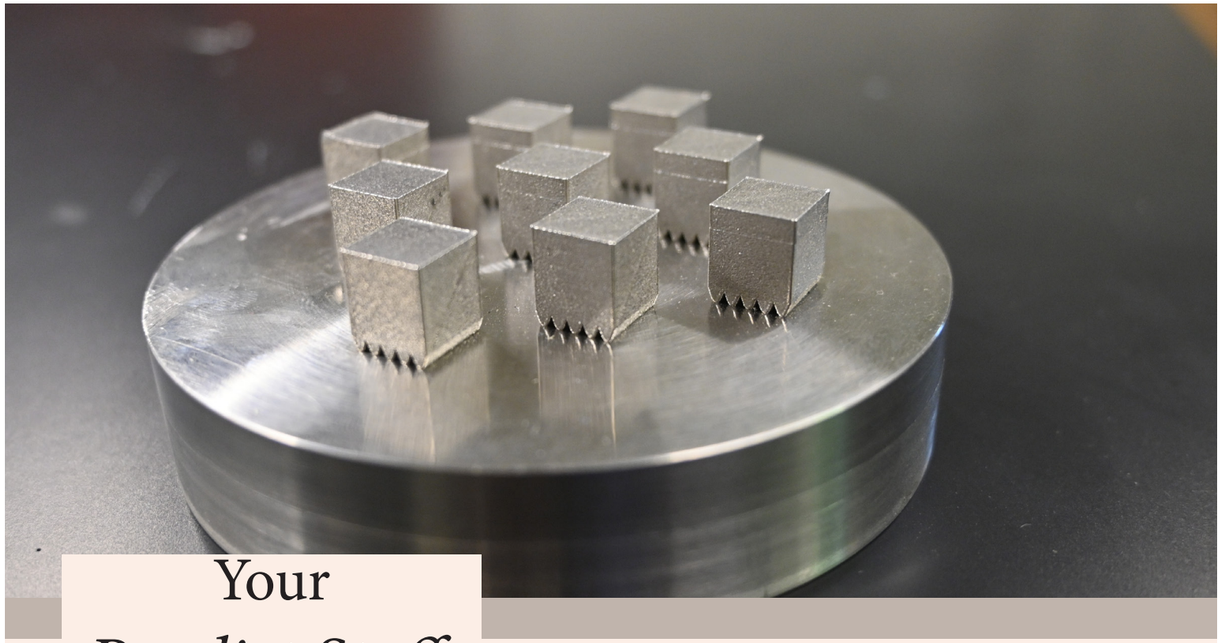

Your *Paydirt Staff:*

EDITOR IN CHIEF Skyler Matteson

JOURNALISTS Alexandra Sartori

PHOTOGRAPHER Samuel Baca

LAYOUT-EDITORS Jaime Mendoza

SPECIAL CONTRIBUTIONS

Mike Kenneally
Adam Kool
Tamanna Rumee
Hari Krishnan
Viktor Forgacs

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paydirt@npe.nmt.edu

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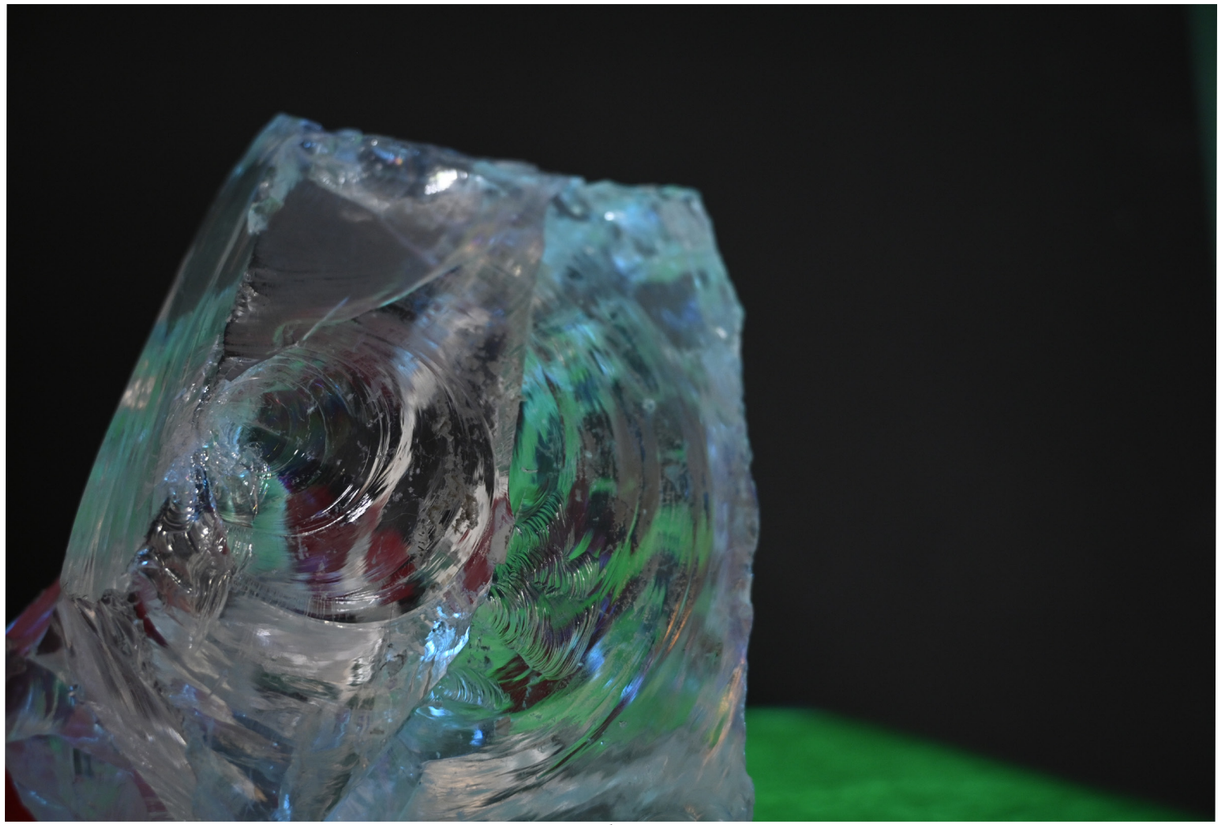
PAYDIRT

Hot Coffee, Hot Chile

September 27th, 2021

In This Issue:

