

Grantville Gazette Volume XX

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Jim Baen's Universe Grantville Gazette, Volume 20

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What is this? About the Grantville Gazette

Written by Grantville Gazette Staff

The *Grantville Gazette* originated as a by-product of the ongoing and very active discussions which take place concerning the 1632 universe Eric Flint created in the novels *1632*, *1633* and *1634: The Galileo Affair* (the latter two books co-authored by David Weber and Andrew Dennis, respectively). This discussion is centered in three of the conferences in Baen's Bar, the discussion area of Baen Books' web site. The conferences are entitled "1632 Slush," "1632 Slush Comments" and "1632 Tech Manual." They have been in operation for almost seven years now, during which time nearly two hundred thousand posts have been made by hundreds of participants.

Soon enough, the discussion began generating so-called "fanfic," stories written in the setting by fans of the series. A number of those were good enough to be published professionally. And, indeed, a number of them were—as part of the anthology *Ring of Fire*, which was published by Baen Books in January, 2004. (*Ring of Fire* also includes stories written by established authors such as Eric Flint himself, as well as David Weber, Mercedes Lackey, Dave Freer, K.D. Wentworth and S.L. Viehl.)

The decision to publish the *Ring of Fire* anthology triggered the writing of still more fanfic, even after submissions to the anthology were closed. *Ring of Fire* has been selling quite well since it came out, and a second anthology similar to it is scheduled to be published late in 2007. It will also contain stories written by new writers, as well as professionals. But, in the meantime . . . the fanfic kept getting written, and people kept nudging Eric—well, pestering Eric—to give them feedback on their stories.

Hence . . . the *Grantville Gazette*. Once he realized how many stories were being written—a number of them of publishable quality—he raised with Jim Baen the idea of producing an online magazine which would pay for fiction and nonfiction articles set in the 1632 universe and would be sold through Baen Books' Webscriptions service. Jim was willing to try it, to see what happened.

As it turned out, the first issue of the electronic magazine sold well enough to make continuing the magazine a financially self-sustaining operation. Since then, nine more volumes have been electronically published through the Baen Webscriptions site. As well, *Grantville Gazette*, *Volume One* was published in paperback in November of 2004. That has since been followed by hardcover editions of *Grantville Gazette*, Volumes Two and Three.

Then, two big steps:

First: The magazine had been paying semi-pro rates for the electronic edition, increasing to pro rates upon transition to paper, but one of Eric's goals had long been to increase payments to the authors. *Grantville Gazette*, Volume Eleven is the first volume to pay the authors professional rates.

Second: This on-line version you're reading. The site here at <http://www.grantvillegazette.com> is the electronic version of an ARC, an advance readers copy where you can read the issues as we assemble them. There are stories posted here which won't be coming out in the magazine for more than a year.

How will it work out? Will we be able to continue at this rate? Well, we don't know. That's up to the readers. But we'll be here, continuing the saga, the soap opera, the drama and the comedy just as long as people are willing to read them.

—The *Grantville Gazette* Staff

COLUMNS:

So . . . How was the con?

Written by Paula Goodlett

In a word, great. Marvelous is another accurate descriptor.

I enjoyed Albacon immensely. Great hotel, decent hotel food, lots of restaurants within walking distance that had truly great food, absolutely gorgeous weather in Albany for the weekend.

The 1632 convention went very well, thanks to the organizers of Albacon and to the fans who came to participate. The room reserved for our use was just about the right size and stayed full. We might even have been able to use a larger one. We covered the scheduled panels, got a lot of really good ideas for future stories and generally spread the happiness around.

Virginia DeMarce's panels, "Time Passed in the Past" and "What Didn't Happen" were very well received, as was Gorg Huff's "Economics in 1632." "Snerking the Plots" is a perennial favorite, of course, as is "How to Get Published in the Gazette." Iver Cooper's dance demonstration went very well and his later discussion on the social aspects of dance was really informative. One of the best panels, however, was "Weird Tech." Boy oh boy, did we get a lot of ideas!

We were also treated to a filk involving Brillo the Ram, which will someday appear here in the magazine, all going well.

All in all, Albacon was a very informative, productive experience and it's one that we're eager to share with more fans.

Which we will be doing. Next year, over the July 4th weekend. (Appropriate, considering the Fourth of July Party, isn't it?) We'll be running our 1632 Minicon at Fiestacon/Westercon 62 in Tempe, Arizona. Here's their website: <http://www.fiestacon.org/>

It'd be great to see more fans there. Y'all come see us next year.

In Other News . . .

We're pleased to have given a subscription to the *Grantville Gazette* to the *Liturgy, Hymnody & Pulpit Quarterly Book Review* , who have asked for review copies of future 1632 universe books.

Rev. Paul Cain said:

We publish reviews books of interest to our Lutheran readers, particularly ones on worship, preaching, and church music.

We'd like to include books in Baen's 1632 series because of the setting in Germany, the inclusion of our Lutheran Confessions (Concordia) in some stories, and Lutherans as characters, like Gerhard.

It's not very often that a science fiction magazine gets this kind of notice, and we're all very pleased about it. Baen Books was happy to respond affirmatively to "so far the least expected request for a review copy."

It's nice to be noticed, folks. Thank you, Rev. Cain.

Paula Goodlett and the Grantville Gazette Editorial Board

FICTION:

The Anaconda Project, Episode Nine - Delayed

Written by Eric Flint

By Hook or By Crook

Written by Victoria L'Ecuyer



Hamburg, January 1633

Someone grabbed Annabet Nutsch and covered her eyes. "Guess who!"

Annabet stiffened. She recognized the voice and jabbed her elbow into her brother's ribs. "Grow up, Johann." She wrestled free and shook her finger at the tall, gangly young man with light brown shaggy hair. "You should be in Jena doing your journeyman's work." She tucked her blonde hair back under the cap he knocked askew.

"And you should be a housewife with a child on leading strings." He grinned at her, green eyes filled with mischief. "Look at this and tell me what you think."

Annabet shoved her baby brother out of the way. "I'm working."

"Just take a look!".

Annabet snorted. "Fine. A quick look, then you have to leave. My mistress is not an understanding woman." She dumped an armload of clothes in a wash tub and shoved them in the soapy water. "Rinse the linens, Wilhelmina, while I deal with my brother," she told the young maid who was helping her. Annabet took Johann's arm and towed him to a corner where they could talk unheard. "What is it?"

"American lace." Johann grinned.

Annabet looked at the long, narrow band of lace. It was made of very fine yarn that was twisted and tangled in a regular fashion. It should have looked ugly, but it didn't. "This is nothing I have seen before." She stretched it flat to better see the stitches.



"It's from the future. I learned how to make this from an American woman in Grantville," Johann said. "She had this lace everywhere! It was on her tables and chairs and on the bottom of her curtains." He reached in and pulled out a ball of string and a fist full of hooks. They were all a different size and none bigger than a thin tree branch. "I whittled these for you. They are called *crochet hooks* ." He reached into his bag again and pulled out a handful of papers with sketches and strange lettering. "Here are instructions. I cannot read the English, but I can tell what each step means. The lady I bought these from could barely speak German, let alone write it. I will need your help translating this."

"Johann, you know I don't read English!"

"But you do know what women call things." Johann grinned. "The lady taught me how to *crochet* . If I do what each picture shows, you can tell me how to write instructions." He sent her a pleading look when she remained silent. He rifled through his sketches and found one with a simple lace edging on the collar. "Look. She said you can make a collar like this in three days. Lace edging for sleeves would take maybe a day. Two, if you're slow. A collar as wide as your hand is long would take a week. Three at the very most. I can engrave the pictures easily. Now that I have a press, I can set the instructions and print the patterns myself."

Annabet scowled. She had heard her father carrying on about her brother's new press and his Committee and their dreams for revolution. She agreed with her father's skepticism. It sounded too good to be true. But this . . . She took the paper with the design. Johann was a good artist and his sketch was clear. The collar was simple, almost plain, but it was still lace. Annabet was torn. The American lace sounded like a get rich quick scheme, but this was lace. The wealthy matron who employed her as a maid of all work only had it on her very best clothes. "I will look at this. Tonight." Annabet stuffed the paper and all the rest back in his bag. "Don't assume I will fall in with your plans. Now go before Frau Koch sees you." .

