Marvin and Andrew Heyn, at Elmore Mountain Bread. As I drove further on narrow and muddy roads, my senses became more and more exhilarated as I felt the remoteness and powerful presence of the Putnam State Forest.

I reached the end of a small road that was bordered by cozy houses and spotted the red mailbox that signaled my final destination. The house down the entrance way looked traditional, and rather small for a bakery. I caught sight of a mixer running by one of the bakery's windows and saw Andrew slightly bent over it, paying attention to the dough. Blair stepped out of the house and welcomed me to their off-the-beaten-track home and bakery.

I had met Andrew and Blair at the 2016 Kneading Conference, in Skowhegan (Maine), where Andrew had brought a granite millstone and shown us how to carve furrows and lands. I had also read about them in Amy Halloran's book *The New Bread Basket*. After immersing myself into the craft and culture of farmer bakers in France, it was a revelation to meet North American pioneers of a new generation of bakers who milled their own flour. I wanted to make this pilgrimage to their bakery to witness their craft and lifestyle as miller bakers (and stone mill builders too!), and learn about their vision of a new farming, milling, and baking ethos.

> IT WAS THE SMELL OF THE LIVING PROCESSES THAT GIVE BIRTH, BREATH, AND BREADTH TO BREAD. THE BAKERY IS THEIR HOME.

DAY 1—FROM MIXING TO PROOFING

Dropping my gear in Andrew and Blair's small, but open and well-lit living room, I breathed in the deep, nutty, and earthy aroma of fermentation. It was not the fragrance of flour nor freshly baked bread, but the organic, living scent of fermentation. It was the smell of the living processes that give birth, breath, and breadth to bread. The bakery is their home.

At ten o'clock on this sunny, spring morning, Andrew had started mixing the autolyse. All the doughs were to be mixed on this day, then proofed or bulk fermented in the cold chamber, and baked the next day in the wood-fired brick oven. The oven was already gleaming with elongated flames that slowly licked its vault, radiating a profound heat that warmed even the core of my bones. The oven's heating pace was unhurried, as only a very long firing cycle could bring the heat to sink deep into the thick masonry.

Batch after batch, Andrew measured freshly milled flour and water into the arm mixer (a rare sight in North America while more common in Europe), and mixed it into a rather stiff autolyse dough. The dough rested about an hour in tubs, and then was mixed once again with a preferment (mostly leaven, but poolish was used for the baguette and focaccia doughs).

Rather late in the kneading process, Andrew added more water and the salt. "I add the salt rather later than sooner," Andrew said, "because otherwise the impermeability of the dough increases, the gluten becomes strong too fast, and I cannot get the very long development I'm looking for. The varieties of wheat we're using, and the fact that the flour is freshly milled, change the way we work."

Freshly milled flour made with local varieties of wheat reacts differently according to crops' location, grain storage humidity, and the overall quality and property of the grain itself. Therefore, Andrew had to pay close attention to the dough's hydration (between 80 and 85%). For this, he used a technique called bassinage in French: he started mixing with a stiff autolyse and dough, and slowly hydrated the dough through the kneading process. The pace of an arm mixer is one of the slowest among all available mixers, and it took up to twenty

Blair Marvin and Andrew Heyn dividing and shaping on a spring day at Elmore Mountain Bread.

minutes to achieve the volume and structure that Andrew was expecting.

Andrew and Blair want good bread wheat, but not necessarily with a high protein content: a protein level of 12% is good enough for their purpose. In the past, they have milled and made bread with locally sourced wheat that could have barely been tagged as "bread wheat."

Andrew stood still beside the mixer—his long, slightly curved shape leaning forward—while he paid very close attention to the dough. A piercing gaze, along with a grayish Rajasthani-like beard and mustache, conferred an aura of dignity.

Once kneaded, the dough was divided into sub-batches that were put into tubs. Andrew stacked them on chariots and shelves and then continued to fold the dough following a precise timing.

Blair had gone teleskiing two days before (an activity she had not had the opportunity to do for years). She said she felt stiff as she joined Andrew to divide and shape the loaves. A joyful, energetic, and forthcoming woman in her mid-thirties, Blair did not hide that bread making had progressively scarred her body: "I'm a baker, and I can't live without baking!" she said. "But because of the repetitive gestures, dividing, shaping, I feel some pain. This is why we're using a divider and the table loader, to make it easier on ourselves, and to keep doing it after all these years." Andrew, in his early forties, added: "I can see myself building mills for the next ten or twenty years. But baking would become really hard."

The country dough—made with flour milled from Champlain Valley Mills organic wheat—had been mixed with water that was slightly too hot. I tried to shape it, but it tore most of the time. I

watched Blair as she handled the dough softly, but with precise gestures, and formed the dough into balls which she let rest for a few minutes. We then shaped bâtard loaves that we put on linen canvas.

The Vermont Redeemer dough made exclusively with flour milled from Rogers Farmstead's Redeemer wheat (grown in Vermont) was incredibly soft, fatty, and supple. In the old arm mixer, the dough's gluten structure took a very long time to develop. Andrew said: "The gluten network of this dough will not develop well in the mixer. I'll add more water, and the structure will develop as I fold the dough a few times later on. It just drinks so much water that it's impossible to get it all done in the mixer. It takes time."

> "BAKING TOGETHER IS WHAT GIVES MEANING TO IT ALL."

Other doughs Andrew and Blair divided, shaped, and couched on linen canvas included Thornhill rye, made with winter rye from Thornhill Farm; Seven grain, made with cooked cracked barley, oats, corn grits, flax, and millet; Anadama, described as "Our Vermont take on a traditional New England bread, made with Butterworks Farm stone ground cornmeal and Butternut Mountain Farm's dark maple syrup"; and Foagies (Foccacia-Hoagies), a very versatile focaccia dough (with extra virgin olive oil) that can be transformed in sandwich or panini bread. The baguette dough, made with a poolish and Champlain Valley Mills wheat, was folded a few times before it began its bulk fermentation in the cold chamber. It was to be divided and shaped only the next day. By five o'clock in the evening, all the dough was stored away in the cold.

All day, Andrew had kept a vigilant eye on the fire in the oven, and had stacked the last pile of wood into it midway through the afternoon. Later in the evening, after a well-deserved meal and break, he'd spread the embers onto the hearth, to be removed only the next morning after a long resting period—oven-wise, a baker's rest while bread is on its way is always too short!

Blair shared her thought on that matter: "Baking is really hard, no matter how satisfying it can be at the same time. It's something Andrew and I want to do together, with no or as few employees as possible, in this remote area with little social life. Our community here is mostly built around bread—farmers, customers, and other bakers and chefs." (They hire only one part-time employee, Sophia Berard, at the moment.)

"Baking together is what gives meaning to it all," Andrew added.

We retired for an evening meal and conversation about their baking itinerary at a separate family house located by Lake Elmore. Because the bakery is Andrew and Blair's home, enjoying a good time with family and friends in this "camp disguised as a house," as Blair puts it, helps them to unwind. "This is the place where I can rest from my multitasking mind!" Andrew said.

HISTORY OF THE BAKERY

The triangulation between Andrew, Blair and bread was a highly improbable event but proved to be a very successful match. Both Andrew and Blair were trained as cooks and chefs and went to culinary school. They actually met while Andrew was Blair's boss in a restaurant.

Andrew told me the story of Elmore Mountain Bread in these words:

"Dave Deciucies lives a quarter mile up on the road. When he moved to the area about twenty years ago, he could not find any good bread. So, he taught himself how to bake and built a Quebec wood-fired clay oven in his backyard, attached to his wood shop. At the time, he worked as a nurse at a hospital. He would bake fifty loaves of bread, bring it to the hospital, give it to his friends, sell it to his colleagues. Everybody told him: 'This bread is great! You should start a bakery!' He bought a wood-fired brick oven plan from Alan Scott, and in 2004 built a five-by-seven-foot oven. He kept working at the hospital, all the while baking three days a week. That's how Elmore Mountain Bread started.

"He did that for almost five years. He sold to restaurants, to the Elmore store and other shops. Then he sold the business as he did not want to work alone by himself in the bakery The people who lived in this house where we are now located told Dave: 'We could take over the bakery for you, if you don't want to do it anymore.' Dave agreed, and they built the exact same oven here and turned the house into a bakeshop. After less than a year, they realized it was not really for them. They were selling bread at a restaurant where Blair was working, and they asked her: 'Do you happen to know anyone who would want to buy a bakery?'"

This was thirteen years ago. Blair and Andrew jumped in the adventure, without any experience in baking. The owners offered them three weeks of coaching, showed them how to mix, how to fire the oven, and how to shape. "After not even a dozen times baking with them, they told us: 'Here you go!' We took it over from there," Andrew said.

Andrew used his cooking experience to help him learn to bake. "I've always approached cooking from the method angle, not from the recipe. I was reading a lot of books about the science behind

Shaping and proofing loaves in wicker baskets.

cooking. I was interested in chemistry. So, baking was a good fit and suited the way my brain works."

On the top of a whiteboard where Andrew and Blair scribble down important notes about the day's bakes, they have written: "Art without science is nothing." This motto and the fact that they began their bread baking careers without a network of bakers to rely on have inspired Andrew and Blair to unrelentingly seek out knowledge on what they were doing.

"We made terrible bread at the beginning," Blair said, "and we always wished there had been some community out there to help us out. We were cooks who became owners of a bakery! The community was not then what it is now. It's amazing now!"

"Back then, we relied on the online forum of the Bread Bakers Guild of America," Andrew said. "I could ask questions and get answers from bakers. Also, there was a Yahoo brick oven group."

"So dated!" Blair exclaimed.

"The group is still around! There were several bakers answering our questions, including bakers who had built an Alan Scott oven," Andrew concluded.

The bakery is now double the size it was when Blair and Andrew bought it. The Alan Scott oven fell apart, and they had masonry expert Jeremiah Church build a new one for them. They added a cold chamber for retarding fermentation, so they can keep a healthy and sustainable lifestyle, making bread at the bakery, grinding grain at the mill, and building mills in the workshop—all the while raising a six-year-old boy.

> "ART WITHOUT SCIENCE IS NOTHING."

