

CONCERNING LADISLAV NACHMÜLLNER AND THE INVENTION OF THE BLEND THAT BECAME PRAGUE SALT.

by Eben van Tonder

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Introduction

Pork is turned into bacon by the reaction of nitrite. The story of nitrite and its use as curing agent is intriguing and an important part played off in Prague. The story has never before been told in the West or in English. This article is the first in a series of articles to follow on the life and achievements of Ladislav NACHMÜLLNER. Here we intend setting the background information of events that led up to the invention of a nitrite curing brine in Prague. It chronicles some of the events that lead to the story being told and the key people involved in bringing the story to the world. It is also a human saga since it is told at a very emotional time as the daughter of the man responsible for the invention, having just celebrated her 90th birthday, enters the final days of her life.

Early history of salt to nitrite

At first only salt was added to preserve meat. It was found that saltpeter had the effect of giving the salted meat a reddish colour and imparting a specific taste. It became known as curing. The knowledge of saltpeter's ability to cure meat has been understood in many cultures in various parts of the world for millennia, but the widespread "*change from vegetable dyes to saltpetre for the coloring or color preservation, respectively, of meat occurred between 1600 and 1750, probably near 1700. The addition of sugar which favours the reduction of nitrate to the active agent nitrite became common practice during the 19th century.*" (Lauer K. 1991.)

Saltpeter is potassium or sodium nitrate. Between the mid to late 1800's, scientists started to work out that the nitrate was not the real curing agent, but its cousin, the far more toxic compound, nitrite. A private laboratory in Germany, founded in 1848 by C.R. Fresenius recorded, for example, experimented with sodium nitrite as curing agent. (**Concerning Chemical Synthesis and Food Additives**) It was around the 1880's that scientists discovered bacteria's role in reducing nitrate to nitrite. (**Lauren learns the nitrogen cycle**)

In 1891, Dr Ed Polenske, working for the Imperial Health Office, concluded that nitrite found in cured meats and curing pickle arose from bacterial reduction of nitrate. In 1899 two other German scientists, Kisskalt and Lehmann, confirmed that the reddish/ pinkish cured meat colour is due to nitrite and not nitrate. (**Concerning the direct addition of nitrite to curing brine**)

The result of the work done in Germany is that by 1910 the reduction of nitrate to nitrite by bacteria and the priority of nitrite in curing was well understood. The questions were now how nitrite would be obtained and added directly to the curing brines in order to reduce curing time and to control the amount of nitrite that ended up in the cure and how the process of turning nitrate to nitrite could be sped up. On account of its toxicity, this was not an easy question to solve and two distinct methods developed. One in Denmark and one in Germany.



Old Prague

The Danish invention

The Danes applied their knowledge of bacterial reduction of nitrate to nitrite and developed a curing method where they re-used brine that was “reduced” to nitrite already. They allowed fresh brine to be continually introduced into the system, bacterial reduction to take place and thus supplemented the nitrite concentration of the previously used brine. This had the additional benefit of “seeding” new brine with just the right bacteria required for nitrite reduction.

According to this method they first injected fresh brine consisting of salt and saltpeter (potassium nitrate) into meat. They then left the meat for several days in a cover brine. The cover brine was never changed and came to be

known as the “mother brine.” It was their source of nitrite that was directly applied to the curing process. The mother brine was strained and boiled before it was re-used to eliminate pathogenic bacteria. (**The mother brine**)

Clues to the date of the Danish invention come to us from newspaper reports about the only independent farmer-owned Pig Factory in Britain of that time, the St. Edmunds Bacon Factory Ltd. in Elmswell. The factory was set up in in 1911. According to the newspaper reports they learned and practiced what at first was known as the Danish method of curing bacon and later became known as tank-curing or Wiltshire cure. A person was sent from the UK to Denmark in 1910 to learn the new Danish Method. (elmswell-history.org.uk) This Danish method involved the Danish cooperative method of pork production founded by Peter Bojsen on 14 July 1887 in Horsens (**The mother brine**). The newspaper reports talked about a “new Danish” method. The “new” aspect in 1910 and 1911 was undoubtedly the tank curing method.