Johann hesitated, possibly to argue and wheedle her into loafing, but Annabet knew she was pushing her good luck by letting him stay as long as she had. She shoved him out the door.

* * *

Annabet met her brother when he came home from the tavern that afternoon. She watched in satisfaction as their mother grabbed his ear and twisted it.

"Ow!" He fell to his knees when the pressure increased. "I'm sorry. Whatever it was I did, I'm sorry!"

"Not as sorry as you will be when Papa gets home," Annabet told him. "Frau Koch isn't going to renew my contract when it expires. And it expires real soon! She said it was because I had suspicious young men visiting me. When I told her you were my brother she didn't care. I shouldn't have been wasting my time and her money talking to you." Her fists curled. She wanted to twist his ear, too. And pinch and slap and kick and pummel him black and blue. She took a deep breath instead.

She needed the coin. She had spent all of her money on supplies to make things for her dower chest. As long as it was taking Gottfried to save up his mercenary's pay, she was certain that it would be her money that would allow them to get married. When he managed to return. His occasional notes with vague promises had stopped coming. She was worried he was spending all he had earned. "I keep hearing how your Committee of Correspondence encourages women to be as free as men. Not that I believed it.

"Unfortunately for me, it looks like I will be finding out sooner instead of later. I am your first committee member here in Hamburg whether I like it or not. You will print lace patterns before you print anything else. I will sell them for you and you will pay me the same as you would any other shop help."

* * *

That night, Annabet frowned as she watched her brother crochet. He was clumsy and slow. She doubted his claim of a lace collar in three days. Annabet turned to the pictures that gave instruction and scowled at them.

Sighing at herself as much as at him, she began to follow the pictures in the instructions, squinting, muttering to herself as she went. Johann offered advice and additional coaching, hindering as much as helping. After some time, a few shushings, and a kick to Johann's shin, Annabet mastered the basic stitches. Before too much longer, she was making a row of loops and picots on top of a simple filet crochet band that looked like a long, thin ladder.

"Hmphf." She finished her lace cuff and put it next to the hem of her sleeve. "It's like knitting, but not." Annabet started a second cuff. Now that she knew what she was doing, it went much faster. She could do a collar in three days, even if her brother couldn't. "Johann, you may not be an idiot after all."

He grinned. "Then you can help me write the instructions for the patterns? And make lots of lace to display? "

"Yes." She scowled. "But if my eyes cross because of it, I will beat you. You may be bigger, but I'm still older."



Johann laughed. "By the time I finish setting up my printing press, I will have two things to print! A broadsheet for the Committees and a lace pattern for women." He rolled up his project and went to his sister. "I'll be rich!"

Annabet frowned. "If you don't get a broken head first. Those who are in charge will *not* like this. The people who owe favors to them will like it even less. You know that the city leaders aren't at all sure about those crazy Americans. Plus, you've never run a printing press before!"

He waved her concerns aside and got paper from his pack. "Describe the first picture. How many chain stitches did it take to go around your arm?"

* * *

A week later, Annabet walked into her brother's shop on the outskirts of Hamburg. The bell over the door, missing its clapper, *tonked* when the door hit it. Johann yelped, brandishing a tool. She frowned at him before she set her basket down and straightened her lace collar. She removed her shawl, now trimmed with lace, and tucked it into the basket. "Why are you so jumpy? Who has been here?"

"Annabet. What are you doing here?"

She noticed his evasion, but let it slide in favor of more important things. "You need to have your landlord fix the bell and that broken window. This shop may be cheap because it's on the edge of town, but that's no reason for it to be shabby and in bad repair." Annabet looked around, spotted what she was looking for and crossed to the shelves. "I'm getting more patterns. All the women I know want one of each, even though they complain mightily about how hard it is to read them. I ran out." She reached in her pocket and pulled out a small purse. "Here's the money left over after I ordered more hooks. The patterns sell better if I have them.

"And do something about the printing. The ink is too blotchy; the lines are too close together." She squinted at the example in her hand. "Make the spaces between the words wider, too." She went back to the stacks of paper.

A bit desperate, Johann took the money and her elbow. "I'll bring some home tonight." He started to

drag her to the door.

Annabet shook him off. "What did you do? These pages are all tumbled." She pulled more off the shelf. "These are crumpled." She slapped his hand when he grabbed her. "Johann, what happened? Who's been here?"

"Nothing." Johann couldn't meet her eyes. "It was an accident," he lied.

She put her fists on her hips and glared at him. "What kind of accident?"

"I stumbled and hit the shelf. It fell." He met her eyes, finally. "Go home, Annabet. I'll bring the patterns tonight."

She recognized that look. "You are lying." Annabet narrowed her eyes. "Did someone from the city council come here?"

Johann grabbed sheaves of patterns and put them in her basket. "If you want the patterns now, you'll have to sort them yourself." He shoved a second stack in her basket then grabbed her arm in a fierce grip and dragged her to the door. "Go. Home. Annabet."

* * *

The next morning, Annabet answered the door to her parents' house and found her best friend, Bertha, hand in hand with Karl, Bertha's fiancé. "You're back! This is wonderful! Where's Gottfried? You went to war together. Did you get separated?" She went to hug him, then stopped. His face was solemn and Bertha was teary-eyed. "What's wrong?"

"May we come in?" Karl asked.

Annabet lost her smile. She stepped back and held the door open.

She showed them to chairs. Karl dragged his hat off his head, crumpling it in his big fists. He looked at Bertha in desperation, but she was crying.

Annabet hid her fists in the folds of her skirt and took a deep breath. "Gottfried's dead." She said it for him.

Karl nodded. Bertha dried her face and got up to put her arms around Annabet.

Annabet just stood there staring through the wall. "I had hoped he was whoring and too embarrassed to tell me he spent all his pay." She heard Karl clear his throat and focused on him.

"Gottfried was killed at . . ." He stopped when Annabet shook her head.

"It doesn't matter," she said. "He's dead. What good is he to me now?" Annabet was aware of Bertha and Karl communicating with grimaces and head jerks, but ignored them.

Karl eventually left. Bertha stayed long enough for Annabet's mother to return from the market. After a whispered conversation, Bertha left as well. Annabet let her mother guide her to a chair, but ignored her fussing in favor of staring out the window.

Annabet shrugged off her mother's urging to lie down. She did move, though, to a corner, where she stared at a half-finished cuff made of lace shells instead. It hurt to see what she couldn't have.

* * *

Johann clattered in that evening and crouched at her feet. He frowned at her expression. "Why the face? I brought you more patterns. One of them is new."

She started keening.

"Annabet?"

She curled into a ball. "Go away."

He swore. "Why are you crying? Did someone hurt you?" When she didn't answer, he shook her. "Who?"

"Gottfried." She blew her nose.

"Gottfried Groenenbach?"

Annabet stared at him, confused. "No, not the mayor's enforcer." She scrubbed her face. "My betrothed, Gottfried Mueller. He's dead. Now I'll never get married!"

"Dead? How?"

Annabet twisted her handkerchief. "How do soldiers usually die? In a battle. Somewhere." She ignored the tears rolling down her face. "Almost six months gone."

"Why so long to get the news?"

"Gottfried could barely read and didn't see the point in writing. He only did it because I made him." Annabet started sobbing again. "Karl didn't know how to put the news in a letter to Bertha, so he waited until he came back."

Johann put his arms around Annabet. He rested his forehead on her hair. "Is Bertha the one who used to pinch my cheeks?"

Annabet nodded and bawled. "She said she wanted a child just like you. I don't know why."

After a while, she pulled back and wiped her face with the sodden cloth. Johan dug out his handkerchief, and the light fell across his face.

Annabet grabbed his chin. "Why do you have a black eye?"

"I ran into someone," he said. "It doesn't matter. What did Mama and Papa say about the news?"

* * *

A few days later, the door to Johann's shop was locked.

"Are you certain he's here?" Bertha asked. She kept one eye on the half-shuttered windows in the nearby shops, and wrinkled her nose at a pile of garbage scenting the air with more than a hint of rot.