WOOD-FIRED BRICK OVEN

The Alan Scott wood-fired brick ovens became the hallmark of the rejuvenation of the artisanal bread movement in North America and beyond. Anyone with some building skills, a good network of friends, and motivation could build one and get started on the path as an artisan baker. However, even though some bakers actually built pretty large Alan Scott ovens, some improvement and upgrades were necessary to bring these ovens to the next step of heavy duty wood-fired brick oven.

William Davenport was one of the first masons to improve on Alan Scott's original design and to conceive an iron steel frame and brace that helped to keep the hearth and vault of very large ovens together. He trained Jeremiah Church (Boreal Heat) who succeeded him in building some of the most impressive wood-fired brick ovens in North America, including Elmore Mountain Bread's oven, which in 2009, was the first of its kind to be built in the United States. Since then, many similar ovens have been built across the United States and in Canada, based on the experience from Elmore Mountain Bread.

Through trial and error, Andrew and Blair have come up with an original way to manage the oven using the steam from the bread that is baking, without needing water sprayers nor bowls. Rather than loading the oven completely with raw dough, they use the three spring-loaded loading doors to alternate bakes one row after the other. Thus, Blair first loads bread only through door one and then waits before loading through the other doors. When the loaves behind the first door have had their oven kick, she loads the second batch through the second door, allowing this bread to benefit from the steam generated by the bread baking behind door one. After a while, she loads bread through door three, and unloads and reloads the first door This pattern of loading and unloading then continues until all bread is done.

The oven will be rebuilt in May 2017 as its hearth bricks need to be replaced. Other improvements will include better steam retention (the oven will not have a steam injection system), and a better heat accumulation, distribution, and response.

During the renovation, the bakery will be closed

Andrew kept an eye on the fire all day long.

for three weeks. “We’re pretty nervous about all this because we haven’t ever taken a few consecutive days out of the bakery,” Blair said. Blair and Andrew planned on using a mobile wood-fired oven made by Boreal Heat, to bake small quantities of bread during the oven reconstruction.

Another change for customers to adapt to, Blair and Andrew are now adopting a new production schedule—baking two days a week instead of three—that will allow them more time as a family and to rest.

When I visited Elmore Mountain Bread, it was their first week with the new schedule, and customers (individual and shops) kept emailing and calling as they tried to figure it all out. Bread, either baking or eating it, creates habits. It is the bakers’ mission to create an environment in which they can thrive, be sustainable, and offer their best to people who love their bread.

> “ELMORE MOUNTAIN BREAD'S OVEN WAS THE FIRST OF ITS KIND TO BE BUILT IN THE UNITED STATES.”

Top: Andrew and Blair shaping baguettes after baguettes. Bottom: Overnight proofed country loaves, pulled out from the cold chamber.

THE ELMORE COMMUNITY

The bakery is located a short distance away from the small town of Elmore. The town, which is the home of a mere 800 inhabitants in winter gets crowded in summer when holidaymakers flood the State Forest Park and Lake Elmore. Its downtown consists mainly of the Elmore Store and the Fire Tower Pizza restaurant, a project that evolved through a partnership between the store, Elmore Mountain Bread, and Jimmy Kalp.

Elmore Mountain Bread is a wholesale bakery that only sells through external retail shops. And not only health food stores but supermarkets too; twenty-five percent of the sales occur at Hannaford supermarket in Morrisville. Blair and Andrew are always amazed at the variety of people who buy and like their bread. They smile at the memory of meeting three-tooth loggers who exclaimed: "I love this bread, yaar!"

The bread is even sold at a gas station where a basket of baguettes stands on the counter. A visitor from a gourmet restaurant once stopped at the gas station on his way to the bakery and was shocked to find the bread being sold there. "He must have wondered what kind of bakery we are! But bread is not only for foodies," Blair commented.

DAY 2—BAKING AND FRESH STONE-MILLED FLOUR

At five o'clock in the morning, after we had mixed the dough and shaped the loaves, I stepped in the bakery to find Andrew pulling out the ashes from the oven, while Blair and Sophia divided and shaped baguettes, Foagies, and other breads. These doughs (which contained a bit of yeast) had had an overnight bulk fermentation in the refrigerator. The sourdough breads had proofed all night long in the cold. Andrew stacked the proofed loaves on racks before they went into the oven. Andrew got the oven ready so that Blair could take it over. Then he helped to divide and shape the last loaves for the day. Blair and Sophia managed all the bakes, loading and unloading dozens of loaves at a time with a table loader. From time to time, Blair selected a baked loaf that she liked, and took some photos that she later uploaded to Instagram.

WHY DO WE STONE MILL ALL OF OUR FLOUR DAILY?

FLAVOR

We want to make the best bread possible and fresh milled flour has incomparable flavor. When flour travels weeks, months, and miles between mill and bakery, inherent flavors are lost forever.

NUTRITION

Grain kernels have three parts: bran, endosperm, and germ. As soon as the grain is cracked open and exposed to air, the germ and bran that contain vitamins and minerals lose their vitality. We mill the whole grain kernel, keeping the nutritious germ and bran in our fresh flour and in your bread.

TRADITION

Like wood-fired baking and long fermentation, stone milling is a practice worth reviving. Historically, mills were a key part of community food production, and now hey are vital to the renewal of strong local food systems.

Text printed on Elmore Mountain Bread's bags (written by Amy Halloran).

Blair calls herself a photography and Instagram geek. Both serve to share their vision about bread, and to show that bread is not just toasts and sandwiches. Once, Blair took photos of a Hungarian bread served with eggs which she and Andrew ate as breakfast, tagging them "bakers' breakfast." An old woman from New York came up all the way to the bakery and asked Andrew if she could buy some of this bread. Andrew had to excuse himself: "Sorry we ate it all!"

The hot loaves cooled on wooden shelves hung from the ceiling with a pulley and winch system. As soon as they were cool enough, Blair and Sophia started to pack the orders, which friends, neighbors, and customers then helped to deliver to various retail shops. Blair also delivers some of the bread herself: "I want to connect with the people who buy and eat it."

When all the loaves had been shaped, Andrew's work in the bakery was done. It was time to move on to the mill.

FRESH STONE-MILLED FLOUR

In 2013, Blair and Andrew experienced a grain and fresh flour epiphany. Baker and friend Dave Bauer, from Farm & Sparrow, sent them a bag of organic, fresh stone-milled flour. The aroma caught their attention immediately. Andrew and Blair mixed two batches of dough, one with the fresh flour and the other with organic "bag" flour, as Blair puts it: "We followed the same formula, method, and preferment. We had these two loaves that looked similar, but the one made with the fresh flour tasted so much better. The answer was in the pudding!"

There was no looking back: they decided that they would mill their own flour, preferably with grain that they could source locally. Blair said: "When I was baking bread out of bag flour, I loved the bread I was making, but something was missing. Now I know the farmers who grow the wheat, and I really don't want to mess up the bread I make with their grain." Pointing at the two large flour bins near the bakery's door, she added: "Put your head

Andrew at the mill.

into the flour buckets and smell how two different crops yield a different grain, flour, and aroma. Flour out of a bag is stale!"

While Andrew and Blair hope to source all their grain from local farmers, the grain production in Vermont is still rare, small, and expensive. Andrew knew of only four farmers in Vermont who grow wheat and grain, some of which were progressively retiring. Elmore Mountain Bread thus has to rely on a constant supply of organic grain from Champlain Valley Mills (New York) while at the same time fostering close relationships with Vermont and Maine farmers.

Since Rogers Farmstead started growing wheat, Andrew and Blair have been loyal to them and have bought all the grain that the farm wanted to sell—even when this meant paying double the price than that of organic commodity grain sold by the large mills and suppliers. The first year, the storage conditions were difficult, and the grain's quality suffered. They bought it anyway and tried to make the best bread they could out of it. The next year, Rogers Farmstead invested in better storage equipment, and since then, the quality of the grain has kept improving year after year. Andrew and Blair still buy all the Vermont Redeemer wheat that the farm is willing to sell. Using this wheat, they make one of the very few Vermont-only breads in the world! Recently, Rogers Farmstead commercialized a pancake mix made with freshly milled flour, and customers keep asking for more. Rogers Farmstead and Elmore Mountain Bread created a new grain economy through their commitment and belief in each other.

The bakery gets its corn from Butterworks Farm, where farmer and author Jack Lazor experiments with all sorts of small-scale crops, and its rye from Thornhill Farm, which grows a winter rye

for a rye whiskey distilled and aged by Caledonia Spirits. Overall, a third of the grain that the bakery uses originates from Vermont. The remaining two thirds comes mostly from large-scale distributors. This year, Elmore Mountain Bread may also buy grain from Maine Grain Alliance members who harvested Warthog Winter Wheat.

"Our aim would be that all our grain is local," Blair said, "so that we can bridge the gap between farming and baking." Andrew continued: "Milling stands between farmers and bakers, and this is how millers can make a big difference. Mills connect bakers to farmers, and vice versa. That connection creates a local economy and serves to de-commodify wheat, even in places such as Kansas, which is the Bread Basket in the United States."

In the past years, bakery milling has become a core aspect of what Andrew and Blair do. It not only gives them a new and different perspective on the artisanal bread movement in North America but also connects them to a wider network of people who are genuinely concerned with the whole process from grain to bread. "It's all about relationships, connecting with people who are inspired by the same vision, and quest, for grain, flour, and bread," Blair said.

Many variables impact on milling, including grain humidity, protein level, grain's hardness or softness, the speed at which grain is delivered from the hopper and into the mill, the gap between the millstones, and so on. Thereby, to start milling their own flour, Blair and Andrew knew they wanted a stone mill that would yield the results they expected—with the best control possible over their flour. Little did they know that this would would mean building a whole new generation of stone mills.

BUILDING STONE MILLS

Andrew and Blair built their own mill out of necessity, along with their friend Fulton Forde (Boulted Bread), who also wanted to mill. Approaching mill design not as a mechanic would approach it but as bakers with bread in mind, they reviewed the mills available in the United States (mostly US-made Meadows Mills and German-made Osttiroler), and concluded that none of these mills would meet their expectations.

> "MILLING STANDS BETWEEN FARMERS AND BAKERS, AND THIS IS HOW MILLERS CAN MAKE A BIG DIFFERENCE."