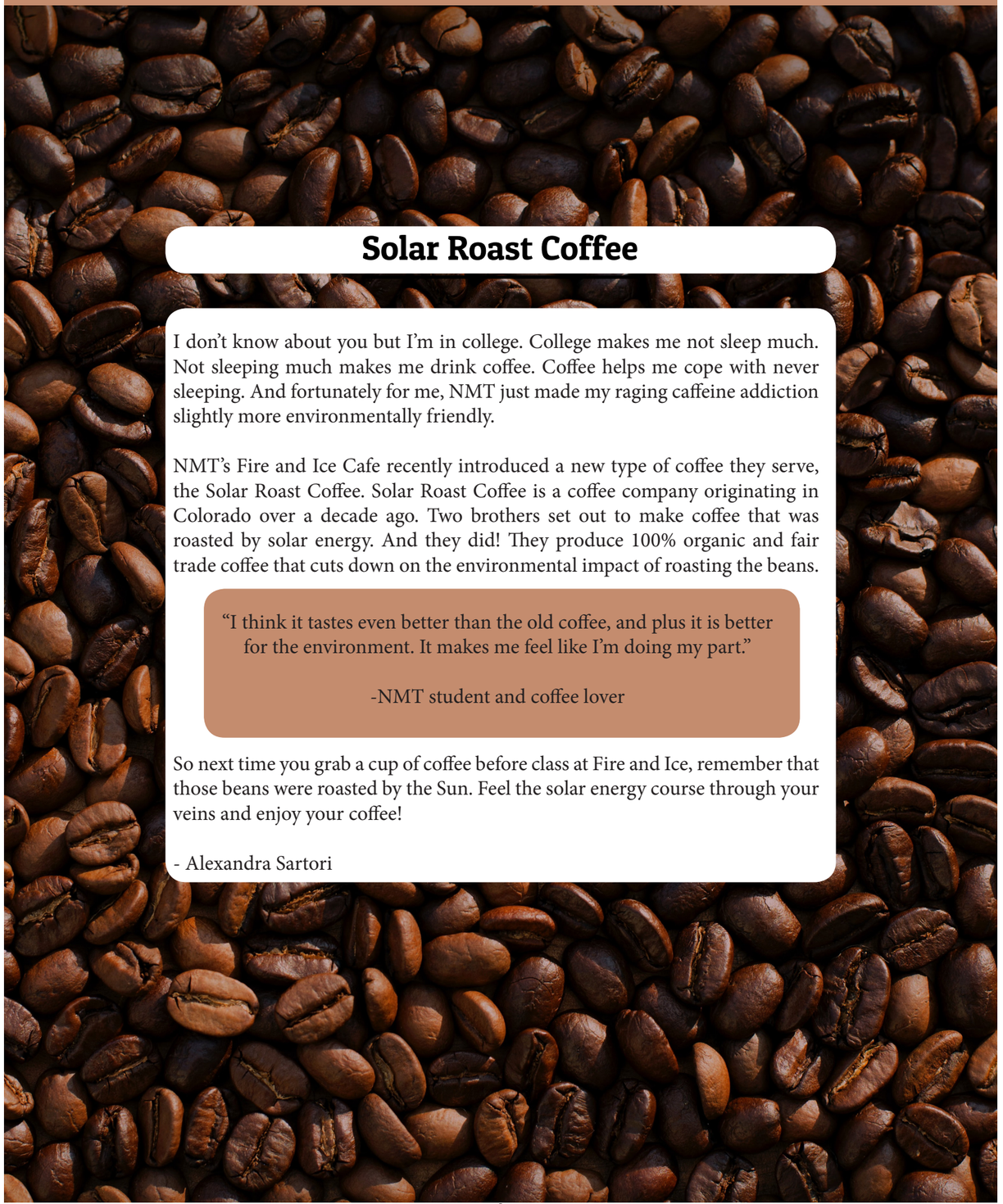


Sudoku

		3	6					1
				9	5			6
	4				7	3		
3	9	4		1			5	8
	5							
	8						1	
		7			2			
2						4		
	1			4			6	

Relax and Unwind

" Smell the roses. Smell the coffee. Whatever it is that makes you happy." -Rita Moreno



Solar Roast Coffee

I don't know about you but I'm in college. College makes me not sleep much. Not sleeping much makes me drink coffee. Coffee helps me cope with never sleeping. And fortunately for me, NMT just made my raging caffeine addiction slightly more environmentally friendly.

NMT's Fire and Ice Cafe recently introduced a new type of coffee they serve, the Solar Roast Coffee. Solar Roast Coffee is a coffee company originating in Colorado over a decade ago. Two brothers set out to make coffee that was roasted by solar energy. And they did! They produce 100% organic and fair trade coffee that cuts down on the environmental impact of roasting the beans.

> "I think it tastes even better than the old coffee, and plus it is better for the environment. It makes me feel like I'm doing my part."
>
> -NMT student and coffee lover

So next time you grab a cup of coffee before class at Fire and Ice, remember that those beans were roasted by the Sun. Feel the solar energy course through your veins and enjoy your coffee!

- Alexandra Sartori

SGA Meeting Rundown: 9/21/21

1. **ANNOUNCEMENT: Paydirt is currently looking for a journalist to hire! If you are interested in writing for us, email paydirt@npe.nmt.edu.**
2. **Many COVID-related concerns were covered during the meeting, covering topics regarding hybrid/distant learning, testing and quarantines, and classroom disinfectants. Michael Voegerl, the director of the Office of Student Affairs, responded to many of these concerns. For the sake of brevity, many