"Yes," Annabet replied. "He spends all of his time here or at the tavern talking about the Committees of Correspondence." She pounded on the door. "Johann! Open up!"

"I don't think he's here," Bertha said. "I don't think we should be here, either. This isn't a very good part of town."

Annabet huffed and knocked on the door again. "Johann!"

The door jerked open and stopped partway. Johann blocked the opening. "What?"

Annabet pushed on the door. "What were you doing?"

Johann pushed back. "Working," he said. "Go away."

Annabet pushed harder. "Open the door."

Johann glared. "No."

Her eyes narrowed. When Johann didn't back down, Annabet demanded, "What is wrong with you?"

"Nothing." He shoved his jaw out in the stubborn expression that Annabet recognized all too well.

"We'll see about that." Annabet threw her weight on the door. "Bertha, don't just stand there! Help me."

Bertha added her weight. Johann held them off for a moment but ended up slipping back a step or two.

Johann gave up. "Stop."

Annabet squinted with suspicion, but stopped. Johann shoved something aside and opened the door.

Annabet stepped over the threshold, then stopped. Bertha followed, trying to peer around her. The shop was covered with spilled ink and scattered papers.

Annabet picked up a ruined pattern. "What happened?"

Johann kicked at a pile of ink-splattered paper. "A group of men from the city council." He shrugged and surveyed his shop. "They ruined all my paper and spilled the ink then left me with a warning."

"Be glad they didn't do more," Bertha said. "They normally break heads."

Annabet paused her prodding of the nearest mess and looked up at him. "What kind of warning?"

"Get out of the Committee or suffer the consequences."

Annabet snorted and started to pick up papers. "What did you expect?"

"Not this. I expected other journeymen and apprentices to join me." He sighed. "I hoped they would help me spread democracy."

Annabet clucked. "Always the dreamer."

Johann kept silent and continued cleaning. The women followed suit, at least until it came time to mop up the ink.

"Do you have enough money to buy more supplies?" Annabet asked.

His gaze slid away then he forced it back. "No," Johann said. "That is what part of the mess is from. I fought to save what I had."

Bertha sniffed. "He's ruined."

Annabet sent her an angry look. "That's very helpful of you." She considered the blotches on the floor. "Tomorrow. Tomorrow, I will think more clearly. Today, we will clean this up."

Johann crossed his arms, trying to look as forbidding as their father. "No. You will stay out of this!"

Annabet just looked at him. "You are not Papa to order me around. You are not my betrothed, either. You are just my baby brother, and you need help." A tear slid out of the corner of her eye. "I need something to work toward, something to hope for." She took a deep breath. "Please?"

Johann swore. "Fine." He uncrossed his arms and went back to work.

Bertha just patted him on the shoulder as she went to look for a mop. "You're a good boy. Stupid, but good."

* * *

Annabet met Johann when he came home the next night. He had no more bruises, but he did have a fresh scowl. He slammed the door behind him.

"What's wrong, now?" she asked.

He kicked a chair. "No one will give me paper or ink on credit. I have nothing to print on."

"You will." Annabet took the heavy purse she'd been carrying all day out of her apron pocket. "I want to go into business with you. I want to be a full partner and not just your clerk."

"What do you mean?"

"I sold all the linens from my dowry chest," she said. "One of the cooks where Bertha works is fumbled-fingered when it comes to fancy work. But she's thrifty and has plenty of coin instead. She's also in love, and her sweetheart just made master. He's ready to marry, and her dower chest was half empty. I emptied mine and filled hers for a good price. That, added to the money I earned working for Frau Koch . . ." She grinned while he gawped. "I will buy the paper and ink and give you half for your Committees of Correspondence. You will use the rest to print patterns for me."

Johann stared at her. "Why?"

Annabet's mouth pinched. "I grieve less for Gottfried than I do for the house we would have had and the

children. All the men my age are either betrothed or married. I don't want to wait for a young one to earn enough to take a wife. That leaves widowers with children." She shrugged. "It's not my first choice, but I'm tired of being considered a child when I'm not.

"I will have a better chance of getting married quickly if I have money rather than goods." She held out her arms, fingering the hems of her sleeves. "With this American lace, I will look wealthy. By selling your patterns and making my own, I will be wealthy." She looked at her brother then picked up a pamphlet. "I read your *Rights of Man* and *Common Sense*. It's starting to make sense." She dared him with a glare of her own. "Will you deny me the same chances because I am a woman?"

Johann closed his mouth and swallowed. "No." He looked at her then began to grin. He grabbed her in a hug. "We will change Hamburg!"

Annabet snorted. "We'll try."

* * *

"Annabet, where are we going?" Bertha asked the next evening.

"To check on Johann's shop while he is traveling." Annabet met a drunkard's leer with a glower. "He managed to buy supplies, despite the council's orders that the paper and ink sellers were not to do business with him."

"That's to be expected." Bertha watched the street while Annabet wrestled with the key. "They like money, too. So why are you checking on his shop?"

"Johann is like a new mother with her first baby. He is afraid something will happen to his press while he is gone. He had to go to Grantville to buy more lace patterns." She shoved the door open. "He is hoping to bring back double what he did last time."

Once inside, Bertha looked around. "I expected more mess."

Annabet lifted the canvas sheet covering her brother's machine. "No one has broken the press. Yet."

"Give them time."

Annabet settled on a stool by the window and pulled out her latest crochet project.

"What are you doing?"

"You've seen me crochet."

Bertha tapped her toe. "Why are you doing it here?"

"I promised Johann I would watch his shop." She looked up and saw her friend's expression. "No, I am not getting soft headed. If the city council's thugs come with hammers and pry bars, I won't get in their way. I'll just offer to sell their wives and sweethearts my lace." She tipped her basket to show off the tidy bundles of crocheted edgings.

Bertha regarded Annabet for several minutes then dragged a bench into the light and pulled out her spinning. "I didn't know foolishness was contagious."

* * *

Three days later, Annabet looked up to see a very large man with a crowbar and ink-stained hands blocking the door. Two men with cudgels stood behind him.

"Is the printer here?"

Annabet realized that talking bravado was different from facing down thugs. She lowered her work to her lap wishing Bertha, anyone, was with her. "No."

The crowbar-wielding man looked at the sheet-covered press before examining her. "Where is he?"

"Halfway to Grantville."

"When is he coming back?"

"I don't know," Annabet said.

The city council's enforcers muttered back and forth between themselves, then left. The remaining man stepped in and closed the door. "When did he leave?"

Annabet looked him in the eye and lied. "Two weeks ago."

The man frowned at her. The door swung open and hit the stranger in the back. He spun to face his attacker.

"Annabet! Annabet, you must help me." Wilhelmina dodged around the man. "How do I fix this?" She thrust a knitted object at Annabet. "It's all matted." The maid that followed her looked frightened. She skittered her way past him.

Annabet glanced at the scarf. "You scrubbed it in hot water, didn't you?"

"My little sister smeared jam on the end. How else . . ." Wilhelmina broke off and bit her lip.

Annabet sighed. "Once wool is fullered into felt, you can't undo it. Scrub the whole thing until it's even. Then when it's . . ."

"Quiet," the man bellowed. "Is this a print shop or a sewing circle?"

"Neither. It's a crocheting circle," Annabet told him. "And a lace shop." She shook out her work before folding it and tucking it into her basket. "You may as well sit. I won't have time to speak with you until I help these girls with their problems." Ignoring him and his dumbfounded expression, she turned back to back to Wilhelmina. "Fuller the whole length. Dry it, then bring it back. Close your mouth, child. You look like a fish."

Wilhelmina, glancing from the man, who was still standing, to Annabet and back, did as she was told, then babbled and shoved her friend forward. Tongue-tied, the girl just thrust a wad of string at Annabet.

Annabet rolled her eyes. She untangled the project and found a misshapen lace collar. She smoothed it out on her lap, examining the design. "You are decreasing here and here." She pointed at the mistakes.

"Do not do that. When you get to the end of each row, chain three, turn it around, then continue the pattern. You must always chain up to the next row." She handed it back. "Rip it out and start over." She scowled at the girl's moan. "Don't argue. You'll never get wed with that in your dower chest."

"But I followed the instructions!" The maid dug in her bag and pulled out a battered piece of paper. "Here."