They wanted a mill capable of milling at a very low speed (to keep the stones and flour from heating), yielding a good throughput for an artisanal bakery (without the cost of a large, commercial stone or roller mill), and with millstones made of 100% natural granite. "A millstone is similar to a chef's knife," Andrew explained. "Some knives are said to require no tuning, no sharpening. They do work well for all sorts of things, but they're just normal at doing it. On the other hand, if you take a German chef's knife that needs regular sharpening, you get a knife that's exceptional every time you use it. The same is true with millstones. A granite millstone will need to be dressed once a year, or even once every few months, but it'll do its job perfectly when you need it—which is every day you mill. A composite millstone will work correctly, will not require maintenance, but you will not get the same result every day."

Andrew co-founded New American Stonemills less than two years ago, and his mills are currently in use across the United States and in Canada. Andrew has also built and installed a 48-inch mill in Minneapolis, close to the headquarters of General Mills, in an area where all wheat is commodity grain with a very high level of protein (15%). Building a mill currently takes three months and there is a waiting list (more than ten mills long already) for customers hoping to order a new mill. So, to keep up with the demand, Andrew is currently working to triple his workshop's space.

Above: Grains falling from the hopper into the millstones. Right: Furrows on a granite millstone.

The mills can be from 26 to 48 inches (66 to 122 cm) in diameter, all made with Barre Gray granite millstones quarried and cut in Vermont. A 40-inch mill will process 100–150 lb (45-68 kg) of grain per hour, while a 26-inch one processes half of that. At Elmore Mountain Bread, Andrew and Blair use a 40-inch mill to process 6,000 to 8,000 lb (2,700 to 3,600 kg) of grain per month, equivalent to 1,500 lb (682 kg) of wheat per week.

Dressing a millstone means carving out designs in the granite. The designs are composed of furrows (running parallel to the radius, they carry the grain from the middle to the periphery while cracking it) and lands (running perpendicular to the radius, they grind the grain finer and finer). The dressing will be different depending on the kind of flour one wants to mill.

If a baker wants 100% whole wheat flour, keeping all the bran in the flour, the goal will be to mill all the bran to a very fine level. For this, the best design is one where the furrows will not reach the periphery of the millstones and the bran will need to travel through the finer lands to be milled completely. The whole wheat flour will thus contain very fine bran—no flakes—and will still develop a good gluten structure.

When milling a flour that will be sifted—for example at an extraction rate of 85% as is the case at Elmore Mountain Bread—the furrows will need to carry the coarse and medium bran to the periphery so that it can be sifted out later.

For Andrew and Blair, milling is not a way to save on the price of flour. Andrew said: "The return on investment is very limited. Grain is sold to bakers at a price equal or greater than the price of equivalent flour. Commodity grain can be bought for twenty-five cents a pound, while locally sourced grain may cost above one dollar a pound. Local, New England farmers who breed and grow varieties of wheat own relatively small farms, their initial investment is very high, and they can't sell in large volumes."

So, the greater gain is that of a better product, and of creating a strong and sustainable connection from farm to table. This is reflected in the price of the bread, and bakers who mill still have work to do in educating their customers about the value of

"THE GREATER GAIN IS THAT OF A BETTER PRODUCT, AND OF CREATING A STRONG AND SUSTAINABLE CONNECTION FROM FARM TO TABLE."

bread made with freshly milled, locally sourced grain.

Customers are already attracted to products and produce that are grown or made "locally" but the expressions "freshly milled flour" or "fresh stone-milled flour" have not yet caught much of their attention. While they probably taste the difference, they do not necessarily make their choices based on the fact that the flour is "fresh." For most of them, to "buy local" is a more important deciding factor, so miller bakers need to adapt their message to the public.

The "next bread", as Amy Halloran wrote about in *The New Bread Basket*, cannot be a commodity food. It has to be part of a healthy lifestyle which includes a great diversity of foods and where bread is considered to be a complete food in itself, just like locally grown, organic produce, and selected beers from a local microbrewery. In that new food ecosystem, bread does not need to be cheap: it needs to be fulfilling to our heart, stomach, senses, and spirit. As high quality bread will make a name for itself—through Michelin chefs and superstar bakers—proper attention will progressively be given to the empowering effect of creating a bread connection from fields to toasts.

CONCLUSION

Milling brings Andrew and Blair full circle, implying many variables, just as baking bread does. "All of this effort adds another level to an already complex process," Blair said, "but the satisfaction in creating these connections is so rewarding!"

Andrew and Blair are a part of a new grain economy and a movement for advancing it, contributing to the movement's dissemination through talks, conferences, and teachings they give regularly (e.g., at King Arthur Baking School). As the industrialization of grain, milling, and bread went under way, the connection that people had maintained through grain was lost. Farming, milling, and baking are ways to reconnect with the places we belong. In promoting local grain, fresh stone-milled flour, slow fermentation, and baking in a wood-fired oven, Andrew and Blair are the epitomes of a new generation of "partisan" bakers who wish to change the course of grain and bread.

EPILOGUE

In an email that Andrew sent me after my visit to Elmore Mountain Bread, he wrote:

> *I wish you had a chance to meet Dave Deciucies, the founder of Elmore Mountain Bread. Next time you visit!*
>
> *After Dave had started the bakery and his daughter was in school, he did an oven project at the local high school. He got a bunch of the students together and they built a Quebec-style clay oven on the school playground. A lot of the kids contributed and helped to build it. Several of them really got into bread and making pizzas for school charitable events. The school still uses it a few times a year to make pizzas.*
>
> *The interesting part of the story is that these are some of the kids that were influenced by the project: Josey Baker (The Mill), Jeremiah Church (Boreal Heat), Jonah Bourne (Woodbelly Pizza), Hannah Rossman (Blue Grouse Bread), George Kiley (helped us in the bakery when we first started and carried our starter with him, which he eventually shared with Josey Kate Sprague, our former baker), Trevor Braun (our engineer friend who helps with mill design, also went to Africa to build a wood-fired oven for a village).*
>
> *And it all goes back to Dave Deciucies.*

Read and comment online
(more photos in online version)

> ALL OF THIS EFFORT ADDS ANOTHER LEVEL TO AN ALREADY COMPLEX PROCESS, BUT THE SATISFACTION IN CREATING THESE CONNECTIONS IS SO REWARDING!

MEETING MILLERS IN SOUTH AUSTRALIA

FEATURE

Words: TIA INGLE, Photos: PIXABAY, RISTO INGLE

Flour is the most important component in bread. However, as bakers, we often don't know much about the processes involved in making it. The growing interest in home milling and heritage grains is making milling more visible, but many aspects of a miller's craft remain a mystery. To get a better picture of what milling consists of, I contacted two millers in South Australia, whose flours I regularly use with great results, Laucke Flour Mills and Four Leaf Milling. Both agreed to meet me, happy to share their knowledge.

Laucke Flour Mills is a family-run company that has been operating in South Australia for over a century and currently has its third generation at the helm. Ensconced in the mill's baking test lab, I had a fascinating conversation on baking and milling with Martin McLennan. Four Leaf Milling was founded by Rosemary and Gavin Dunn who have been milling organic flour since the 1960s. They are now grooming the younger generation to step in to uphold the tradition of their milling principles.

Four Leaf Milling is a certified producer and miller of organic grains. Laucke Flour Mills processes both organic and conventional grain, with an objective to process both as "cleanly as possible" with the minimum amount of pesticides applied to the harvested grain.[1]

Both mills have an extensive offering of flour varieties ranging from wheat to the increasingly popular ancient grain types such as spelt.

DIFFERENCES BETWEEN ROLLER-MILLED AND STONE-GROUND FLOURS

Milling is the process of breaking wheat kernels into small particles that are refined to various degrees, that is, flour. The method used for doing this is the most notable difference between the two millers: Laucke Flour Mills primarily roller mills the grain while Four Leaf Milling only produces stone-ground flour.

Roller milling is the conventional method of milling: the grain is milled using steel rollers and then pushed through consecutive sets of sieves that separate the bran from the endosperm. The process results in a soft, white, refined flour that consists mostly of endosperm—desired by many over the centuries. To make wholemeal flour, millers put a certain percentage of the sifted-out bran back after the initial milling.

In stone milling, the different parts of the grain do not get separated but are crushed and distributed together using a pair of millstones. Four Leaf Milling processes the grain through a stone grinder, and all that comes out is used. Compared to roller milling, the temperature of the flour stays cooler, which helps maintain higher protein levels and does not disrupt essential enzyme activity. Many people prefer stone-ground flour because they believe it has a higher nutritional content and a better flavor.

1 In Australia, the organic status of farmed products is taken very seriously. All producers who want to use the label "certified organic" have to go through a series of strict audits which take years to complete, and producers cannot use this label on their products unless they have been approved by the governing regulators of organic produce, regardless of whether their produce has been grown without pesticides.

Top: Rosemary Dunn (left) and Tia Ingle.
Bottom: Martin McLennan.

When comparing flours, bakers and millers often talk about extraction rates.

According to Martin McLennan, "The extraction rate is the percentage of the whole grain that remains in the flour." So, wholemeal flour should have a 100% extraction rate because it contains all of the bran. In roller milling, this is not strictly true because the bran is added back after the sifting process—whether this was the content of bran found in the initial milling is debatable.

The extraction rate is also a measure of the mill's efficiency: when making white flour, a good mill can reach an extraction rate of 78-79%. If the number is lower than that, there was either more bran in the milled grain or the endosperm was poorly sifted and got stuck in the bran.

Spelt differs in the sense that, unlike normal wheat, it is harvested with its husk still on it. The husk in spelt needs to be removed while it still has the bran on it and, as a consequence, there is less bran to be found in spelt flour than in wheat flour.

MOISTURE CONTENT IN MILLING

To get the best out of the grain, millers need to know and control its moisture level. This is done by grinding a wheat sample.

At Laucke Flour Mills, where most of the milling is done using roller mills, the aim is to achieve a moisture content of around 13.8%. By going for a reasonable amount of moisture penetration on the bran but not so much on the endosperm, they hope to make the grain like a pea popping out of the pod. Ideally, as soon as the bran goes through the first break rollers, the endosperm would shoot out leaving a big lump of bran behind. *It doesn't usually happen, but it is the aim.*

The measurement is done by grinding a wheat sample which is then placed in a chamber that will measure how much moisture there is in it (using sophisticated infrared technology). Based on the results, some amount of water is added to the grains by storing them up to 48 hours in large conditioning bins before they go through the mill. Hard wheat usually needs more conditioning than soft wheat.