COVID rules and regulations can be found on the NMT website, and if you have additional concerns not covered in them, email Michael at michael.voegerl@nmt.edu.Current reported vaccination rates are as follows: 81.5% of employees are vaccinated as of 9/2/21, and over 77% of students are vaccinated as of 9/8/21.**
3. **425 people were tested during the week of September 13th, and no cases were reported. We currently have no active cases on campus, either.**
4. **At least 1 waterbottle filling station is to be installed in every building.**
5. **There has been a recent uptick in event and student participation. Going along with this, 49ers and other upcoming scheduled events are proceeding as planned.**
6. **The next Board of Regents meeting is this Thursday (30th)at 9am in Macey. Our student regent, Veronica Espinoza, will have office hours this Friday from 11am to noon at the Brown Hall conference room, and every Friday after that.**
7. **The SATD has reported that multiple spaces within the SAC are inoperable due to mice infestations and contamination. He has been working continually to remedy the situation, despite delays from other departments. Look for an article on this situation in the future, as there is far more to this to cover!**
8. **Clubs: keep an eye out for emails regarding your approved budgets.**
9. **There is a Socorro city council meeting on October 4th at 6pm.**
10. **A new Social Media Committee has been formed and will begin working to keep students informed and involved.**
11. **Club Advisory senator florez lol: nothing to report. Search and rescue overnight training quasar meeting smash club tournament 6pm fridays. Contact tracing 3 days in advance.**
12. **Legislative standards: Review book of law and previous senate literature.**