Annabet read the paper and sighed. She pulled another one out of her basket and checked her notes. "You must have bought an early pattern. Johann fixed that mistake when he printed it the second time." Annabet exchanged the bad pattern for a good one then shooed the girls off. She turned back to the stranger and made a point of straightening her elaborate lace cuffs and smoothing her apron which was edged with wide bands of more lace.

"Is there something you want?"

"That printing press."

Annabet gave the man a second, closer look. He had ink-stained clothes and looked old enough to be a master. If so, he was one of the young ones.

"It belongs to my brother," Annabet said. "I'm not allowed to sell it."

"Are you allowed to talk about the Committees of Correspondence?"

Annabet considered the man a third time. From the age and amount of stains on his clothes, she thought he was married to a lazy wife—if he was married at all. She started toying with her crochet hook.

"Who is your master?"

"Herr Groenenbach."

"Friend to the mayor and uncle to Gottfried?"

The journeyman printer sneered, but nodded. "My name is Paul Klaussen. Herr

Groenenbach is too lazy to want to train a new apprentice and too cheap to let me do it for him." His sneer turned into a snarl. "But he's more than willing to buy his friends on the council round after round of beer." He bit off the rest of what he was going to say.

Annabet stared at the crumpled, nearly illegible pattern in her basket while she twirled the hook in her fingers. Then she considered Klaussen one last time. She read his sullen expression easily. Her dead fiancé wore that same look often before he ran off to be a mercenary.

"My brother, Johann, left for Grantville four days ago. I don't know how long it will take him to walk there, buy patterns, and walk back. I don't even know that I trust the Americans when they say they want equality for all.

"I do know this. The Committee of Correspondence has given me work when no one else would."

"Then we will speak of work." He sat down next to her and shoved the pry bar under the bench. "Show me the pattern your brother messed up."

* * *

Five days later, Karl entered the shop. He trailed Bertha and carried a short bench over his shoulder with one hand and held a tall, narrow table with the other. Two youngish maids took them with a glad cry. The small cluster of women rearranged themselves and reapportioned the lamps, each one trying for the best light.

"Klaussen is not lying to you," Karl told Annabet. He took a seat close to Bertha and accepted a batch of narrow wooden rods from her. He began whittling them into hooks.

"So we have a printer who knows how to print." Annabet waited for the excited whispers to die down. "We still have to deal with the Groenenbachs and the city council. If they suspect anything, we will still lose the press."

Bertha, searching through her bag for her misplaced hook, said, "So hide it."

* * *

Two weeks later, the door to the shop slammed open again. Gottfried Groenenbach swaggered in backed by five bravos. "Where's the printer?"

Twelve women scrambled to keep their lights from being blown out by the wind gusting in. Annabet ordered him to shut the door. "Were you raised in a barn?"

She had the pleasure of seeing him gape at the freshly painted walls. Racks of spindles, knitting needles, crochet hooks and sewing scissors were on the wall opposite the door. There were bundles of prepared fiber waiting to be spun. Stiff paper bobbins that held various kinds of crocheted lace filled in any gaps. It was a craft woman's dream and a bully boy's ultimate confusion.

"Well, were you?" Annabet demanded.

"This is a print shop!"

The women tittered. The bravos shifted uneasily.

"Does this look like a print shop?" Annabet asked.

Gottfried looked around and tromped through the assembled maids.

The women drew their feet back and pulled their skirts out of his path, much like they would do for a filthy, snarling mongrel.

"You're up to something," he said.

"Yes," Annabet agreed. "I am up to teaching crochet. Would you like to learn? I charge by the hour."

Gottfried snarled at the sniggerer by the door. He gave the shop one last glare then stomped out.

Bertha, who sat by the window, watched the council's enforcers leave. "They're gone."

Paul opened the hidden door to the back room. "You were right, Annabet. Fresh paint does cover up the smell of ink." He sat in the space cleared for him and continued to read aloud the latest news from the Committees of Correspondence.

* * *

Johann returned a week later. Tired and dirty, he looked from Bertha to Annabet with the biggest smile he could muster. "I have more patterns." He started to say more, but the door opened. Two girls walked in, followed moments later by two more. He looked around, confused at the changes. "Annabet, what's going on?"

The girls ignored him. They moved a bench into the light then sat out tapers in simple clay holders on one of a handful of tall stools. The women opened their work baskets and made themselves at home. One sent him a quick glance. The other frowned at a lacy circle.

"I'm giving crochet lessons. Not everyone can make sense of the instructions." Annabet shooed him off.

"In my shop!?" he asked in a near-bellow.

"Don't yell," Bertha said. "You weren't here. And it's her shop as much as yours now."

Annabet sighed. "It kept your precious printing press together. We hid it in the back. And watching for an attack is not that different from waiting for someone to return from war. Hand work makes the time pass." She turned to her students then had to rap one of them on her head to get her attention back on the lesson. "A double crochet stitch there, not a treble, Wilhelmina."

Bertha made a rude sound. "Who is going to suspect a lace shop, Johann? We're just girls, after all. No Committee here." She put on a dumb look, then laughed at his expression. "Don't worry. Everyone here is a member of the Committee. Annabet makes Karl and Paul check to make sure no new members are spies for the city council"

"Who is Paul?" Johann asked.

"Paul Klaussen. Who happens to be a real printer," Annabet said. "He's as excitable about the Committees as you are."

Johann made a face at her, then went to check the printing press for damage. Not finding any, he collected his pack and crouched beside Annabet. "I found something else while I was gone."

She looked at him with suspicion. "What is it this time?"

He handed her a hank of fine wool thread. "A peddler was selling this. I thought you might like the color. It's a thank you gift for helping me. Not that I expected this much help."

Bertha leaned closer. "What an odd shade of pink."

Annabet squinted at the label wrapped around the yarn. "'Brillo's Best,'" she read aloud. "'Common Wool for the Common Man. Color: *Mauve*. Product of *Lothlorien* Farbenwerks.'" She fingered the wool. "What kind of name is '*Lothlorien*'?"

Bertha took it from her. "What kind word is *mauve*?" she grimaced. "Scratchy. I've seen better wool."

She passed it on.

"But the color!" one girl cooed. "So pretty."

"How much will you pay me for it?" Annabet asked.

Johann squawked, outraged.

She glanced over at him. "I agree with Bertha. If I am going to work with wool, it has to be softer than that."

The girl named a price and dug for coins. Johann blinked and held his tongue when the other two young maids also offered to buy the yarn at the same price. By the time the women were ready to leave, he was left with an empty pack and a bemused expression.

As he and Annabet walked home, he finally spoke. "They paid more than I did."

"So when you go for more patterns, buy more Brillo's Best."

* * *

The next evening, Annabet watched Johann and Paul circle each other like strange dogs, ruffs raised and ready to snarl.

"This shop is not a bone," she said. "One of you can't print and the other can't draw. My lace patterns need both. So does the Committee."

When they didn't leave off the posturing she stepped between them and shoved Johann toward the door to the printing room. "Show Paul your letters from the Committee. Tell him about Grantville, too, while you're at it. I want you out of my hair until the women come. Three or four of them said they will be bringing their sweethearts."

They turned to her in unison. "How do you know?" Johann asked.

"Women talk in the market place as much as men gossip in the tavern." When they just stood there, she assigned sweeping and dusting.

Both men balked and headed for the press room. All three kept busy getting ready for that evening's Committee meeting. Sixteen women and girls, not counting Bertha, showed up. Half of them brought their sweethearts. Some brought hampers in addition to work bags. Others brought flasks and before long it was share and share alike.

People were reduced to sitting on the floor, and Karl eyed the walls and muttered about benches. Bertha told him to save his carpentry work for a shop in a better part of town.

Annabet stood by the door, brow wrinkled as she listened to Karl describe his experiences with the Americans to the newest Committee members. Crochet hooks flew while women grilled Johann about Grantville ladies. She glanced over when Paul joined her.

"Bertha is right. We should move the shop. We would get more business."

Annabet shook her head. "We don't have enough money saved to rent a better place. Plus, looking too prosperous will get us more attention from the city's councilmen than is safe right now. If Groenenbach comes by with his bully boys, we can say this is a gathering of friends and get away with it.