At Four Leaf Milling, moisture content (they aim for 12%) is measured using a moisture meter, and

for a different purpose: all grain loads that come to the mill are tested, to make sure that they are safe for storage. If grain were to be stored above a moisture level of 12%, they believe this would invite mold problems.

PROTEIN CONTENT IN FLOUR

One of the things bakers often focus on when considering the flour they use is its protein content, "Too much so," Martin McLennan suggested, "unless you want to make a rubber ball. And adding gluten is unnecessary."

The general school of thought is that high protein flour is better suited to bread making. However, Martin disagrees. He believes that the wheat variety is more significant when it comes to making bread. Within one wheat variety, protein content can be anything between 10% and 14%. A protein content of 11% is good enough for general bread such as French baguettes—anything higher than that would only be too tough and chewy. The one instance where a higher protein content is desirable is when making bagels, which are expected to be dense and chewy.

Weather conditions also affect the protein content and the quality of the flour. Water dilutes the nitrogen in the soil, which in return diminishes the protein content in the grain. In a nutshell: wet weather leads to low protein and dry weather to high protein flour. Because of the wet weather this past season, both millers expect all flours to be softer this year.

As wheat needs to be dry to ripen properly, the wet season also delayed harvests. Farmers in South Australia harvest only once a year, usually starting around November. This year, they were still harvesting in January!

Grain classification in Australia is less complex than in the United States. Its purpose is to determine whether the grain is suitable for human consumption in the first place, and secondarily, to assign a benchmark for the grain's hardness, color, and protein content to assist in determining whether the flour is suitable for bread making or pastry making.

Moisture meter at Four Leaf Milling.

> "THE GENERAL SCHOOL OF THOUGHT IS THAT HIGH PROTEIN FLOUR IS BETTER SUITED TO BREAD MAKING."

STARCH DAMAGE

Anyone familiar with the "no-knead method" of making bread knows that a sticky dough, when given time, will relax and eventually absorb the water and come up with a manageable gluten window. This autolyse effect is affected by the flour's water absorption rate, which in turn depends on the way grains are milled.

As a manner of speaking the miller is physically scratching the surface of the starch granules so that water can penetrate the granules, and thus facilitate the amylase's conversion of the carbohydrates (starches) into maltose. The extent of starch damage will influence the amount of water the flour can absorb and the fermentation rate.

A flour in which there is little starch damage might have a water absorption of about 55%. Flour that has moderate starch damage might have a water absorption of 60%. If starch damage is excessive, the flour will first have a water absorption of 65% but will eventually give all the water back, resulting in gunk.

> "MANY PEOPLE WHO GRIND THEIR OWN GRAINS LIKE THEIR FLOUR TO BE VERY "ALIVE" AND THEREFORE USE THE FLOUR IMMEDIATELY AFTER MILLING."

FRESHNESS AND SHELF LIFE OF FLOUR

Bakers often wonder how fresh their flour should be. In Martin's opinion, freshly milled flour will benefit from a couple of weeks' rest (or at least 5 to 6 days) after being milled. "The performance of the proteins, in particular, is not as good when used after immediate milling," he said. Allowing the proteins to oxidize for a week or so will improve their stability: when a baker mixes this flour into a dough, the proteins, especially the glutenins, come together to form better and longer strands.

For those into home milling, Martin suggested experimenting by making a dough with freshly milled flour and another with flour milled a couple of weeks earlier and comparing the baked end results. He believes that the former will not produce as nice a loaf as the latter; a bit of age will make the protein more valuable. "Age will make the dough more malleable and easier to handle in the final shaping before proof," he said.

But stability and ease of handling may not be the only properties bakers should look for in flour. Rosemary said that many people who grind their own grains like their flour to be very "alive" and therefore use the flour immediately after milling. "They believe that freshly ground flour also tastes sweeter—a subjective opinion," Rosemary hastened to add.

In all, stone-ground flours are less stable than roller-milled flours because of their bran and germ oil content. They will become rancid at a faster rate than flour that has had these components removed. Warmer weather will also expedite rancidity. Rosemary's view on the shelf life of stone-ground flour is that flour is best used within 5 to 6 weeks of milling. Age will not specifically alter the structure of the milled grain, but the germ itself only stays alive roughly 3 to 5 weeks from milling, after which it will become inactive.

Overall, no flour has a limitless shelf life; good flour should be fresh. Its peak is usually around the 3 to 6 week mark from milling. Removing the germ gives the flour a longer keeping period, but not that much longer. It too will eventually start to go stale. Airtight and dry storage conditions are key.

Martin once forgot some flour at Marree (where he periodically does volunteer work). To his sur-

Above: Millstones at Four Leaf Milling.
Right: Laucke Flour Mills.

prise, when he went back after a year, apart from being thirsty, the flour was still pretty good, only requiring a higher level of hydration as it had dried up a fair bit. "Providing you can keep flour critter free, there is no reason why it shouldn't last. Just remember although it lasts, it won't get any better," he said.

As it turns out, unlike wine, flour does not improve as it matures with age—sadly, I will have to scrap that thought of vintage flours.

ADDITIVES IN FLOUR

The millers at both Laucke Flour Mills and Four Leaf Milling are strongly against adding any unnecessary additives into their flours, but cannot vouch what others do.

Legislation in Australia requires folate and thiamin to be added to conventional flour. Organic flour is exempt because the additives would demerit its organic status. Folate supplementation during

pregnancy is thought to help prevent spina bifida, a birth defect where the backbone and membranes around the spinal cord are not completely closed. Thiamin is added to flour because it is considered to be good for alcoholics.

When the legislation was introduced, Laucke Flour Mills was opposed to it because of their philosophy "to keep food as clean as possible." However, to achieve standard uniformity, the legislative body concluded it was better that the miller adds the folate and thiamin instead of the baker, because that could be very ad hoc and dangerous. However the statistical evidence that these additions to flour reap benefits to the parties concerned is lacking, according to Martin. "You would need to eat at least twelve slices of bread every day to get the recommended daily allowance for this purpose," Martin said.

At Four Leaf Milling, the only additive used is bicarbonate soda, which is added to self-raising flour.

BREAD IMPROVERS

Bread improvers are collections of ingredients to make the bread dough perform better. These include flour softeners, such as soya, and calcium sulfite, a mineral that works as a supplement to yeast. The primary functional ingredient, however, is ascorbic acid (first introduced to bread making in the 1950s in the Chorleywood bread-making process), which is used because its oxidizing properties help stabilize the flour. Commercial bakeries also use emulsifiers in their bread improvers to get a soft white bread that never goes moldy. Finally, enzymes may also be added to bread improvers.

"In Australia, all flours are naturally low on enzymes, which runs the risk of discoloration of the product as the dough potentially runs out of food for the yeast and the starch cannot be converted to amylase. This is one of the reasons why bakers in the past used barley or wheat malt to get that caramelized coloration on their crust," Martin explained.

We also touched on the difference between fresh and active dry yeast. Martin's opinion was that there is no significant difference as it all comes from the same strain. Traditional bakers may prefer fresh to dry active yeast, as it has a slightly lower lag time after finishing mixing the dough: dry yeast is still in the process of hydrating itself into the dough, whereas fresh yeast springs into action straight away. The problem with fresh yeast these days, especially if it is used in large volumes, is that its quality and freshness depend on the supplier. Old yeast produces glutathione, a product which destroys the protein. "If you are using bad fresh yeast you are not in a good place," Martin said.

"IN AUSTRALIA, ALL FLOURS ARE NATURALLY LOW ON ENZYMES."

TYPES OF GRAIN AND FLOUR PRODUCED AND SOLD AT THE MILLS

Laucke, as a point of differentiation, has named all their flours after Marsupials. They have Kangaroo, Euro, Bandicoot, Bettong, and Wallaby, along with spelt as a heritage grain variety.

Four Leaf Milling's stone-ground flours are wholemeal, light wheat, rye, spelt, and Egyptian Gold (more often referred to as Kamut or Khorasan). They also produce a wide selection of cereals such as sprouted grains. "They are wheat grains that sprout and grow roots at the same time," Rosemary explained. "You end up with a big grain which is then cooked to a certain degree until it just starts to burst. If you mill sprouted grains, you will find the result very sweet."

Both stabilized and unstabilized oats are also popular. Unstabilized oats are oats that have not gone through a steam process, that is, the oat kernels are rolled without moisture or steam. Steaming removes lipase from the oats and improves their shelf life. Unstabilized oats, for example, are not suited to muesli because the oats would absorb moisture out of the fruit components and potentially cause them to become bitter. Unstabilized oats will also go rancid faster, but many people think (just like with stone-ground flour) that they are healthier. Four Leaf Milling also produces oat flour from oats that were put through the steamer and then milled. Oat flour is low in protein, and some bakers like to use it in the bread they bake to get a softer texture.

As it happens, Four Leaf Milling sells more rye flour than wheat. They believe this is mainly because there was less rye flour available last year. Until now, bakeries have not been particularly fussed whether they use organic or conventional rye flour, but are perhaps discovering that organic rye flour is better than conventional.

Traditionally, bakers have not been accustomed to looking out for organic flours. The growth of artisan bakers—in their search for a better bread product—has finally begun raising the profile of organic wheat producers and millers.

Read and comment online

Products at Four Leaf Milling.

AMBER LAMBKE

REVIVING A REGIONAL GRAIN ECONOMY IN NORTH-EASTERN UNITED STATES

FEATURE

Words: FRANÇOIS THIBEAULT, Photos: MAINE GRAINS and STEPHEN RADFORD

During the 2016 Kneading Conference in Skowhegan (Maine, United States), I volunteered to help with setting up the event, assisting presenters, and baking pizzas during the Bread Fair. At the event, I met Amber Lambke, then Executive Director of Maine Grain Alliance (which organizes the Kneading Conference), CEO of Maine Grains, and a leader in community development and local food sustainability.

Amber communicated an engaged vision about how grain, flour, and bread can change our relationships with each other and influence the world we inhabit. This conversation with Amber Lambke addresses her vision and mission through her work in revitalizing a regional grain economy in North-Eastern United States.