The Food Section

"Cooking and baking is both physical and mental therapy." - Mary Berry

The First Chartwells Cookoff

Cooking is a unique activity, it's necessary for survival but it can also be an artform. SGA President Dallin Sobers recently decided to put this artistry on display and help NMT students "change Chartwells from the outside."

Whether you're a freshman or a graduate student, Chartwells' reputation has a tendency to precede itself. "Consistently we'd seen chartwells performing at low reviews, regardless of employees or changes to their menu." Sobers wanted to put an end to this. He found that the best way to go about this issue was to challenge students to step up the plate.

"So You Think You Can Chef?" is a cooking competition designed by Sobers to allow students to compete in a friendly cook off, where the winner gets to have their dish on the Chartwells menu. This competition is expected to take place every month. Students form teams and submit their application to Sobers for the chance to compete. This month, seven teams submitted their request but only four were allowed to compete.

The competition ran in two parts, the initial round held during lunch between the original teams that only allowed two teams to move on to the finals. Then, the final round which would determine the winner. The food is judged by a panel of food lovers ranging from NMT students to Chartwells staff alike.

This month's first round featured dishes such as chicken stir-fry, baja shrimp tacos, and a chili mac and cheese. The esteemed judges found that the chicken stir-fry and baja shrimp tacos were just a notch above and the two teams moved on in the competition.

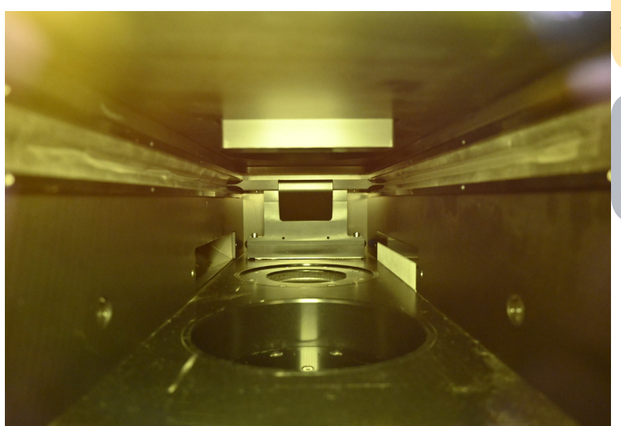
The chicken stir-fry dish hailed from a team called "The 305's" and the baja shrimp tacos from the "Gordon's Donkeys." These two teams went head-to-head in the finale. Both brought their best.

In the final round, The 305's made a tomato soup that perfectly combined a warm blend of spices and jammy, caramelized onions and then the only thing that pairs with tomato soup so absolutely, grilled cheese. This powerful

properties is thought up for some application. The alloy is then made in a small amount in an arc melter, sliced up, and scanned at a very small scale in order to check the underlying structure. Should everything look good, the alloy is then ordered as a powder in a larger batch for further testing. This is where that big LPBF machine comes in.

"In the LPBF process, we have 2 tables. One is the supply table, and the other is the build table. Powder is dragged from the supply table to the build table in increments of about 10-6 meters." (NOTE: this is more than 10x smaller than your hair width) "A laser beam melts the powders, forming the geometries desired. Highly complex parts and lattice structures can be formed by this process, such as trusses, and [at a small scale.] Different alloy powders can come in for different applications. Aluminum alloys for lightweight applications, Titanium alloys for prosthetics and other high performance applications at low temperatures. Nickel based alloys for high temperature applications and Magnesium alloys for ultra-lightweight applications. These include the Aluminum Copper alloy mentioned earlier."