Paul thought about it then grunted an assent. He called the meeting to order.

* * *

A week and a half later, Paul hauled Johann into the family parlor and laid him on the floor in front of the hearth.

"Where did you find him?" Annabet asked. She reached for the medicines and cloths she had arranged and rearranged while she waited. Her mother came in and helped Annabet tend Johann, stitching him up where necessary.

"In an alley," Paul said. "On the way back from the shop. Groenenbach and his henchmen had just finished the beating and were getting ready to use knives. I bribed some drunks to go down the alley so Groenenbach wouldn't linger. Karl and your father went to the taverns Johann visits. I paid an urchin to find them with the news."

Annabet and her mother worked while Paul kept checking doors and windows.

"He can't stay here," Annabet said. "They'll kill him." She looked at Paul. "They'll kill you, too."

Paul crouched next to her. "So send him to Grantville for more lace patterns. He's a journeyman. Let him journey. I'll just pretend to court you."

Annabet glared at him.

"My master has no daughters and his wife is dead. His sons are apprenticed to other trades. I've been looking for my own wife. I don't see why it can't be you as well as another." He met her frown with a calm look. "It makes a good story and keeps you safe as well. Or do you think Gottfried Groenenbach won't beat women? Or worse."

"Listen to the man, Annabet," her mother said.

* * *

Two weeks later Karl and Bertha slipped into the shop. For once, Bertha carried everything, leaving Karl unhindered. He peered into the dark before closing the door. Annabet sent them a questioning look from across the crowded room.

"Gottfried Groenenbach has been asking questions about me and Paul," Karl said. "Someone saw Paul help Johann and reported it to the city council."

Paul swore. "Did they follow you?"

"I think so," Karl said.

"A strange man has been lurking in the neighborhood, too," Bertha added. "I thought I saw him on our way here."

Annabet grabbed spindles off the wall and bundles of unspun fibers from bins. She pulled the Committee of Correspondence's pamphlets from the hands of the women and filled them with supplies.

"Spin," she ordered. "Don't gape. Work."

Next, Annabet pointed at the new members and the males with nothing in their hands. "You, you and you, go to the press room. Karl, stay put. We know they saw you walk in. You will spend the evening telling war stories to Paul and the other men who are making something. We women will talk of spinning and lace."

Everyone stared at her. She grabbed the ear of a young apprentice and hauled him to his feet.

"Move!"

Everyone obeyed. The room rearranged and formed a scene like a cross between a family's gathering room and a well-lit tavern. The conversation was stilted. People kept looking at the windows. When the door didn't slam open right away, the Committee relaxed and conversation became more general. The apprentice cracked open the hidden door and begged a couple more lamps for the back room so they could read easier.

Paul grabbed Annabet as she paced among the benches and made her sit beside him. He shoved her work basket in her hands. Annabet muttered under her breath, but took out her latest project—a curtain, like the one her brother told her about.

The door slammed open. People jumped. Gottfried Groenenbach and his wrecking crew armed with cudgels swaggered in. Everyone drew back.

"Plotting revolution?" he asked.

Annabet held the lace panel up to the light to judge her progress. "Making frillies." She switched her gaze to the enforcer. "Gossiping. Female things."

"And you, Herr Klaussen?"

Paul met Groenenbach's look, then took a pull from his flask. "I am the only non-betrothed rooster in a room full of hens. Who needs revolution when there are women running loose?"

Groenenbach looked around again. "Why these women?"

Paul smiled and tugged on Annabet's lace-edged cap. "I like my pullets to have fine feathers." He grunted when Annabet's elbow connected with his ribs. "And be full of spice. I will be a master some day so I might as well start looking for a wife sooner rather than later."

Groenenbach sneered at that. He and his men tromped through the women, kicking over baskets and upending work bags, searching. They loomed over the men, Karl in particular.

Karl ignored them and kept sanding his latest crochet hook.

Not finding anything but patterns and simple tools, Groenenbach menaced the group for a bit then left.

* * *

Johann stepped inside the door of the Nutsch family parlor almost three weeks later. He growled and dropped his pack.

Annabet frowned at him. "What is wrong with you?"

Johann pointed at Paul. "What is he doing here?"

"Talking about the Committees of Correspondence."

Paul merely drank from his mug. "I'm also courting your sister."

Annabet swatted him. She had learned Paul liked to tease people. He especially liked to tease her. "He is keeping up the charade we agreed on."

"No one only visits their sweetheart at their shop," Paul added.

Johann just looked at him with suspicion.

Paul smiled. "How many patterns did you bring back? More and more women want American lace. Annabet can't make her own patterns fast enough."

"Lots. The lady let me copy a whole book this time." Johann opened his pack and took a thick sheaf of paper out before tossing several rollags of mauve wool to Annabet.

"They had no spun wool," Johann told her. "I did manage to convince the owner of Lothlorien Faberwerks that all women know how to spin. All they wanted were the new colors." He pulled out more bundles of unspun wool. These were smaller and in a variety of vivid, nearly eye-searing colors Annabet had never seen before. "He got excited and talked into some device. Then he sold me all the samples my bag would hold and asked that I tell him what the women liked best." Next he pulled out more paper.

"Are those the patterns?" Paul asked.

Johann grinned. "Oh, no. We have much work to do. While I was in Grantville, there were many stories being told about Brillo the Ram." He nodded when Annabet raised her eyebrows in a question and pointed at the wool piled in her lap. "That Brillo, yes. If Brillo were a man and not a ram, he would be leading the Committees of Correspondence.

"I collected all the stories I could since I think they will be very popular here. I also started sketching illustrations for them. I think I could make them into books for children. Listen." He read *Schade, Brillo! Schade!* aloud to them. "It's never too early to start teaching people about freedom."

Annabet and Paul exchanged looks. Annabet blushed and fingered the wool in her lap. "The earlier the better," she said. She straightened her shoulders. "It is our duty to instruct children how to be good adults. If we should ever have them."

Paul smiled at her and raised his mug in a toast.

Annabet blushed and went back to her hand work.

Paul stopped teasing her, for the time being, and looked at Johann. "Show me your sketches then read us the next story."

* * *

An Electrifying Experience

Written by Jack Carroll



Somewhere in the eastern Harz mountains, 1635

*S*omething's burning! Stefan Leichtfuss stopped in his tracks to sniff, and began slowly scanning his eyes all around. *There!* A wisp of smoke was rising out of that new wooden cabinet mounted on the post! Before he could move, there was a loud humming, and then a rising screech from the machine on the floor. He was halfway across the mill before the two sacks he'd been carrying hit the floor and spilled. He paid no attention to that—in one fluid motion, he snatched up the grain shovel leaning against the wall and swung it at the leather belt. It popped clear of the pulley and hung down. He shouted out the door, "Herr Hartmann! Stop the wheel!"

* * *

The first thing Gerd Hartmann heard was a howl like an outraged cat. He was already moving when Stefan yelled. In three fast strides he reached the headrace gate, seized the lever in both hands, and slammed it shut. The flow over the spillway rose, while the wheel rumbled to a halt. As Gerd ran through the door, Stefan stuttered, "I-I'm sorry, Herr Hartmann, I know it's not my place to give orders."

"Never mind, I stopped it because I trust you. I would have anyway, I heard it too. Now . . . what happened?"

Stefan pointed to the box. "I saw smoke starting to come out of there, and then the belt started slipping on the pulley. I knew something was wrong."

"The generator pulley?"

"Yes."

Gerd unhooked the latches on the side of the cabinet and swung the front cover open. He didn't know what the insides were supposed to look like, but it surely wasn't this. The pivoted copper bars with the wooden handle were tarnished, almost black in places, and the metal was still hot—he could smell it. There was some kind of covering over some of the wires, looking frayed and charred. Something black had dripped down to the bottom of the case, and there were tiny flames dancing on the liquid pool, licking against the wood at the back.

"Quick! A bucket of water!" He pushed the cover shut to contain the flames.

The only bucket handy was full of freshly ground flour. Stefan dumped it back in the bin at the foot of the grindstones, and ran outside to the brook. He was back in seconds. Gerd opened the box again and started tossing the water in, a little at a time, until the black stuff hardened and the charred wood was damp.