Amber founded Maine Grains in Skowhegan in 2012, with her business partner, Michael Scholz. Maine Grains's mission is to revive a regional grain economy in North-Eastern United States. Maine Grains sources Maine-grown wheat, spelt, buckwheat, oat, and other ancient varieties of grain, and processes stone ground organic flour. It sells grains and flour between Maine and New York City, to artisanal bakeries, national food stores, whole foods store and restaurants, colleges and institutions, and breweries.

As a mill, Maine Grains fosters new relationships between farmers, bakers, brewers, and malters. However, this interview with Amber testifies that stone-milling is just a tangible proof of Maine Grains's deeper purpose.

Amber came to milling from a community development perspective, rather than from a farming or baking background.

"I am a home baker, and by no means an expert," Amber said. "I enjoy baking, and I appreciate good bread. About ten years ago, when I started doing this work in the bread and grain scene, I was just a bread connoisseur who felt the lack of good bread in my community. We would drive long distances to stock up on bread and put in the freezer, all the while trying to perfect some artisanal home baking techniques. I prefer whole grain and sourdough breads, and I am excited to be part of cultivating those things at the local level."

KNEADING CONFERENCE

Amber became involved on the social and community scene of Skowhegan when she moved to the area in 2001. Through that involvement, she met with people interested in all things bread, from growing grain to building ovens. She was a volunteer in creating the first Kneading Conference in 2007, which she described as the beginning of her formal work in bread and grain:

"It came about at a time when our town, Skowhegan, was gaining some momentum in organizing itself to revitalize its downtown. I was involved in some volunteering efforts, to help grow and expand our farmers' market. The time was ripe for ideas that helped to accentuate our assets and the things that were special about rural Maine.

"In 2007, Albie Barden, one of the founders of Maine Wood Heat, came to me. He had just returned from San Francisco, where he had been teaching wood-fired oven building at Camp Bread, an event put on by the Bread Bakers' Guild of America. Camp Bread had turned away a large number of people, and Albie realized that if he just took the leftovers and brought them to Maine, he could stay put and teach right here in his home community. Albie is sought after to travel around the world to teach oven building to bakers and people who care about good flour, but he had not focused a lot of time and attention doing that here at home.

"Albie asked if I would help in pulling together a volunteer group that could think about bringing together farmers, millers, bakers, and oven builders for what became the first Kneading Conference. I was the group's first committee chair."

This volunteer group was seminal in creating a new grain-based movement in Maine. The movement triggered the establishment of Maine Grain Alliance (Amber Lambke was the first Executive Director, before leaving the position to Tristan Noyes in 2016), a not-for-profit organization that oversees the Kneading Conference, the Bread Fair, as well as educational programs and some technical assistance in seed-saving work.

The Kneading Conference was a major source of inspiration and motivation for Skowhegan grain activists like Amber and Michael. However, Amber recalled another specific moment when she realized that grain was to become a core focus of her social engagement. It was her grain "epiphany," as she described it:

"The epiphany for me was learning that in the history of our county, Somerset County, here in Maine, in 1837, we produced 239,000 bushels of wheat, at 60 pounds (27 kilos) to the bushel. That's enough to feed 100,000 people! There are only 15,000 people that live in the county now. The epiphany for me was that at one time we were

> "HERE IN MAINE, IN 1837, WE PRODUCED 239,000 BUSHELS OF WHEAT, AT 60 POUNDS (27 KILOS) TO THE BUSHEL. THAT'S ENOUGH TO FEED 100,000 PEOPLE!"

growing a whole lot of grain. Back when it was hand-harvested and horse-plowed. That was our county alone; all of the other surrounding counties were also producing a significant amount of grain.

"It made me realize that the question is not whether we can grow grain in Maine, it's how do we do it and how do we keep this knowledge alive and well. Grain growing was not obsolete in Maine. It was used for crop rotation. But farmers weren't selling grain. There has been grain grown for feed, but less so for food. We wanted to convince farmers to grow grain for food but needed to figure out how that grain was going to be processed.

"My business partner and I started traveling to see any possible mill that we could find in the North-East. On these travels, I saw that the infrastructure was very fragile: often, there would be an older farmer who had designed some infrastructure, to clean or mill grains, but on a very small scale. Many of these farmers told me: 'If I die tomorrow, no one knows how to run what I've set up here.' The infrastructure looked very fragile, and the processing piece of the grain economy was missing.

"In some places, old water mills were being restored, for historical purposes, but not for serious food production, as in New Hampshire or Rhode Island. We realized that we needed a serious infrastructure that was going to serve our region. It had to take a different scale than what we were seeing. It needed a different kind of business model, one in which you had enough employees to ensure the everyday functioning of a business that can process grains."

> "THE QUESTION IS NOT WHETHER WE CAN GROW GRAIN IN MAINE, IT'S HOW DO WE DO IT AND HOW DO WE KEEP THIS KNOWLEDGE ALIVE AND WELL."

Amber Lambke and Michael Scholz.

I wondered if there was anything personal in Amber's commitment to the grain cause, and why she would go on to start a milling business in the first place. Amber said:

"When I was learning about grain and helping to organize the Kneading Conference, and thinking about milling, I didn't think that it would be me that would be part of starting a mill. I began looking for other milling operations that wanted to put their efforts in Skowhegan. I cared a lot about the revitalization of our rural downtown, which has seen the loss of jobs for many years now. Many manufacturing industries left this area. Skowhegan has been known for making shoes, paper, and woolen products.

"I care a lot about what the next work opportunities are for people in rural Maine. Bread, grain, and milling happened into my life in this equation. Visiting mills and seeing that the infrastructure was fragile, I started thinking that I needed to understand the world of national or global flour production. I wanted to understand whether this would even be possible at the community level. So I went to Kansas State University, to follow their International Grains Program.

"I was the only woman out of twelve participants in the class. People were there for very different reasons. I was in the class asking about organic grain production and stone milling. I learned that, in the United States, organic grains was only one-tenth of one percent of the grain produced in the country. That was a few years ago. Organic grains were not even on the radar of the people teaching the class, and not a focus of the International Grains Program at Kansas State University.

"Michael Scholz and I were interested in stone-milled flour, which preserved flour from heating, for natural fermentation baking, and to obtain nutri-

tious flour. No one at the International Grains Program could point me to a single book in the library about stone milling. There are only two formal places to learn about milling in the world, in Kansas and in Switzerland. If Kansas could not put me in the direction of a book about stone milling, then no one was focusing on this anymore, and that made us as good as people as any to do something like this.

"That was a turning point for me. I came home from that Kansas trip thinking this isn't another mill that we recruit to Skowhegan, but maybe this is us figuring this out, and getting to work on a business plan. I came home concerned and caring about my community. I realized that there were vacant buildings in Skowhegan that needed a reuse and a repurpose to contribute to a vibrant downtown.

"Once Michael Scholz and I realized that grain processing and infrastructure were the major missing pieces in the link between farmers growing organic grains and bakers using them to make good bread, we launched Maine Grains, in 2012."

A COUNTY JAIL THAT BECAME A MILL

No one could have predicted at that time that the former Somerset County Jail would become a beacon of the new grain economy in the North-Eastern United States.

"This building has four stories of vertical height, in a very sturdy concrete building that is heavily reinforced," Amber laughed out aloud.

She continued: "I was able to see that the vertical height is helpful in milling, because you can send grain to the very top of the facility, and gravity feeds it through the equipment. That conserves energy. Also, some of the smaller mills that we had visited on farms had mentioned that marketing themselves and letting people know that they even existed was one of their biggest struggles. I felt like conducting a project like this downtown, which would be highly visible, and would be a unique repurposing of a building. We would not lack—and have not lacked—for any publicity on what we are doing. It's highly visible.

"This was an awkward building for our county commissioner to dispose of so we were able to

> "MICHAEL SCHOLZ AND I REALIZED THAT GRAIN PROCESSING AND INFRASTRUCTURE WERE THE MAJOR MISSING PIECES IN THE LINK BETWEEN FARMERS GROWING ORGANIC GRAINS AND BAKERS USING THEM TO MAKE GOOD BREAD."

> “OUR CORE MISSION IS TO PARTICIPATE IN THE REVIVAL OF A REGIONAL GRAIN ECONOMY.”

Amber Lambke

buy the building for $65,000. And it came with a fully functional commercial kitchen. There were a lot of needs among the farming community and the farmers market for a certified space for value-added products. We knew at the very least that it would come in handy, which it has over the years. In fact, over the years, the farmers' market relocated to the mill's parking lot, and other groups started using the Somerset Grist Mill infrastructure alongside Maine Grains.

I had already started to get an idea of Maine Grains' social vision and mission, and how they relate to sustainability, health, and local economy. Amber clarified the matter further:

"Our core mission is to participate in the revival of a regional grain economy. There are a lot of other benefits that go along with what we are trying to do, including job creation. We live in a county which has a high rate of unemployment, poverty, and hunger. We are trying to use our assets in this area to create job opportunities for employees. We are trying to create meaningful work. We are making a useful product that is healthy for people, produced in a responsible and sustainable way.

"What drives me to keep doing this every day is that farming, milling, baking, and oven building work in concert to one another, and are part of a larger infrastructure that keeps building more and more economic opportunities for regions. I think this model works beyond grains. There is an industry that can build around an idea like this. The fact that we exist now makes it possible for value-added producers that want to use local grains to be in business. We work in cooperation and inside the same cluster as malters, brewers, and bakers, so I think that, as a whole, it's a lot of fun to be strengthening the grain cluster in Maine."

CARING FOR PEOPLE AND NATURE

Amber went on to explain how Maine Grains is trying to be as environmentally responsible as possible:

"We are a certified organic mill.

About seventy percent of what we process is now organic, but we are also willing to work with farms that are trying to transition land to be organic. There is a part of our production line that is not chemically treated but is not certified. That is both out of necessity and commitment. If we were buying only certified organic grain out of Maine right now, we could probably not operate year around, in our building, and have enough grain. I need to be able to work with the farms that are transitioning to make our business plan work. At the same time, it's giving farms opportunities to serve new markets and to transition to organic.

"We are nearly a zero-waste facility. We produce food as a primary product. Some of the byproducts go on to become animal feed. Some of the hull and chaff that we clean off the grain are useful to local farms for animal bedding, or they go to gardeners as mulch. There is a mushroom company in Maine that is buying the oat hulls to grow mushrooms.