As you might expect, the precision of the LPBF method allows for very fine metallic microstructures to be created, "finer than one can get in ingot casting." For those unfamiliar, most solid materials have a repeating structure within them that directly affects its properties, known as the material's microstructure due to its small scale nature. Refining this in LPBF "provides high strength, which has eliminated the need for deformation processes such as rolling and extrusion." These are common techniques used to form a metal into a desired shape through force, like in blacksmithing where hot metal is hammered into a blade or otherwise.



"While those processes help to eliminate defects [such as cracks,] we don't have those in AM. [This] is why reliability is an issue, and why we need to eliminate defects in the additive process." AM is a 'one and done' type process. The material is created with a much finer structure than could be achieved in conventional ingot casting, but any defects are there to stay; there's nothing else down the line that removes such issues like rolling, extrusion, or otherwise.

However, when the problems are solved, the benefits are high. "AM eliminates these steps and [more,] which cuts down costs. Thousands of parts of an assembly process can be eliminated with one step. Small additions of one element to a [powder composition] can make a huge difference, and [when under load] the finer microstructures prevent cracking."

Despite the large, half-a-million dollar machine looking quite complicated, it seemed that the purpose was fairly simple, and crucial. By acquiring this new device for the Materials department and the campus as a whole, high performance materials can be Additively Manufactured and perfected for a wide-range of applications.

Dr. Majumdar closed by showing me a large inter-departmental project chart that multiple professors and researchers were taking part in, showing that although this machine and its uses are large on their own, it is even still a part of the bigger picture: "We are working on a New Mexico NSF EPSCoR project that combines NMT, NMSU, UNM, 2-year colleges, industries in AM, and Sandia National Labs. The goal is to advance intelligent manufacturing in NM and develop a distributed manufacturing network. This network would allow for manufacturing from anywhere around the state, and we want to take it to the country. This is a 5-year project and is currently in its final stages. We will need students, and if they are interested, contact me for demos [and more.]"

Dr. Majumdar's office is in Jones 104, and his email is Bhaskar.Majumdar@nmt.edu. Contact him if you have any questions, are interested in the NSF EPSCoR project, or would like to see the machine up close!

- Skyler Matteson

Science and Research

"How would you describe something you can't see?" - Mutou

Laser Powder Bed Fusion

Sounds cool, doesn't it? Or at least, pretty complicated. Abbreviated LPBF, this process is used by specialized devices to create materials like a 3D printer, melting alloy powders into solid products, layer after layer. The Materials Engineering Department recently acquired one of these devices for around $500,000; a half a million dollars. As I am a Materials student myself, I had a direct connection to talk to Dr. Majumdar, the man who secured the device, about its functionality and purpose.

Dr. Majumdar himself was originally a Mechanical Engineer at Indian Institute of Technology Kanpur, but while attending the University of Rochester, he switched to Metallurgy after taking a course in dislocation theory. He then worked at several locations in Ohio, including Metal Labs and Wright-Patterson, before moving to New Mexico in the Fall of 1999 to pursue an academic career here at NMT.

Before asking about the whirring and glowing giant machine that took up half the lab room, I first asked Dr. Majumdar what his research was about. At an introductory level, Additive Manufacturing (AM) is "building up from the particle level." That is, a material is built one small piece at a time from a model or blueprint, like a commercial 3D printer does. As far as the materials used for AM are concerned, Dr. Majumdar described that "polymers are at a more advanced stage [in AM] than metals, because that is where [AM] started. For metals, the applications have been largest in prototypes, [but] now, it is developing into a production level."

Dr. Majumdar explained that Additively Manufactured metals were facing issues regarding the solidification process, where the metals go from liquid to solid, due to defects within their structure. "Pores and cracks exist. Our efforts are to reduce those. The main drive for that is that they need to be reliable materials. It can be proven that the AM metals are working, but there is still hesitation [to use them.]"

"Our work is directed towards making high performance AM metal materials that are crack and defect free. As an example, while you can make Aluminum Silicate alloys [that are] highly customizable," (NOTE: Aluminum Silicates are used in electrical and heating elements and other applications) "you cannot make Aluminum Copper alloys, which are higher performance alloys, but they crack. Our goal is to overcome that limitation. Another [project] we are working on is high temperature Nickel-based super alloys. They are used in aerospace turbine engines at temperatures of 1000oC, [but these] also face AM problems."