* * *

When Theodor Dränitz heard the call from down the shaft to try it again, he'd gone outside the mine entrance, and waved to Hartmann down by the mill. Hartmann waved back and started the wheel.

Theodor went back in with his lantern and climbed down the upper shaft. He'd gone twenty feet along the tunnel, when there was a strange snapping and hissing sound, and an orange glow appeared between the boards of the wooden covering over the wires. Then he smelled smoke, and flame blossomed at one spot.



He took a short-handled pick and started to knock loose the burning board, before the fire could spread. Flaming fragments and splinters rained down on his left hand. He shook them off and kept swinging. Suddenly the dull orange glow from two of the newly exposed wires faded to black, and the noises stopped after a few seconds. He stamped out the burning wood, and looked to make sure no other pieces were on fire.

He went back up as fast as he could with his burned hand, and ran outside—Hartmann wasn't in sight. He hurried down the hillside to tell him not to start again, until they could figure out what had gone wrong.

* * *

All the way up at the house, Marta Seidelin heard the shouting. This scheme of Winkler's had her a little nervous to begin with. She rushed down to the mill to find her husband Gerd and his apprentice Stefan looking into a ruined-looking complicated thing on the post, along with Theodor Dränitz from the mine. There was a big puddle of water on the floor. Then she saw the condition of Dränitz's hand. There were raw, red patches, blisters forming, and dirt all over it.

"Theodor! That looks terrible! It must hurt!"

"Oh, it's not so bad."

"Well, it will be if it gets infected. The newspaper had an article about burns. Come up to the house with me and I'll take care of it."

Stepping back outside, she looked up to the house, and saw her daughter at the door. "Ilsabe! Ilsabe! Take two cups of boiling water from the pot and set them to cool!" Ilsabe waved and went inside.

* * *

Stefan was unlacing the belt when old Winkler arrived from down in the mine. "What's your apprentice doing over there, Hartmann?"

Can't even call Stefan by his name. Gerd snorted. "What does it look like, Horst? He's taking down the belt from that generator of yours."

"Hah? What about the test run? I'm certainly not going to pay you if you don't turn it."

"I'd like to get paid, all right, but I haven't the least desire to have my mill burned down. Take a look at this. Take a *good* look. This thing was on fire when we stopped it."

"The switchboard? On fire? What did you do?"

"We started the wheel when your foreman Theodor signaled. Then we stopped it when the pulley started screeching and this thing caught fire, and we put out the flames. Enough, Winkler! I'm through letting you and your men just try things in my mill with this new machinery when you obviously don't know what you're doing. Get somebody up here who understands this." His voice rose to a roar. "And by God, no more 'quick tests' without a proper belt release lever!"

The shouting match went on for ten minutes while Stefan finished taking down the belt and stowed it behind the generator.

* * *

"*Well?* What's wrong here?"

Winkler was standing with his arms folded and a scowl on his bewhiskered face.

Gerd silently fumed. This was just typical. *What a way to speak to a man who came all this way to help!*

The young Dutchman—he'd introduced himself as Jan Willem Bosboom, a "field engineer" from

American Electric Works—straightened up from examining the insides of the switchboard. He just shook his head. "Quite a lot, Herr Winkler. Quite a lot. But *this* —" He pointed at a large porcelain block. "—is why the damage went so far. These load wires are supposed to be connected to the bottom end of the fuse holder. They're connected to the top instead."

"We tried that. Those little pewter ribbons on it are too weak. They kept melting."

"Well, I should *hope* so! That's what they're there for. They're supposed to disconnect the circuit when the load is too great, so that *this* —" Bosboom gestured open-handed toward the remains. "—doesn't happen. The instruction sheet explains all that. You did read it, didn't you?"

"No," Gerd said in a dangerous voice. "Herr Winkler has that. His men did everything, except for adding a pulley and belt to my main shaft."

"Oh? I see. Well, others are selling the services of their water wheels to generate a little electricity, and there's no reason you shouldn't do the same. But *this* . . . Well, I'll go over the owner's manuals later with both of you, but for now, let's finish the initial inspection before the day gets any further along. I'll get my hand lamp. We can follow the wiring down into the mine, and then we'll see what the pump looks like."

Gerd took a deep breath. "I think I'd better come along and see all of it for myself."

Winkler looked up sharply. "Eh? As you wish. Mind your head in the tunnels."

Bosboom reached down to his tool case and took out a small varnished wooden box. They started up the hillside to the mine entrance, Bosboom looking speculatively at the line of poles as they went.

Meanwhile he flipped out a crank on the side of his lamp, and with a *skkrrrk* spun it for a minute or so. Finally he flipped a little lever. A soft whirring noise started up inside, and a narrow beam of yellowish light sprang out through a window on the front. Gerd looked curiously at the thing. "Is that one of those marvelous portable lights I've been hearing about?"

"An up-time electric flashlight? Not quite. They can't duplicate those yet, but somebody found a good use for the half-million or so Christmas tree bulbs they have."

"Christmas tree bulbs? What are they?"

"Well, during the Christmas holidays, they decorate their houses by bringing in a small fir tree and stringing colored ornaments and tiny electric lights all over it. Supposedly it was originally a German custom, but they used little candles in the old days."

Winkler looked blank. "German? Not from around here. What a strange habit!"

"Oh, I agree," he laughed. "A street full of houses with Christmas trees in the windows is a sight to treasure forever, though."

* * *

The boss was coming up the hill. Gerd Hartmann was with him, looking like he was ready to spit thunderbolts. The stranger behind them must be the foreign expert to figure out what was wrong with this new pumping machinery . . . what was he supposed to be again? Some new kind of mine engineer?

Theodor Dränitz picked up the lantern at his feet and lit a second one from it. He handed it to Herr Winkler as they reached the entrance, but it was Hartmann who performed the introductions.

Theodor led the way to the shaft head, and began descending the ladder. The miller followed him down, and then the visiting engineer. Finally the boss started down. The engineer was still ten feet up on the ladder when a sudden realization struck Theodor. "Herr Bosboom, wait!"

Crack! There was a clatter and a muffled exclamation. The beam from the odd-looking lamp swung around wildly.

"Hold on, I'm coming back up. Here, I'll guide your foot to a solid rung."

He braced himself between the ladder and the opposite side of the shaft, and lifted. The light steadied above him.

"Are you all right?"

"I think so," came out with a hiss. "It feels like I strained my left shoulder. I should have let the lamp fall and grabbed on with both hands."

"I'm sorry about this. I've been meaning to replace that weak rung. All this confusion . . . Can you make it down the rest of the way now?"

"Yes, but give me a moment."

Bosboom slowly descended the last few feet. Herr Winkler came down, and Theodor led the party off along the tunnel. By now the whirring from Bosboom's lamp was slowing down, and it was starting to get dim. Hartmann asked, "Herr Bosboom, would you like me to wind that for you?"

"Thank you, yes. I wish I had some ice for this shoulder."

Theodor replied, "The water in the flooded shaft is almost as cold as ice. I can dip a rag in it for you when we get there, if that will help."

"It's worth a try."

Bosboom stopped when he saw the charred fragments lying on the tunnel floor. "What happened here?"

Theodor said, "One of the cover boards caught fire when all this happened. I knocked it off so the flames wouldn't spread. That's when I got this burn."

Bosboom looked down at the bandage on Theodor's hand, then turned and raised his lamp. Herr Winkler didn't seem to notice when the engineer stiffened. Hartmann did. He asked, "What do you see there, Herr Bosboom?"

"These wires here look like iron. They should be copper. That's one major problem right there."

Herr Winkler snapped, "There's no copper wire made around here. We were told that iron could be used to carry electricity."

Bosboom looked over his shoulder at him. "That's a common mistake, unfortunately. Our instruction

sheets warn against it. Besides all the other reasons not to use it, iron wires would have to be at least two and a half times this diameter to carry the current. That's why they got so hot and started a fire."

Winkler waved his hand at the wires. "The smith charged me enough for the iron wire. Copper would have been unbelievable. That would have to come all the way from Saalfeld!"