"We also work closely with a local organization, the New Jail, which has an agriculture program. They are raising pigs, and we make some of our byproducts available to them in support of their farming program. There is a stream of flour here at the mill that is the first catch in the morning. When we turn on the millstones, we are feeling for the appropriate texture and grain of the flour. We are catching that flour until we divert it to start saving it. That first catch of the day, we call it 'the run of the mill flour.' It's variable in texture, but it's still edible, and it's great for pancakes, muffins, and pastries. We make that available to schools, jails, and feed banks at a deeply discounted rate."

About the variety and volume of grain that is processed at the mill, Amber said: "We are processing wheat, oats, rye, spelt, buckwheat, corn, and some heritage varieties (emmer, einkorn, Red Fife). For the first time this year, we had a farmer in Maine who was able to supply us with a small amount of durum wheat grown in Maine. We are also working closely with some of the seed savers in Maine, to continue to propagate varieties of interest. There was a customer in New York City that wanted to see a Danish variety called Øland, grown in Maine. We were able to purchase the surplus. In Denmark, it's one of the preferred heritage grain. Denmark's climate is a lot like Maine, cool and moist, so that grain has grown well here.

"In terms of volume, we processed about 700,000 tons (2,000 pounds or 907 kilos per ton) of grains last year. That was double what we had done the year before. I think the market for grains is changing pretty rapidly, as people become educated about artisanal baking techniques, and the health benefits and flavor of grains. There is a lot of variety within wheat, a lot of different flavors within wheat, and different reasons to use different wheat. As this interest continues to develop, there is more room in the market for mills like ours."

CHALLENGES

While there is a great potential for grain, there are challenges in actualizing a new vision based on an interdependent network of committed farmers, millers, bakers, brewers, and malters:

"One of the challenges is that…" Amber takes a deep breath while she pauses on the question, "if you look at the grain system in the world and the United States from a 2000-foot altitude, we are trying to recreate a regional grain economy that had nearly fallen apart. Maine and North Eastern states are not or were not typically believed to be grain-growing states anymore. Trying to reimagine and make the economics of a smaller scale system work, when most of the world is accustomed to buying flour produced at a massive scale, is a very challenging thing. We are producing as much grain in a year as a modern commercial white flour mill could produce in a day. We are doing that with more staff, and more costs, and yet, as we all know, the food system that we have grown accustomed to is an unsustainable one. It's somewhat out of control, from an environmental standpoint, from a labor standpoint, from a health standpoint.

"One of the most discouraging things that I saw at the Kansas State University course was that all of this energy, machinery, and time goes into processing white flour. I remember looking at the machine that was producing bran, wheat germ, and farina, and at one end the white endosperm came out. At the very end of the milling process, the powdered vitamins and minerals get blended back in to

make sure that the flour is a sustaining food. We've just spent a lot of energy taking all that stuff out so that it can be shipped across the globe, be shelf stable, and nutrition is just an afterthought!

"I am but one among a small community of millers across the United States who are all starting to participate in these regional scale mills. It's asking the consumer public, or the bakers that are going to buy our flour, to think very differently about systems, costs, and frankly just even how you get the product and work with it. That is my biggest challenge, I would say.

"At the micro-level, on a day-to-day basis, entrepreneurship is not for the faint of heart. You get very good at managing crises! One difficult thing to the next! Whether it is the need to raise money, the need to fix a piece of equipment, or when this batch of grain is not what I expected, you need to get skilled at anticipating and solving problems."

THE FUTURE OF THE NEW GRAIN CLUSTER

I asked Amber how she sees the future of the new grain cluster. She said:

"I think the future is bright for mills and grains because I think writers are telling the story of these projects in a way that is heightening the consciousness of all of us as eaters. We now understand what it means to care about eating grass-fed beef or purchasing local vegetables. We have a high level of education about other food issues right now, and it's our turn for grains! I think that good bread and the strengthening of the cluster will continue to improve.

"Another thing that I find encouraging is that some large-scale production bakeries are starting to integrate better grains into their operations. At the same time, small village scale bakeries are popping up everywhere. They are transforming people's palate around what good bread is.

"The millennial generation has grown up going to the farmers' markets and is very comfortable at making food choices with local purveyors. That generation is going to be the food shoppers for the next twenty years. There is a level of sophistication and demand for local high-quality foods that are continuing to improve."

> "I THINK THE FUTURE IS BRIGHT FOR MILLS AND GRAINS."

FRESH VS. LOCAL

I wanted to know whether customers cared more for the freshness of Maine Grains' stone-ground flour or its local origin. I assumed that the general public was unaware of the fact that flour could even be a fresh food. Amber said:

"People are purchasing flour from us for both reasons: because it's fresh and flavorful, and because it's local. We need to respect professional bakers' systems and constraints too. It's hard to be developing new recipes too frequently or to change flour too frequently. Some degree of consistency is important. For example, when we were building our business plan, some of our largest customers in Maine originally said: 'Please don't come to me to purchase your flour until you have a year's supply of a particular kind of grain, so that the specifications are not going to be all over the place.' That is understandable. Those same bakers have become some of our strongest advocates, promoting the benefits of local grains. They are developing more flexibility over time.

"It does take a high degree of relationship building to make sure that we are communicating enough when there is a change that is apt to occur, if we expect that a certain protein or moisture level might cause a change in a baker's baking regimen. In the end, this is all about rebuilding relationships that bakers are not used to having with millers anymore. That is part of the reward for customers. It's a process, but encouraging bakers to embrace those changes, rather than considering them a detriment to the flour, is part of our work. It's part of the fun, hopefully."

As home and bakery milling are gaining momentum in the United States, and elsewhere, I hypothesized that these artisan millers were connected in some way or another to medium-scale or even large–scale mills. Amber confirmed my assumptions:

"It all contributes to the same conversation about locally sourced ingredients that are flavorful and that produce high–quality food that is enjoyable. It takes all of those. We do plenty of business with bakery millers who are deciding to mill themselves. They buy just the berries from us.

"We play the role of connecting them with farmers, sourcing what is of interest to bakers, cleaning it, packaging it, and getting it to them when they need it. Those are incredibly important customers to us as well.

"There will be home millers that care a lot about the freshness of milled grains, and there are some families that may not ever take that extra step to do that part of the work at home. All of it is good, and it all contributes to the same kind of change that we are looking for."

Grain, flour, and bread are all changing in a reciprocal manner—one affecting all the others. Farmers reinvent themselves to grow grains in innovative ways. A new generation of stone mills and millers bring honor back to one of the most commodified foods in history. And creative bakers are pushing the limits of taste and form with bread that is as good as it is healthy. All these constitute a tangible proof of that change.

Read and comment online

A BAKING DAY WITH YAEL LEVI

BAKING DIARY

Yael Levi is founder and baker at Baby's Bread, in Ohio (United States).
www.babysbread.com

5:00 am—The oven automatically turns on with the dutch oven inside. My goal is to get up and put some bread in the oven for the family—this is after they complained yesterday that there was no fresh bread in the house.

8:15 am—(Didn't make it out of bed as planned.) After an overnight proof in the fridge, the bread gets put on parchment, scored, and goes into the hot dutch oven.

8:50 am—Bread is out of the oven and is crackling… Great oven spring… I'm happy… Daughter is happy, she has fresh bread!

9:00 am—My schedule this week is crazy: sick child at home with a virus going on for four days, two house guests, a daughter who just moved back home after her year at university, three other kids coming in and out. There is never a dull moment, so unless I'm planning a sale I never know when I'll be baking. I'm going to make my multigrain-multiseed for an event that I will be attending this evening, with a delegation of nurses that came from Israel. Weighed out the seeds for my soaker (going to scale it). Didn't read the formula correctly. Note to self: focus, especially when so harried! Starting over. Reweighed all the seeds and oats and poured boiling water over the mixture.

9:10 am—Mix flours, water, and starter for autolyse. Weigh salt and put on mixer. This is the best way for me not to forget to add the salt

9:30 am—Hunger has taken over. It's time for a smoothie (organic greens, frozen fruit, chia seeds, hemp seeds, fresh ginger and turmeric).

9:50 am—Add the salt, mix, add the soaker, put dough in container and give it a few stretches and folds with wet hands. Using your hands is the ultimate way to get to know your dough!

11:00 am—Decided that I need to bring a sweet bread to the event tonight. Pulled out my 50% starter which I fed last night and is ripe and ready to use. The formula I have calls for overnight proofing in fridge, no time for that—a formula is only a guide anyway. Mix flour, water and starter for autolyse. Weigh the salt and poppy seeds. Chop the weighed cranberries in the food processor.

11:40 am—Add the salt to medium gluten development, add some grapeseed oil then the chopped cranberries and poppy seeds. Give the dough a few stretches and folds—great feeling dough!

12:10 pm— Had to run out. Asked my daughter to do two sets of stretch and fold at 30-minute intervals for sweet dough. Put the seeded dough in fridge to continue fermenting.

2:30 pm—Returned home. Gave sweet dough a stretch and fold to

get a feel of the dough and checked for a gluten window. It can proof a little longer as I get out my seeded dough. Weigh and preshape seeded and sweet doughs. Bench.

3:05 pm—Final shape for seeded bread. Three go into fridge on a couche to proof until tomorrow and two go into baskets to proof at room temperature, to be baked for tonight's event. Same goes for sweet dough, except they all go into baskets. Turn on oven.

3:30 pm—Sad day, off to a funeral. (Fed starter—100%—for challah dough I'll make tonight.)

4:45 pm—Return home. Check proofing breads: need more time to proof.

5:00 pm—Start baking breads I made yesterday that have been proofing in the fridge (traditional rustic and toasted flax seeds). Tried a new method Teresa L. Greenway posted on Facebook using a parchment paper belt to help with the oven spring. Used my new stencil on the seeded bread.

7:00 pm—Brought a basket of my bread (4 varieties) to the event. Before I left I asked my son how many breads I should bring, he responded: "You don't need to bring too many. Nobody eats bread like we do." He was wrong, the bread was inhaled! There's just something about real bread!

9:50 pm—Challah dough mixed and put in the fridge to proof until tomorrow.