Dr. Majumdar then began to describe how these limitations are being overcome. In essence, the research goes through a set of stages, checking to make sure everything is working right before moving onto the next. This way, if something is not working, the problem can be examined and rectified before continuing, allowing funding to be used effectively. The team starts this process through "computational materials science and analysis," where a new metal alloy material with favorable

combination was inspired by the chef's love for the iconic duo. "I like grilled cheese and tomato soup, so I made that."

The other team, Gordon's Donkeys, created a powerful carne asada torta. The sandwich, stacked with three different kinds of meat, was inspired by the team's upbringing, citing their heritage as the source of their culinary masterpiece.
The judges, four in total, ubiquitously agreed on the sandwich for the winner of the round. The dish exalted what they were all looking for in the winning food. Despite this, the judges were also enamored with the tomato soup, and a few Adam Driver, "good soup" quotes were thrown around. With this, Sobers has decided he would like to maybe try and put together a "Grilled Cheese and Tomato Soup" day to show off the stunning runner up.

All two of these rounds took place in front of Chartwells and Fire and Ice during the day. Students clamored around to watch the chef's passion in their dishes come forth and well, frankly, the smell in Fidel was heavenly that day.

Another So You Think You Can Chef? will be occurring next month, so if you think you have what it takes to land your dish on Chartwells menu, be sure to be on the lookout for the next team sign up. And until then, happy cooking!

- Alexandra Sartori

Chile Not Chili

Red chile that. Green chile this. Oh, you like christmas chile? Yeah? You think you're special for that? Sorry, don't misunderstand, here at Paydirt, we love our chile. But with chile roasting season upon us, it seems that this time of year is just chile, chile, chile. As much as we hear about and eat chile, it's hard to say how many people have actually heard about its prolific history, like did you know that there is New Mexican green chile being grown in space, right now, as you read?

There are a lot of different types of chile but what makes a New Mexican green chile a New Mexican green chile, besides the whole "from New Mexico" part? It comes down to the size and shape of the pepper itself. New Mexican green chiles are long and slender peppers, averaging around 5-12 inches in length.

The history of the chiles is a lot shorter than you might expect. While the culinary use of peppers and chiles in Mesoamerica was prevalent for centuries, this trend did not move north into New Mexico until around the 1700s when the Spanish arrived. The Spanish, during their colonization of the Southwest, brought these chiles with them and directly contributed to the popularization of them. Even then the love for the chile was much more of a slow burn, taking centuries to become a well-liked food.

During the 1900s, with chile starting to become a much beloved staple in the New Mexican diet, the Fall season was really the only time to enjoy it. It wasn't popular to can or jar green chile yet, so New Mexicans could only consume it for a few months after the harvest. Some would try powdering the pepper but many found that this version was a duller version of the fresh chile. Upon the arrival of refrigeration, green chile's popularity started to rise even more.

The symbol of the chile is easily just as iconic as the Zia symbol. It is adorned almost everywhere in New Mexico: license plates, logos, artwork, bridges, jewelry, even on the signs that welcome in drivers as they pass into New Mexico. This popularity isn't just happenstance. New Mexico State University (NMSU) played a huge role in the 1920s in developing the perfect green chile, a chile that was more drought resistant and easing off on the heat. (I guess NMSU actually can be good at something?)

With New Mexican green chile accounting for around 70% of America's chile pepper production, the pepper brings in around $50M in state revenue every year. Not only that, the chile industry makes up for tens of thousands of jobs in the state. So, although green chile is an important cultural and culinary aspect of New Mexico, it also plays a large role in the state's economics. A drawback to this is the unpredictable nature of the weather in New Mexico, which can detrimentally impact crop harvest yield and the subsequent revenue.

Whether you love it or hate it, New Mexican green chile is an integral part of New Mexican life. It dominates the fall season with roasting outside the local Wal-mart. It comes on every food served in a restaurant here, even things you might not suspect in (like milkshakes). It's even fuel for an age-old New Mexican ice breaker, "red or green?" So….red or green?

- Alexandra Sartori