"Actually, no. We have plenty of it at the sales offices in Halle and Magdeburg, and there are others selling it too. That's not the worst problem I see here, either. Well, let's continue the inspection."

Theodor answered, "This way, then, Herr Bosboom," and stepped forward.

As the party moved through the tunnels, Bosboom kept looking around at the bends, the drain channels, and the wooden covering over the electrical wiring.

Finally they came to another shaft, filled with water almost to the top. Theodor reached down into the water with a rag, and handed it to the engineer. Bosboom clapped it to his shoulder, and began examining the equipment lying on the tunnel floor, moving his lamp around as he did.

There was a cast iron pump secured to a hoisting rig, connected to a long canvas hose stretched out along the tunnel, and a loose coil of electrical cable running down from the end of the wooden raceway. The engineer looked it all over. Then he knelt down and took a close look at the pump.

He sniffed at it. "What on earth? *Ohhhhh*."

The boss snapped, "What now?"

"Just a moment, while I make certain." Bosboom took the rag off his shoulder and wiped the nameplate clean. He brought his lamp up close.

"Well. To start with, this isn't a mine pump. It's for a village water supply system, and it's only meant for clean water with no muck in it. If the length of that discharge hose is any indication, it can't possibly force water up from anything like the depth of this shaft, and I don't see the pressure relief valve it's supposed to have in case of a blocked outlet line. That's why it stalled out and overloaded the wiring. There's no fused disconnect switch on the wall here. Now that I think of it, I didn't see one at the mine entrance either. On top of everything else, you had the fuses at the generator bypassed. This motor smells like it's cooked."

Winkler looked wide-eyed at him. "*Cooked?* Why would anybody cook a motor?"

Bosboom's shoulders shook for a moment. He coughed, then got out, "Sorry. A figure of speech I heard at the factory. It means it was probably ruined by overheating."

"So what does this mean? How do I make this pump the water out of here so we can get down to the ore seam?"

"With *this* pump alone? You can't. It's impossible. The most it could do is push the water up the entrance shaft and out of the mine, if you didn't have a drain tunnel at this level."

"What? This is supposed to be a good pump. It cost enough!"

"It *is* a good pump, or it was. It's just not the right pump for this job. It's not even the right kind of pump."

All right, I've seen what I need to. Let's climb back up and go over what has to be done. We'll start by going through the instruction sheets for the equipment in the mill, I think."

Theodor dipped the rag in the shaft again and handed it back to him. "I'll climb right below you, in case you need help on the ladder. I'm very sorry about the fall."

Winkler stalked off down the tunnel.

* * *

Ilsabe nestled the covered pot into the coals, and scooped more coals onto the lid. "That will do it for now, Mama."

"Good. Why don't you go tell Papa and Stefan when we'll be eating? Peter will be back by then, if I know your brother." She winked.

"All right, Mama."

She walked downhill to the mill and stepped inside. The stranger kneeling on the floor must be the expert Papa was expecting. He was doing something to that machine of Herr Winkler's that had caused so much trouble. There were tools and small parts lying around it.

Papa was saying, "Stefan, his shoulder is hurt. Go help him."

"Don't you want me to finish getting this load under cover before dark, Herr Hartmann?"

"Well . . ."

"Papa, I can help."

Papa looked over in surprise. "Oh, Ilsabe. I thought you were busy in the kitchen."

"No, most of that is done. Mama sent me to tell you that supper will be ready in about an hour. I can stay and help here if you need me."

"Well, yes, you came at a good time. Ilsabe, this is Herr Jan Willem Bosboom. He's here from the company that made all this electrical machinery. Herr Bosboom, this is my daughter Ilsabe."

The stranger looked up. "I'm pleased to meet you, Fraülein Hartmann."

"Pleased to meet you, Herr Bosboom. What would you like me to do?"

"I need you to pick up one end of this generator while I put a block of wood under it. Then the other end, and I'll prop that side up as well. After that you can take off these nuts and we'll pull it apart."

Papa picked up his grease pot again and went back to the mill machinery.

She knelt down and took a grip. It looked like a lot of iron, but . . . "Oh. This isn't as heavy as it looks. If you're quick with the sticks, I can pick it up all at once."

"All right." He put the blocks in place against the side. "Ready."

A second later it was propped up with its ends clear of the floor. He handed her a wrench and gestured with his hand. "You turn the nuts *this* way to take them off. I'll hold this down. Once that's done, you can slide off the end bells and we'll pull the rotor out."

She looked at the wrench in her hand. It shone like a mirror, and there wasn't a hammer mark on it anywhere—except . . . "Herr Bosboom, what's this here?"

"That? That's a kudzu leaf. It's the maker's hallmark."

"They must be great craftsmen. This is a beautiful piece of work."

He glanced up at her. "You appreciate fine tools?"

"Naturally. I grew up in this mill."

She turned to the generator, and set the wrench in place on the first nut. She gave it an experimental tug to get the feel, then braced her knee against the side and gave a solid pull. Two minutes later the insides were exposed to view, and she was lifting the pieces one at a time to a cloth spread out on a bench.

Ilsabe watched curiously while Herr Bosboom blew the dust away and started playing his lamp over the parts. She pointed to the wires wound around a stack of thin iron plates. "This looks very carefully made. What do all these pieces do?"

"Well . . ."

* * *

Winkler and Dränitz came back to the mill with a handful of thick pamphlets. Gerd came over to the bench to see, with Ilsabe beside him. Bosboom spread out the papers for the generator and the switchboard, and looked up in surprise. "Herr Winkler, these are in Italian! Do you read Italian? Do you, Herr Dränitz?"

"No, but there are plenty of pictures. We just went by those, and the tables."

"*Whooh*. So, you didn't get any of the cautions and the explanations. That explains a lot. The instruction sheets in German weren't packed with this equipment, obviously. I don't know how that happened, but I'll leave you my copies. But why didn't you just send for the right ones, before doing all this work?"

Winkler flung up his arms. "That would have taken a week or more for the post to go back and forth. I needed to get on with this, so my men could start mining."

"I see. Well, you would have saved a great deal of time, and a lot of money besides, if you'd sent for instruction sheets you and your men could read. Haste makes waste—it certainly has here. While you were gone, I inspected and tested the generator with Fräulein Hartmann's kind help." He nodded to her. "Except for that and a few bits and pieces, there isn't much here that can be saved."

"What! I wrote to the company to send somebody who could get this working, not to be told there is nothing to be done."

Bosboom straightened up and faced Winkler, his hand resting on the open leaflet. His voice went flat.

"Herr Winkler, this trip up here is costing my company a day and a half of my time, and if you're being charged for it, I haven't heard about it. My job is to tell you the truth, not wave my hands in the air and magically turn it into something else. So I suggest you start taking detailed notes of this discussion, if you want to accomplish anything.

"Now, then. There's a great deal that can be done. In fact, this can be made to work. The basic idea is right, an electric pump is by far the most practical solution, with so little left of the old pumping machinery, especially everything there was above ground. But the system has to be engineered correctly. The pump company has people who can do that for you, and their consulting rates are reasonable.



"But the worst problem I see from the electrical side is that knob-and-tube wiring you have in the mine. That only belongs inside a dry building. It's dangerous anywhere in a damp tunnel, but you have it running right above open drain channels. Let a discharge line burst, and it's a death trap. Besides that, you have outdoor pole lines, and those don't look like they're up to standard either.

"There are just too many pitfalls here for inexperienced workmen. You need the services of a licensed electrician to direct the rebuilding, otherwise somebody's sure to be killed."

"An *electrician* ? There isn't one within forty miles of here! It would take days to get one, and they charge a fortune! If you're such an expert . . ."

Bosboom clenched one hand on the edge of the bench.

"Herr Winkler. My employers make a point of maintaining a professional demeanor and sticking to technical matters when speaking with a customer."

"Well, of course!"

He looked unblinking at Winkler for a good two seconds, then growled, "I could make an exception in your case."

" *What?*What do you mean?"

"You asked for help. I've been patiently explaining what it will take to get the results you want, and make this pumping system safe for you and your men to be around. You stand here brushing aside what I'm telling you, as if a loud voice will change the facts to suit your convenience. *It won't*. We all had to begin from the beginning, but what seriously disturbs me is your unwillingness to learn when you have the chance. Do you expect to make this work without taking the trouble to get the right equipment and install it properly? For that matter, don't you care at all about the lives of your miners? Or your own life?"