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DIGGING INTO SOURDOUGH CULTURE WITH IAN LOWE—PART 1

CRAFT

Words: BARBARA ELISI CARACCIOLO — Photos: BARBARA ELISI CARACCIOLO and IAN LOWE

> “I GUESS SOURDOUGH BAKING IS, FOR ME AS FOR MANY OTHERS, A WAY OF RECONNECTING WITH MOTHER EARTH. SO WHY BE PEDANTIC ABOUT IT?”

Sourdough. Pasta madre. Surdeg. Masa madre. Sauerteig. Μεταλευτής. Levain... of course, levain.

Something acidic (sour, sauer, sur), something that can regenerate itself (madre, mother), and something that can rise (levain, leaven). These are terms found in the languages of some of the cultures that have traditionally used this mixture of wild yeasts and lactobacilli to ferment flour and make leavened bread.

There are several proverbs that warn us to not let a lover know too much about the loved one, lest the information break the spell. Applying this old-school wisdom to my passion for sourdough, I did not mind knowing as little as possible about my creature and preferred an instinctive approach when it came to bread making, even though I was earning my living as a scientist. I guess sourdough baking is, for me as for many others, a way of reconnecting with mother earth.

So why be pedantic about it?

One good reason for unveiling the magic behind sourdough fermentation is consistency. As sourdough bakers, we have all faced the enigma: “Why did this loaf come out ugly, sad, and flat while last week’s loaf was just gorgeous?” Some days, my sourdough starter tripled its volume in a few hours, and on others, it hardly doubled. Thus, quite reluctantly, I began to seek for answers. I learned about the impact of the acidity of the sourdough culture and the effect of the external temperature on my starter. I became accustomed to the terms homofermentative and heterofermentative lactobacilli. But I was still feeling that I was missing some pieces of the puzzle and that I needed help to move forward.

To find the answers to my remaining questions, I reached out to one of the most acclaimed masters of sourdough baking, Ian McMillan Lowe. He is a baker with a substantial bread baking background combined with a deep interest in the microbiological aspects of natural fermentation.

Ian has worked for chefs Mario Batali, Thomas Keller, Sam Mason, Gordon Ramsay, and Chika Tillman in New York City, and for Daniel Chirico in Melbourne, Australia. In 2013, he opened his “neighborhood bakery,” Apiece, in Launceston, Tasmania. Apiece specializes in naturally leavened bread and its Instagram feed is one of the most followed among sourdough baking enthusiasts. Ian is also the co-founder of BreadEd, an artisan bakers’ conference focusing on local grain economies, now heading into its fourth year.

In his spare time, Ian reads everything ever published on sourdough fermentation, continuously updating his knowledge as new scientific articles on the topic are published. Most importantly, he does not just read; he applies what he learns to his baking, turning his bakery into a permanent bread lab that produces delectable experiments.

Ian Lowe teaching a bread-making class.

How did you first become interested in natural fermentation?

I grew up in the suburbs of American cities like Houston, Phoenix, Wichita, and Dallas, where the food you eat outside your home is, almost without exception, the result of an industrial process. So, from a young age, I had an intense desire for "real" food, partly because it was so foreign to what I knew. My interest in natural fermentation, then, is born of a desire for simple, pure and "authentic" foods. I am a disciple of bread, as bread is my favorite food.

Natural fermentation is still the norm in lesser developed countries, more out of necessity than ideology. In rural Africa and Southeast Asia, for example, there are traditional beers still being made using whichever local grains happen to be available, like sorghum, millet, or maize. The resulting beer is naturally fermented, low-alcohol, unpasteurized, unfiltered, and ultimately has a short shelf-life. What's more, these beers are closer to sourdough bread in their microbial communities than they are to "first-world" beers, and arguably with greater health benefits.

What are, in your opinion, the advantages of this type of fermentation compared to that based on commercial yeast?

First, there are the obvious benefits, repeated in baking literature: extended shelf-life, better texture in the final product, and an increased nutritional profile. But, for me, flavor matters above all else. And in this sense, there's no comparison: I've never had a yeasted product that tastes better than its sourdough counterpart—a

conclusion similarly found in nearly every study using controlled blind tasting panels.

What are the main differences between the two types of fermentation, natural and yeast-based?

There are three primary differences. The first has to do with an overall mindset, the implications of which are difficult to elucidate. The use of industrial yeast strains embodies the reductive, illusory ideal that humans have some control over nature. Of course, it's just a gross simplification for convenience's sake.

Yeast manufacturers produce a highly specific subset of yeast strains for use in almost every biotechnological application: beer, bioethanol, bread, the production of medically-related compounds, sake, wine. Most of these strains are selected for only one or two reasons. Saccharomyces strains used in bread production, for instance, have been chosen to maximize carbon dioxide output and for their ability to survive whichever packaging process is used. That's it. It's hard to quantify the long-term environmental or health costs, which are likely both immense.

The second corollary stems from the first. The industrial process allows for the concentration and use of cell numbers that are not achievable in nature. For example, to attain a yeast cell population comparable to that you would find in a dough made of 1% fresh yeast to one kilogram of flour (a standard rate of inoculation in classic lean dough formulas), the sourdough baker would have to preferment approximately 16 kg of flour.

In other words, if using a liquid leaven, a batch size based on 1 kg of flour would require 32 kg of starter for a comparable cell population!

The last distinction is both theoretical and practical. Mainstream baking research, education, and applications are based solely on yeasted products, which creates a huge deficit when it comes to understanding the use of sourdough. The two methods of fermentation are in no way comparable, yet conventional baking wisdom treats them as the same. Take dough rheology as an example. Every customary method of measurement is practically useless for sourdough applications, as the entire body of research was developed for yeasted doughs. Yeast-dominant fermentations occur within a limited pH range where the grain enzymes that impact dough strength are all but inactive. So, from a baker's perspective, yeast-dominant fermentations are overly simple, proceeding along linear paths because dough strength means flour strength throughout the fermentation.

An example of this is Arnaldo Cavallari's (the guy who invented the ciabatta in 1981, after talking with Raymond Calvel) last ciabatta formula, which calls for pre-fermenting 100% of the flour. That is, all the flour is made into a stiff biga with water, yeast, and malt, and fermented slowly overnight. The next day, more water, yeast, malt, and salt are added, and the dough is mixed intensively. As the dough's pH is essentially static, never dropping too far below wheat flour's natural pH, protein bonds remain intact, and the dough doesn't fall apart at any point in its fermentation.

Nic Boskell, Apiece's head baker, with an 8-kg filone he made for his family for Christmas.

> “A 'GOOD' SOURDOUGH IS ONE THAT MAKES THE BAKER HAPPY.”

This isn't the case with naturally-leavened doughs, where strength is a decidedly more complex and nuanced subject. The sourdough baker must manage two divergent sets of cell populations during fermentation, yeast and lactobacilli, each with their individual growth requirements and metabolic consequences, altering dough strength in very different ways.

What makes a good sourdough starter?

A “good” sourdough is one that makes the baker happy. Or, to put it another way, a “good” sourdough is one that produces the outcome the baker desires. In this second sense, it's possible to frame the discussion in a somewhat objective manner, as long as we agree on what it is that we desire.

My goal in baking education has never been to define what is or isn't desirable for a given baker, but rather to help with the understanding and know-how necessary to achieve whichever end she might choose. From this point, we can uncover the variables that affect a particular outcome and then learn how to use them to our advantage. We must, though, begin with a basic understanding of what sourdough is and is not, and what a sourdough can and cannot be.

Researchers distinguish between two main types of sourdough: type-I and type-II. Type-I sourdoughs are the kind familiar to most people reading this interview, the cultures used as the sole leavening agent in western European breads. They are refreshed on a daily basis and kept at room temperature. Maintaining a “good” one involves specific considerations. Type-II sourdoughs, on the other hand, are natural dough improvers. Because of the way they are maintained, they are completely absent of any organisms capable of producing carbon dioxide (yeasts and heterofermentative lactobacilli) and have no

Barbara's sourdough starter. All happy and bubbly.

leavening capacity. Type-II sourdoughs can either be spontaneously or continuously refreshed, with up to seven days between refreshments (at room temperature). The only organisms capable of surviving this long are homofermentative lactobacilli, which are much more acidophilic than heterofermenters and can hence withstand much lower pHs.

Homofermenters are lactic acid bacteria associated with the mammalian gut microbiota (hence why they are dominant in most meat and dairy fermentations), and therefore have a much higher optimal growth temperature range (35-40°C/95-104°F) than most heterofermenters found in sourdough cultures. What's more, they exclusively produce lactic acid from glucose, which has two consequences: it means they are excellent acidifiers, but also that if they are the dominant organism in a culture, the resulting bread will be very acidic, harsh-tasting, and dense. The biggest mistake I see amateur, and even some professional, sourdough bakers make is the blurring of the lines between type-I and type-II sourdoughs, which shows in the final loaf as under-fermentation. This result can occur at either the starter or final dough level.

So, the "good" lactobacilli that we should try to have many of in our starters are the heterofermenters, if we want to have a well-risen loaf. So why use type-II sourdoughs at all?

Type-II sourdoughs have their place, though. They are used in rye breads throughout eastern and northern Europe and Russia, on their own or in conjunction with commercial yeast. Either way, they help limit rye's amylases, which are inhibited at lower pHs, preventing starch breakdown during baking that can lead to gummy interiors.

Other examples of type-II starters are found throughout Africa and Central Asia, where they are used to acidify batters made into griddled flatbreads, such as *injera*.

> TEMPERATURE IS THE MOST FUNDAMENTAL PROCESS PARAMETER AVAILABLE TO SOURDOUGH BAKERS.

Type-II starters improve texture and flavor, as well as increase keeping ability and bioavailability of nutritional compounds, mostly owing to the lowering of the dough's pH.

French artisan bakers are increasingly using type-II starters kept in leaven machines (like Éric Kayser's Fermentolevain) as natural dough improvers alongside commercial yeast in place of industrial additives. But it's important to distinguish between these two types of starters and then to understand the process parameters involved. The parameters that most affect the composition and performance of a sourdough culture are, in order of importance, the substrate (that is, flour type), temperature, and pH. There are other variables, of course, like water activity (hydration expressed as unbound water), osmotic pressure (salt or sugar concentration) or redox potential, but they are relatively negligible from the baker's perspective.