Another account from England puts the Danish invention of tank curing early in the 1900’s. C. & T. Harris from Wiltshire, UK, switched from dry curing to the Danish method during this time. In a private communication between myself and the curator of the Calne Heritage Centre, Susan Boddington, about John Bromham who started working in the Harris factory in 1920 and became assistant to the chief engineer, she writes: “John Bromham wrote his account around 1986, but as he started in the factory in 1920 his memory went back to a time not long after Harris had switched over to this wet cure.”

So, early in the 1900’s, probably sometime between 1899 and 1910, the Danes invented and practiced tank-curing which was brought to England around 1911.

It only stands to reason that the power of “old brine” must have been known from early after wet curing and needle injection of brine into meat was invented around the 1850’s (*The history of curing*) even before the bacterial mechanism behind the reduction was understood. Possibly even from before this time as the meat juices coming out during dry cure must have had the same extraordinary curing power. It was however the Danes who took this practical knowledge, undoubtedly combined it with the scientific knowledge of the time and created the commercial process of tank-curing which later became known as Wiltshire cure.



Prague Bridges

The German invention

Where Denmark focused on harnessing the power of old brine, in Germany they were toying with the idea of using sodium nitrite as their source of nitrite. Sodium Nitrite was by this time used extensively in an intermediary step in the lucrative coal tar dye industry that flourished in Germany and in the Austrian-Hungarian empire, notably around the city of Prague. There was a second use of sodium nitrite in medicine. It was expensive to produce and viewed with some skepticism by the general public for use in food on

account of its high toxicity. (Concerning the direct addition of nitrite to curing brine)

It was the First World War that provided the transition events that caused the sodium nitrite to end up being used as the source of nitrite in curing brines. Saltpeter was reserved for the war effort being one of the main components used in manufacturing of gunpowder and was consequently no longer available as curing agent for meat during World War One. (Concerning the direct addition of nitrite to curing brine)

In August 1914, the War Raw Materials Department (Kriegsrohstoffabteilung or KRA) was set up under the leadership of Walther Rathenau. It was Rathenau who was directly responsible for the prohibition on the use of saltpeter. He therefore is the person in large part responsible creating the motivation for the meat industry in Germany to change from saltpeter to sodium nitrite as curing medium of choice for the German meat industry during World War One. (Concerning the direct addition of nitrite to curing brine)

By 1917 nitrite was not only used for curing meat in Germany, but proprietary meat cures containing nitrites were being marketed across Europe. (Concerning Chemical Synthesis and Food Additives)



Prague 1910

Developments in the United States

Both these methods were being looked at very closely in the United States around this time.

The first recorded direct use of sodium nitrite as a curing agent in the USA was in a secret experiment in 1905. The USDA approved its use as a food additive in 1906. (**Concerning the direct addition of nitrite to curing brine**)

In 1915, George F. Doran of Omaha, Nebraska, filed a patent for using *“sterilized waste pickling liquor which he discovered contains soluble nitrites produced by conversion of the potassium nitrate, sodium nitrate, or other nitrate of the pickling liquor when fresh, into nitrites. As such his patent involved taking waste pickling liquor from the cured meats.”* This is the same concept as tank curing invented in Denmark some time before 1910 and probably after 1899. He states the objective of his invention as *“to produce in a convenient and more rapid manner a complete cure of packing house meats; to increase the efficiency of the meat-curing art; to produce a milder cure; and to produce a better product from a physiological standpoint.”* (US 1259376 A)

Despite the obvious advantage of a far quicker curing time of the use of sodium nitrite had over the tank cured Danish method, the fact that Doran still took the trouble to register the patent for a tank curing method in 1915 makes sense if one considers that tank-curing or the Wiltshire curing process became widespread in application in England. Since it was early days for both methods, it was not clear yet which method would dominate.

