



Grandma Ach

A Science Lesson on the Chemistry of Bread that Brings a Bigger Question of Life into the Classroom.

BY JOHN BICKART | AUGUST 6, 2023

In two science classes on March 20, 2023 at the wonderful Rainbow Community School in Asheville, NC, I taught some thirty plus seventh and eighth graders a lesson on the chemistry of bread, then we made my Grandma's famous 'crisps' - fried pizza dough that you dip in powdered sugar. The lesson was a celebration that followed a very successful school-wide science fair. The lesson went something like this ...

A Break in History

My Grandma Ach (Achinapura), my mother's mother, was born on November 18, 1888 in Italy. She came to America, got married at an early age, and had 14 children. My father's mother, Grandma Bickart, was born in America on the exact, same day, month, and year. When my mom and dad fell in love and found this out, they felt like star-crossed lovers.

I used to shadow Grandma Ach when she cooked, which was basically all the time. I asked a million questions. Not everyone likes a million questions, like my friends and teachers and aunts and uncles and parents and siblings and cousins; but Grandma didn't seem to mind. One of my favorite times to learn from Grandma and ask questions was when she made pizza dough for frying (which she called 'crisps') or paprika chicken or tomato sauce. I would watch very carefully and ask her why she did

what she did. If no one else was around and I had Grandma all to myself, I would also ask her questions about what it was like in the 1800s.

"The 1800s? Well, it was very different from now, Johnny. Instead of getting around with cars, we used our legs and horses. Instead of getting news from television and telephone, you had to go out of your house and talk to your neighbor."

From the time I was young I loved hearing about the 1800s because I was slowly forming a theory that, as it turns out, I would write about for the rest of my life. My theory was that the human daily routine has been remarkably similar throughout history - until now. Isn't it true that some of our main activities are to walk and talk? We walk around to get somewhere, and we talk to find out what is happening. The basic methods of *transportation* and *communication* have been SURPRISINGLY EQUIVALENT FOR ALL OF RECORDED HISTORY - and most probably for pre-historic times - up until now. Now, if you currently live in a technological culture, the world you are born into is experiencing something for the first time in history. Therefore, that makes Grandma's generation the last generation to live daily life like every generation for all time as far as we know. She, and any cultures that still use foot and animal for transportation, and word of mouth for communication, share this with the ancestors.

Let me note here that some say that there were groups of humans that lived in far distant epochs that predate even our anthropological ancestors, ones that came before what we generally call pre-historic humankind. If these groups existed, I would be fascinated to find their means of transportation and communication. For now, I will concentrate on Grandma's and my world. Our well-known world holds plenty of mystery for me at the moment.

The reason I have been thinking about this break in history for my whole life is that I see an incredible opportunity. Just as Grandma is the last generation to have a major commonality with our ancestors, those of us born into a culture with technology are the first generation that does not have that commonality. This means we 'firsts' have a major disconnect with our ancestors. Every generation before us did most of their living according to tradition and routine - 'the way it had always been done.' We do not. We create new ways every other day. We are untethered, unhooked. We are boats without anchors floating about in the sea of time.

And this means two things. First, we have lost something. Second, we may therefore be able to gain something new.

Seize the Moment

Grandma saw this. She would tell me, "Johnny, everything is always new with you young people. You don't even follow your own routines; you keep changing faster and faster."

But somewhere in my 40s, about thirty years ago, I realized that although we must have lost something; perhaps we also have an opportunity that no generation has ever had in the entire life of humankind - the freedom from historical, traditional, parental, conventional expectation.

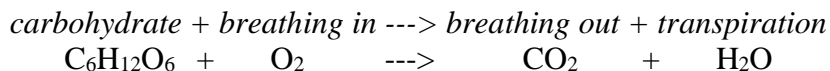
Charles Lindbergh is credited with observing, after his first flight across the Atlantic, that the pioneer has the eyes of the poet - the ability to see meaning that followers may never get to see. My theory is that maybe, just maybe, in this moment of history, we are Lindbergh's pioneer-poets. We are the generation that has been born into a new world that is radically different than the old one. We have been given a world full of individuals who, because of technology, can know what people

all over the planet are doing - and can reach out to them. We can visit them and talk to them at the drop of a hat. This presents two very different opportunities. It's a world where a few terrorists can hurt a large multitude; but contrastingly, a few school children can save a nation. We have a moment, here, now. And the traditions and routines of our ancestors do not necessarily frame answers to our problems. Our past does not always suggest specific ways of being for our future. We are new. We are free. We are poets of the next version of humankind without limiting perceptions and patterns of the past. I don't know about you, but for me this virginal moment is frightening, liberating, sobering, intoxicating, and perhaps even gloriously deliberate.