How does temperature influence a starter?

Temperature is the most fundamental process parameter available to sourdough bakers; nothing else impacts a sourdough culture as fundamentally in terms of its composition, activity, and flavor. The dominant organisms most associated with type-I sourdoughs are plant and insect-associated heterofermentative lactobacilli, mesophilic organisms with a narrow temperature range at which their reproductive and metabolic capacities are optimal. This window lies between 22-30°C (72-86°F), which fortuitously coincides with the exact range for the yeast species most commonly recovered from type-I sourdoughs (Kazachstania and Candida genera). If a baker uses successive refreshment temperatures above or below this range, other types of organisms tend to become dominant.

Below 22°C (72°F), there's a tendency for different bacterial genera (like Weissella and Leuconostoc) to prevail, and after enough refreshments above 32°C (90°F), homofermenters tend to predominate.[1] To summarize this rule: it's not impossible to create and maintain a "good" type-I starter outside of this temperature range, but if a baker were to always refresh and ferment within this range, then failure is exceedingly rare.

1 This assumes daily refreshments and hence ignores the effects of pH, which we'll get to in part two of the interview.

What happens when you keep a starter at 4°C (39°F) for more than a week?

Refrigerating a sourdough starter isn't a bad thing, but it's not without a few caveats. First, the baker needs to have a stable, healthy type-I sourdough culture. Most new sourdough bakers who experience dense, gummy loaves have refrigerated their culture before it's even become a "proper" culture! It's hard to create a hard and fast rule here, but, for new sourdough bakers, I'd recommend several months of daily, room-temperature refreshments before using refrigeration. This ensures a fully-viable and stable cell population, and, more importantly, familiarizes newer bakers with the rhythms of a natural starter.

From the relevant research of refrigerating sourdough cultures, it's quite clear that the long-term ecology of a starter is impacted after extended storage below 4°C (39°F). Yeast populations, a critical component of achieving a balanced, well-structured loaf, suffer the most and will be completely absent after three months of refrigeration. After one week of storage, cell populations of type-I heterofermentative sourdough bacteria will be at approximately 1% of their initial numbers, and, after one month of storage, at 0.1%! Although the surviving cells will still be completely viable, it will take more refreshments than most people realize to build their numbers back to their original levels.

When continual refreshment is used in tandem with refrigeration, long cold storage often favors the emergence of more psychrotrophic lactic acid bacteria (such as the Weissella and Leuconostoc species) as the dominant organism. This isn't necessarily bad, but the main drawback with these organisms is that they are even less acid-tolerant than normal type-I heterofermenters, making for less vigorous fermentations at the final dough stage. Infrequent refreshments combined with refrigerated storage, on the other hand, can shift a culture entirely from type-I to type-II.

Another subject the research is pretty clear on is that refrigeration is infinitely preferable to other, comparable methods of storage, like freezing or drying out a culture. The last two methods instantly kill off any yeast species and unalterably shift the long-term bacterial species composition, meaning it would be faster and easier to begin a culture from scratch.

How can we then best make use of refrigeration to store our starter?

The first prerequisite would be to have a healthy, active starter to begin with. Second, it'd be best to allow the starter to ferment at optimal conditions after being refreshed out of the fridge, to begin building cell numbers before cold storage, during which all growth will completely cease. This can mean allowing the starter to ferment at room temperature for anywhere from 4 to 12 hours (depending upon inoculation amount) after refreshment before placing back in the fridge.

Next, it's probably best to refresh at least on a weekly basis out of the fridge, even if you are not using the starter. Why? To maintain the established cell populations, particularly yeast, before they die out completely. This will make using the starter for baking more convenient because of well-maintained cell numbers.

The last recommendation would be to do several successive refreshments before using the culture to leaven a loaf. This ensures you build up the maximum cell population possible and boost the culture's metabolic capacity. The more refreshments, the better (three is good, five is ideal).

It was so uplifting to see all the pieces coming together to form a coherent picture! What Ian is telling us is, in fact, a validation of the method I have been using all these years instinctively, without really knowing why. I have a habit of always letting my starter be “all happy again” at room temperature (generally 22°C/72°F in my kitchen) before putting it back in the fridge. As a result, the starter has been healthy to the point that some of my bread pals joked I had cast a spell on it.

Thanks to Ian’s in-depth explanation about the importance of temperature for lactobacilli and yeasts populations, I now know that my habit was allowing the type-I lactobacilli populations and the yeasts compatible with them to multiply. Therefore, the culture was keeping its stability even during cold storage, and it was easy to make it ready for use in bread baking.

In part two of this conversation with Ian, we will cover the other important aspects of the sourdough puzzle. So hold your breath for the next issue to learn about how to determine acidity levels in a starter, how to start a new culture, how starter characteristics influence dough development, and more.

Read and comment online

IAN LOWE'S DIRECT-PROCESSED BAGUETTE WITH SALTED STARTER

LEVAIN BUILD

INGREDIENT	QUANTITY	BAKER'S %
White flour (T-65, 10.5-12% protein)	435 g	100%
Water	435 g	100%
White starter at 100% hydration	130 g	30%
Sea salt	20 g	4.6%

FINAL DOUGH MIX

INGREDIENT	QUANTITY	BAKER'S %
White flour (T-65, 10.5-12% protein)	887.5 g	88.75%
Whole wheat flour (stone ground)	112.5 g	11.25%
Water	550 g	55%
Starter (from above)	1020 g	102%
Sea salt	7 g	0.7%
Malted barley flour	7.5 g	0.75%

INSTRUCTIONS

1. Mix all ingredients from **levain build** (desired final dough temperature is 28°C/82°F). Ferment for 12 to 16 hours.

2. Mix all ingredients from **final dough mix**. To retain enzymatic activity, we use malted grains that are lightly kilned by a local maltster, but any lager-style malt will do (desired final dough temperature is 28°C/82°F).

3. Use the "improved mix" method to work the dough (a combination of first and second speed to achieve more upfront dough development in the bowl).

4. Allow the dough to rest for 75 to 90 minutes at room temperature.

5. Divide and preshape the baguettes.

6. After 20 to 25 minutes, shape the baguettes and leave to rest for 60-75 minutes.

7. Bake at 255-265°C (491-509°F) with steam, for 22-26 minutes, depending on the oven.

THE RYE BAKER: CLASSIC BREADS FROM EUROPE AND AMERICA

BOOK REVIEW

Words: TIA INGLE

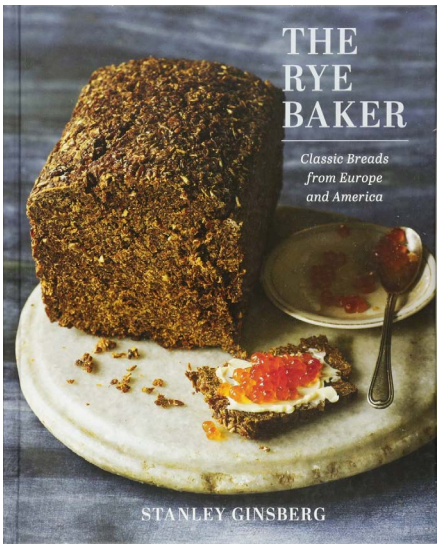
Stanley Ginsberg. *The Rye Baker: Classic Breads from Europe and America*. New York: W. W. Norton & Company, 2016. ISBN 978-0-393-24521-9.
Available on Amazon.

Roll up your sleeves and knead into Stanley Ginsberg's *The Rye Baker* as it covers rye history and—even more importantly—how to get into good dough terms baking rye.

The handling of rye can be a very unpredictable business. A dough made with rye flour can be sticky, wet and runny or, alternatively, hard and crumbly. Trying to understand what went wrong can test the patience of anyone. Even if rye may not be your first choice in grains, if you are a keen baker, you will appreciate the insights *The Rye Baker* shares on different grains and flours, hydration, sourdough cultures, pre-doughs, sponges—ever wondered what a *Detmold sponge* or a *Monheimer sponge* is?—soakers and scalds, bulk fermentation, benching, proofing and more! These are all useful technical aspects to get to grips with.

The first part is an interesting look into rye's history. For example, rye was the only grain to flourish during "the Big Freeze" some 12,000 years ago when Earth entered its cooling period. The rise of nordic countries as a social infrastructure is attributed to the sustainability of rye's hardiness as a food crop. There is also a dark side to rye which potentially makes it the cause of the many witch hunts in the past...

The final part of the book is an appreciative collection of interesting recipes curated from around the world. I have enjoyed reading the prefaces of the regions covered and the introductory snippets to each rye recipe. All the recipes have a clear matrix on ingredients and quantities. It doesn't matter whether your preference is metric or imperial, weight or volume, it is all there, along with the baker's percentage, which is great if you want to scale the recipes in any way. The baker's percentage is also clearly explained in the technical section of the book.



Apart from bringing rye recipes from around the world to your kneading fingertips, *The Rye Baker* is filled with baking lore and knowledge worth its weight in gold. Regardless of whether you are a novice or a seasoned baker, it is definitely a must have bread book for all self-respecting bread heads. I for one will be referring to it over and over again. *The Rye Baker* is witness to the fact that rye is an ancient wild grain with a sophistication of its own that is often under appreciated.

Read and comment online

GALLERY

On a freezing day in January 2016, together with a group of home bakers from Helsinki, I visited Veckoski-Andersböle Vetekvarn, a small family-run mill built in 1934 in Porvoo, Finland. The warm winter light was magical. (Jarkko Laine)

View the gallery online

ISSUE 22—FARMING

BREEDING AND GROWING GRAIN FOR BREAD

The theme for the feature in BREAD's next issue is the natural next step after this issue's focus on milling.

Bread cannot be harvested from the ground or trees: the dough has to pass through a baker's hands, and the flour has to go through a miller's grindstones. But ultimately, it all starts with a seed in the ground—and a farmer's combine harvester. That brings us to the root of all things: earth, nature, agriculture, and how to live as humans on a planet with limited resources.

In BREAD's next issue, we will focus on the people who breed, sow, and harvest the grains we make bread with—not forgetting the practical side of agriculture and baking.

To achieve this, we will be calling on our community of bakers, farmers, millers, writers, researchers, bread lovers—and of course—readers.

Do you have any proposal or advice for us?

Write us at editor@bread-magazine.com.

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