By 1925 it was clear that sodium nitrite dominated in the United States. A document was prepared by the Chicago based organisation, *The Institute of American Meat Packers* and published in December of this year. The Institute started as an alignment of the meat packing companies set up by Phil Armour, Gustavus Swift, Nelson Morris, Michael Cudahy, Jacob Dold and others with the University of Chicago. (**Concerning the direct addition of nitrite to curing brine**)

A newspaper article about the Institute sets its goal, apart from educating meat industry professionals and new recruits, “*to find out how to reduce steers to beef and hogs to pork in the quickest, most economical and the most serviceable manner.*” (The Indiana Gazette. 28 March 1924). In this statement is the clue to the reason of its dominance in the United States where bigger, better and faster was the call to arms for the new worlds industries.

The document is entitled, “*Use of Sodium Nitrite in Curing Meats*“, and it is clear that the direct use of nitrites in curing brines has been practiced from earlier than 1925. (Industrial and Engineering Chemistry, December 1925: 1243)

The article begins “*The authorization of the use of sodium nitrite in curing meat by the Bureau of Animal Industry on October 19, 1925, through Amendment 4 to B. A. I. Order 211 (revised), gives increased interest to past and current work on the subject.*” Sodium Nitrite curing brines would therefore have arrived in the USA, well before 1925.

The rest of the opening paragraph continues to elaborate on the reason for its preference. “*It is now generally accepted that the saltpeter added in curing meat must first be reduced to nitrite, probably by bacteria, before becoming available as an agent in producing the desirable red color in the cured product. This reduction is the first step in the ultimate formation of nitrosohemoglobin, the color principle. The change of nitrate to nitrite is by no means complete and varies within considerable limits under operating conditions. Accordingly, the elimination of this step by the direct addition of smaller amounts of nitrite means the use of less agent and a more exact control.*”

Back in England, the longer curing time and the general method of producing bacon using the Wiltshire or tank cure method is still considered as superior in taste and quality to the quick curing method with sodium nitrite. The fact that this is still practiced by reputable companies in England indicates that there are validity to these claims.



Prague

The Griffith Laboratories, Inc.

One of the American companies that introduced sodium nitrite to the world of curing is the Chicago based company of Enoch Luther Griffith and his son, Carroll Griffith. They started to import a mixture of sodium nitrite and salt as a curing substitute for saltpeter from Germany in 1925. The product was called Prague Salt (Prague Powder, 1963: 3)

Nitrite is very toxic to humans. The lethal dose is between 2 and 6g for an individual. Improper use of nitrite in curing operations has in the past lead to fatalities and the only way to overcome this is to mix it with table salt to “dilute” it. (Lück, E. and Jage, M.; 1980: 90) A problem in the early days was that if sodium nitrite and sodium chloride are mixed, the nitrite tends to settle at the bottom of the bag.

The Griffith Laboratories played a key role in overcoming this problem and in marketing the new curing brine in the USA. They took the concept of the Prague Salt (sodium nitrite, mixed with sodium chloride) and in 1934 announced an improved curing brine, based on the simple use of sodium nitrite, where they fuse nitrite salt and sodium chloride in a particular ratio. They called it Prague Powder. (Prague Powder, 1963: 3, 4) Their South African agents, Crown Mills brought the innovation to South Africa.

The benefits of Prague Salt and later Prague Powder over Saltpeter is dramatic. Prague Salt (sodium nitrite, mixed with sodium chloride) does not have the slightly bitter taste of saltpeter (Brown, 1946: 223). It allows for greater product consistency since the same percentage of nitrate was not always present in the saltpeter and the reduction of nitrate to nitrite takes longer or shorter under various conditions (Industrial and Engineering Chemistry, December 1925: 1243). The big benefit was however in the curing time required. Instead of weeks or even months that is required with saltpeter, curing could now be done in days or even hours with sodium nitrite. (The Food Packer, 1954: 64) From there, brand names like *Quick Cure* or *Instacure*.