Can Science be Spiritually Transformative?

So here I am, teaching 7th and 8th graders about the chemistry of bread.

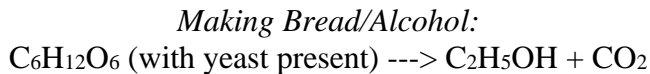
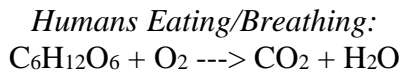
Suddenly - not from any lesson plan - I find myself saying, "You know class, the opposite of photosynthesis occurs when a human is eating a carbohydrate and breathing in oxygen. It is the exact opposite of when trees and plants are breathing in carbon dioxide and drinking water. Here is an equation that represents a typical carbohydrate being added to oxygen (eaten with of course, our necessary breath). If you translate the following chemical equation into language it might read, "Humans (or animals) are eating a plant while breathing (respiration), then exhaling and sweating (transpiration)."



That typical carbohydrate (C₆H₁₂O₆), or more generally, (C_nH_{2n}O_n) could have been:

- typically **sweet** food with a high sugar content (like apples, oranges, berries, honey),
- or typically **starchy** food (like potatoes, bread, rice, pasta),
- or typically **cellulose** food (like celery, carrots, beans).

When nature is making bread (or also, making wine), it is similar to when a human being is eating a carbohydrate. Look at the chemical equations together and you can see that one takes a carbohydrate and adds oxygen and the other without. Humans or animals eating is an aerobic process, which means it is fueled by oxygen. Bread or alcohol making is an anaerobic process called fermentation, which does not use oxygen.



This shows that bread and alcohol are extremely related to our very physical act of living. To make bread or alcohol, you take the same ingredients and breathe life into one and the other becomes the bread/alcohol of life.

After we did a little chemistry on the white board, we cooked the crisps and I asked the students if they liked them. They did. So, I taught them that bread is basic to life. It went something like this ...

You can see that bread is very special to life from at least three vantage points. You just saw a chemical view. You tasted it and thus got the physical view. But you can also see this from what I call a spiritual view - something that inspires and causes wonder.

I told you how you are the absolutely new individuals that have the opportunity to take humankind places we have never, ever been. Well, here is perhaps a place to start. You have just learned about bread - a part of life that has NOT changed in ingredients or the process of making it - for all of history. Bread is also a constant across just about every culture across the whole earth. Almost all communities on the planet take their local carbohydrate grain and combine water and yeast to make bread. And what is more, just about every plant-covered area of the earth has natural carbohydrates covered with wild yeast spores that are airborne and pervasive. This means that there is fermentation to make completely organic alcohol and bread all over the woods. Yes. A completely wild sort of bread and alcohol exist everywhere. Take a walk in the fall and smell the fallen leaves fermenting and breathe in the same fresh air that is in a kitchen when you are making real bread.

So, while you are the new generations - without anything from the past to hold you back - you also have the chance, if you wish to use it, to keep some old things which are natural, delicious and good. And if you choose, as totally free individuals, to be kind en masse ... give me a call ... I'll walk a mile to see that.

#133 *Speaking in Fables*



There once was a magical place. If people who could speak normally went in, they were changed while they were inside, then they

came out SPEAKING IN FABLES.

What does that mean, you say? Well, to speak in fables one must take an ordinary situation and then see something extra. Then, one must put the extra with the ordinary to come out with something EXTRAORDINARY! That's hard to understand, so I'll give you a simple example.

An ordinary way to speak about a candle is to say that we see it every day and we light it in order to see better or we light it just for fun. But to speak in fables, one must observe the flame so carefully that you notice that flames are hot and always go up. It is as if they are little droplets of Sun, going up to return to their home. And if you continue speaking in fables, you would follow such an extraordinary comparison with more observations. You would trace the origin of the candle all of the way back to the Sun. You would say that the flame came from burning wick and wax. The wax came from the Earth, which came from decaying plants, which grew from sunlight. And so,

*to speak in fables, one might end with thanks to the Sun
for every flame - the small droplets of Sun on Earth.*

*Oh yes, and where is that magical place where one learns
to speak in fables? It is called a school.*

LEARN TO SPEAK IN FABLES

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About the Author



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John Bickart, Ph.D., likes to work in the background and let good ideas speak for themselves. He believes that children, and sometimes adults, know what they want and that they empower themselves when they listen to their hearts.

References

Bickart, J. (2020). *Bickart's Just-in-Time Fables* (Vol. 3). Asheville, NC: Red Shirt Interactive Group.