The search for the origins of Prague Powder

In our own bacon curing company in Cape Town, Woody's Consumer Brands (Pty) Ltd., we use Prague Powder to cure our bacon. We buy this from Crown National, the old Crown Mills that was bought by Bidvest. After a year of research I finally understood how and when saltpeter became the primary curing agent for bacon. The cultural and scientific context was unlocked of scientists who started to understand, towards the end of the 1800's, that it was nitrite and not nitrate who took priority in curing. The Danish development that became tank curing in England and the flirtations in Germany with sodium nitrite before the outbreak of the Great War in 1914, are two direct consequence of these scientific discoveries in Germany.

A key aspect of the history of nitrite continued to elude me. I have been wondering for years how the name Prague Powder came about. I have spent many fruitless hours, over a few years, reading through countless documents on the internet and books on curing from around the world. Who sold it to

Griffith and is it possible that it was in Prague that sodium nitrite was first mixed with sodium chloride to make it possible to handle this very toxic substance. This development was essential for the invention to work and a key to its universal acceptance. I wondered if it is possible to find the name of the person or company responsible for this invention.

I contacted The Griffith Laboratories for more information. They have been wonderful in sending me much information, but it seems as if this particular information is lost to them also.

The only facts that I knew for certain was that the invention of Prague Salt or at least its chemical composition and blend happened sometime between 1914, the beginning of the Great War, and 1925 when Griffith imported it from Germany.

I must have given up on finding the answer hundreds of times every month. In frustration I would tell my children that I will never return to the search. My son would joke with me and ask me when we were relaxing at home if I have broken my commitment and looked for clues again.

At the end of 2014 I wrote several mails to scholars, authors on meat history and meat industry professionals around the world who could possibly provide me with clues about the origin of the blend of salt and sodium nitrite in Prague. Many of them returned my mail with further lists of researchers, institutes, universities, scholars and authors to contact, but in the end all were in vain. All, except one.

By December 2014 I have given up on finding articles from Prague about the history of nitrite. I decided to start working through the website articles of industry associations. I began with the Czech Association of Meat Processors. Just before Christmas 2014 I came across an article by Jan

Katina, “*Nitrites and meat products*,” June 10, 2009. The article contained two important clues. The one was important in filling out the timeline for the use of sodium nitrite in the USA by making mention of a secret test that was conducted in America in 1905 and the second one mentioned a butcher by the name of Ladislav NACHMÜLLNER as one of the pioneers of marketing a revolutionary curing salt called Praganda.



When I got home from work on 24 December 2014, after we completed our last shift before our factory closed for the Christmas break, I mailed Jan to get more information on Ladislav NACHMÜLLNER and his Praganda mix. When I did not get a reply, I contacted the K+S Group, the current owners of the Praganda brand. “**K+S AG** (formerly *Kali und Salz GmbH*) is a German-based agricultural chemical and salt company, headquartered in Kassel. The company is Europe’s largest supplier of potash for use in fertilizer and, after the acquisition of Morton Salt, the world’s largest salt producer.” (A+G, Wikipedia)

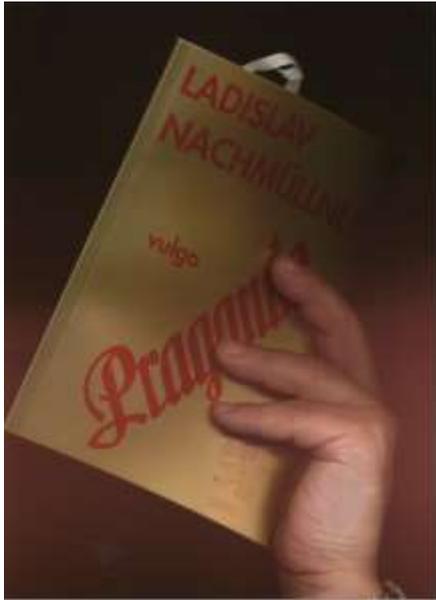
In private communication between myself and the company, they confirmed that Praganda was a nitrite pickling salt and that it indeed originated in the Czech region. The recipes and name are protected by trade marks and patents.

They confirmed that there is a difference in the current formulation between the basic standard nitrite pickling salt and their nitrite pickling salt, Praganda. Praganda contains not only salt and sodium nitrite (the object of my investigation) but also sugars (white sugar, dextrose and dry starch syrup). Sugars improve the effects of the nitrite pickling salts.

This encouraged me. For the first time there was a glimmer of hope that I am on the right track. Not only are we in the right region of the world namely around Prague, but we have confirmation of a nitrite pickling salt that originated in that region.

On 26 February 2015, Jan Katina wrote back to me. He introduced me to Prof. Ing. Petr Pipek, PhD. from the University of Chemistry and Technology, Prague, Faculty of Food and biochemical Technology. Prof Pipek turned out to be instrumental in unlocking the full story behind the invention of Ladislav NACHMÜLLNER and his Praganda mix.

He bought the book written on the life of Ladislav NACHMÜLLNER by his daughter from the publisher who is one of his former student and mailed it to me. Through his students he discovered that Mr. NACHMÜLLNER's daughter was still alive and living in Prague and undertook to locate her so that we could visit her.



Prof. Pipek holding the book.

After months of postal delays, the book on Mr. NACHMÜLLNER finally arrived in South Africa. It is written in the old Czech language and no on-line translation software was able to do a translation on the work. On 20 June 2015, after Tristan's high school ruby match, I drove to the Gardens Shopping Center in Cape Town, where I met Monica and her husband, Mike, who are from the Czech republic and who run among other, a translation service in Cape Town.

There, in a coffee shop, I told them the story of nitrite, what I discovered and why I was so interested in the story of the master butcher Ladislav NACHMÜLLNER from Prague and his invention of Praganda. Right there they read and translated large portions of the work.



Monica who is translating the book with her husband, Mike.

We spoke about producing meat according to original Czech recipes right here in Cape Town in the Woodys factory; about the love of the Czech people for cured meats and about the magnificent delicatessen products we can make from that region.

From reading right there in the coffee shop, they confirmed that Ladislav NACHMÜLLNER was indeed one of the pioneers who was famous for marketing a mix of sodium nitrite and salt and producer of a manageable and highly effective curing mix by 1915, one year after the outbreak of World War One. That he branded and patented it and build a successful commercial business on it.

The time they gave fits the timeline so far developed in this article perfectly. The restrictions on the use of saltpeter in Germany came into effect soon after August 1914 and on the basis of the work of German scientists Polenski (1891), Kisskalt and Lehmann (1899) sodium nitrite was authorised for use in curing brines. Ladislav NACHMÜLLNER, a master butcher in Prague saw the way that the potentially lethal nitrite could be

mixed with sodium chloride (and possibly sugars, as was the practice during this time).

This identifies NACHMÜLLNER as one of the pioneers of one of the first commercial curing brine that incorporated sodium nitrite. During the initial translation from the book on Praganda, Monica and her husband, Mike Werner also confirmed another important clue namely that many copy-cat products soon appeared on the market. NACHMÜLLNER was not just one producer of many. He was a leading producer and the timeline suggest, one of the first.

This is also confirmed by the fact that we know that by 1917 many proprietary curing brines were being sold throughout Europe and as far as the United States that contained sodium nitrite.



Germany itself. Any of these alternatives would fit the reference in Griffith's documents that Prague Salt was procured from Germany.

It is also easy to see that Prague Powder was a good trade name to use in the USA due to the high regard around the world for Prague Hams during this time. If indeed Griffith bought it from NACHMÜLLNER, Prague Powder would have been a much better name for the US market than Praganda. The fact however stands that one of the pioneers of the curing salt known as Praganda and the curing salt known as Prague Powder was in fact Ladislav NACHMÜLLNER. This is true whether it was bought from NACHMÜLLNER or from a competitor who copied Praganda, either in Prague or in Germany.

It provided the answer that evaded me for years. Who invented Prague Powder and where does the name come from? Until we have an actual sales receipt from NACHMÜLLNER's company to The Griffith Laboratory or any other company from that matter, it will remain a matter of conjecture, but narrowing it down to Ladislav NACHMÜLLNER and his company puts us in the right region, during the right time related to the invention of the curing salt. It makes NACHMÜLLNER one of the pioneers of what was sold in America, 10 years later as Prague Powder.

In the meantime Prof. Pipek continued to try and make contact with NACHMÜLLNER's daughter who has not been taking any telephone calls. On 22 June we got word that she just turned 90 and no longer receive visitors. She is very ill and in a frail care facility.

This article will be followed up by a series of articles intended to bring the story of the invention of Praganda to the world.

Krásné jubileum



Eva Nachmülnerová kolem roku 1948

Dne 21. listopadu oslaví 90. narozeniny oldskautka Eva Nachmüllnerová. Děkujeme Pánu Bohu, že jsme se již v roce 1946 setkaly v kostele sv. Terezičky s touto nádhernou, obětavou, veselou ženou, jejíž zásluhou byl založen dívčí skautský oddíl 101. a později i pěvecký sbor pod vedením profesorky Drahomíry Kústové. Milá Evič-



Eva Nachmülnerová z oslavy 85 let v roce 2009

ko, děkujeme Ti, že ses nám věnovala, měly jsme v Tobě vždy oporu a jistotu, že o sobě víme. Děkujeme za Tvoji lásku a vyprošujeme hodně Božího požehnání do dalších let. Za oldskautky ze 101. oddílu kobyliského střediska 88. Radost

Věra Mocová

Conclusion

The history of the use of nitrite in curing brines is one of the most fascinating stories within the story of bacon. Center stage to the development of curing mixes that became commercially available throughout the world is the invention by Ladislav NACHMÜLLNER. The story became very human with the news from Prof. Pipek about the frailty of Eva. The entire meat processing community wish to express our admiration to NACHMÜLLNER and thanks to his daughter for keeping the memory of her father alive. We salute you for a life well lived.

Special thanks:

Special thanks goes to Prof. Ing. Petr Pipek for his personal interest, support and contribution to this story. To Jan Katina, the director of the Czech Association of Meat Processors, for his personal contribution and interest in the efforts of bringing this story to the world. To Monica and Mike Werner for translating vital information from the Czech language. Thanks to the Griffith Laboratory who has provided us with valuable information and who remain interested in the story. To Crown National for their interest in the story and support of the project. To the owners, directors and management team of Woodys Consumer Brands (Pty) Ltd. who continue to support this project with encouragements and advice. To Ing. Alice Roháčková from K+S Czech Republic for the information provided. To the historian and author, Maureen Ogle for the encouragement and references and Lisa Keefe, the Editor of Meatingplace for being a treasure of information and a never ending source of references. To Kristian Nielsen from Azelis, Denmark, who are always eager to contribute and offer encouragement. Christian Schiess from the company Geiger and Klotzbucher (Pty) Ltd. who are always ready to assist with contacts in Europe who may be able to help. To Peter Birkelund and friends from Danish Crown who are verifying information from their side in order to improve the body of evidence and seek verification from their own sources. Finally and most importantly for the family of Ladislav NACHMÜLLNER, for conveying our good wishes to Eva and for the opportunity to get much more information from you.

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Bacon and the art of living



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Images:

Image 1: Prague. www.bjtonline.com/business-jet-news/prague

Image 2: Old

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Image 5: Prague. <http://www.radio.cz/en/static/kafka/3place>

Image 6: Prague

Square. <https://culturemorph.wordpress.com/category/photography-2/page/2/>

Image 7: Ladislav NACHMÜLLNER from vulgo Praganda.

Image 8: Prof Pipek holding Vulgo Praganda. Pic by himself.

Image 9: Monica, holding Vulgo Praganda. Pic by Eben.

Image 10: Trade Mark. From Vulgo Praganda.

Image 11: Eva. Image sent to Eben by Prof Pipek.