"You expect me to throw money around like water? And take who-knows-how-long to do all this?"

"You don't like the cost of safe wiring? Would you rather pay to restore the old pumping system from before the war, with all the push rods and bell cranks? Would you like to pay to rebuild the dam so you could get power to drive it? No? I didn't think so. I can see the answer on your face."

Winkler was turning red. "Who are you, you young puppy, to talk to the head of an enterprise like this?"

Bosboom fixed Winkler with an icy glare and slammed his open hand down on the Italian installation manual. "Who am I, Herr Winkler? The examiners at Leiden consider me a civil engineer. Mr. Reardon is satisfied that I know enough about electricity to give sound advice to his customers. I'm the man who can tell you how to keep from walking into a worse disaster than the one you've already suffered. *The Lord protect your men!* What you have here would never have been built in any of the mines around Grantville. If the state inspectors didn't stop it, the UMWA would."

"Now what are you saying? Are you threatening me with the UMWA?"

"Oh, be serious! The UMWA isn't so foolish as to rely on companies or their representatives to tell them about dangerous mines. Now if you're through trying to bully us into rebuilding this whole thing without charging for it, you can start taking notes, and we'll discuss practical action to get your mine pumped out without killing anyone."

* * *

Winkler went growling and sputtering back to his office with his papers and notes.

Gerd watched the engineer for a minute as he started packing up his tools, still working one-handed. Finally he said, "Herr Bosboom, I don't think I've ever heard a speech like that one. Certainly not to old Winkler."

"I hope I did right. I hope I got through to him."

"What was it that made you so upset?"

"Herr Hartmann, I've seen the consequences of refusing to face facts." He shuddered.

"When I was nine years old, I wanted to see what my uncle Hannes did. One day he let me come with him to a job site, where'd just been engaged as the supervising engineer. You can imagine what a treat that was for me. A canal lock was to be repaired and enlarged, so bigger barges could go through. When we arrived that morning, it had been all pumped out, and the masons were ready to go in and examine the wall.

"Uncle Hannes took a good look around, as he always does. Then he went over by the gate, and looked closer. You know how wood will start to take up a bend, when it's been under too much load for too long? Well, the top beam looked like that. He dug his knife into it, and it went in much too easily. The steward was there, representing the owners. Uncle Hannes stood up and shouted to him that the gate was rotten and not safe. He said it needed to be replaced before anybody could go into the lock with water on the other side of the gate. The simplest way would have been to block the canal with a temporary dam of rocks and dirt.

"But the steward wouldn't hear of it. He answered that the gate had held for forty years, and sent the men in.

"No more than two hours later, it broke open right in front of us. It all happened in a few seconds. Men ran for the walls and tried to ride the rush of water. All of us on the bank grabbed ropes, boards, whatever was within reach, and pulled men out, or just held them up until others could help. But there were two that nobody could find in time, with all the debris and muddy water in that lock.

"So, I broke a company rule just now. Deliberately. I couldn't just ignore a fatal accident waiting to happen, and not try my best to stop it. I wouldn't want that on my conscience. And nobody in the company wants a reputation for making things that kill people."

Gerd was silent again, thinking. He cupped his chin in his hand.

"Herr Bosboom, if I understand the lesson in all this, it's that I can't afford to allow this generator here unless I know enough about it to make it safe. I have to control what's in my mill."

Bosboom nodded his head. "That's a logical conclusion, for certain. I couldn't agree more."

"But you said other millers own these machines, and they're making money with them?"

"That's right, it's starting to happen. I think within a year there will be a sudden increase in that business. The problems of manufacturing light bulbs at prices people can afford are close to being solved."

"I see. That means we have some important decisions to make here. I'd appreciate a chance to ask you a good many more questions. Would you accept an offer of supper with my family and me, and a place to sleep tonight?"

"That's very kind. I wasn't really looking forward to going back down the road, with evening coming on. Maybe my shoulder will feel better after a night's rest, too. Can you accommodate the mule I rented to get up here?"

"Of course. Wagon drivers sometimes have to stay over."

"Thank you, then."

"Ilsabe, *liebchen*, go tell Mama we'll have a guest tonight."

* * *

With a thumping of boots Peter was back from his errand in the village. His eye fastened on the platter of fresh bread in the middle of the table, and Marta's eye fastened just as quickly on him. She reached across with the long wooden spoon in her hand, barring his way. "You'll sit and eat at the table with the rest of us, you wolf cub."

"Mama, I'm starved!"

"Oh, right, I can see your ribs. Papa and the men from the mill will be here in no time. Then we'll all eat. And nobody will starve. Go wash up."

Then Stefan came in, and a minute later Gerd was there with their guest. He seemed a pleasant young man, with a ready smile and an air of intelligence. The cut of his clothes was something like the uniforms the army teamsters wore, but in different colors. His trousers were made of a heavy dark blue fabric with

copper rivets at the pocket corners, and he wore a rugged-looking red and black checked shirt. He took off a broad-brimmed hat in a style she hadn't seen before. *Someone with tales from far away, perhaps?*

" . . . my wife Marta Seidelin, and our son Peter.

"Marta, a man of virtue stands before us."

She cocked her head, with an expectant half-smile.

"Old Winkler drove him to fury."

"Heh-heh-heh. I can't imagine how that could have happened. So then what?"

"Anyone else might have come out with a curse. Herr Bosboom here pronounced a blessing."

This time it was the guest who showed a half-smile—a puzzled one.

"You did! You prayed for the safety of the miners!"

His hand went over his mouth, and his eyes crinkled. "What? Oh. Yes, I suppose I did."

"And I assume you sincerely wished them well, when you called on the Lord to save them from Winkler's foolishness?"

"Well, of course. I wouldn't want anybody to be electrocuted."

"So, there you are. You pronounced a blessing."

" *Pffff!* A civil engineer is supposed to do a lot more than just pray."

Marta laughed as she ladled out the soup, and gestured for everyone to sit down. "Well, husband, what's the news?"

"Marta . . ." He sighed. "We have a problem. It will be weeks before Winkler will be in any position to make use of that generator of his, and even that might be too optimistic. Herr Bosboom says everything has to be rebuilt, and before that can even start, there are other experts Winkler needs to consult. So he won't be paying us to drive it, for as long as that takes."

"Oh, Gerd, we were counting on that money. What do we do now?"

"For now, let's enjoy the food in front of us and our company. We can talk later about how to finish paying the carpenters."

Bosboom asked, "The carpenters?"

"It's no secret. A storm last winter brought down a big tree, right on top of the mill. We were keeping ahead of expenses, until that happened. It's repaired now, and the mill is working again, but it cost a lot. The carpenters have been patient, but they naturally want their money."

"It sounds like a difficult situation. I'm sorry to hear it."

"Well, thank you. Gerd and I really hoped you'd be able to tell Winkler and his foreman what to do to get everything working."

"It's a little too complicated for that, Frau Seidelin," he said with a downcast look. "It involves a lot more than just telling them how to install the equipment my company supplied. That would be hard enough, with what they're trying to do. But there's all the pump and plumbing work to plan over from the beginning, and Herr Winkler seemed to think I could do a mine electrician's job too."

Gerd paused with his spoon in the air. "Mine electrician? There's a trade by that name?"

"Well, in a way. There are some special things to know about wiring in mines. One of Grantville's better-known citizens started out as a mine electrician. I haven't met her, though. She's been away on business since before I came to the company."

Clink! Ilsabe was sitting bolt-upright. The spoon had dropped from her hand. "Herr Bosboom! Did I hear you right? Did you just say that women work in this 'electrician' trade? This trade that Herr Winkler said draws such high wages?"

Marta understood in a flash. "Your dowry. You're thinking of how to earn your dowry."

"Yes, Mama! Instead of some dull job in service somewhere, struggling to save anything at all, maybe I could have a real trade? Herr Bosboom, is that what this means?"

"Well, if you decide that's what you want to do, I'd say it's a real possibility. You're quick enough with unfamiliar tools. If you can do as well with book learning, you could get accepted into an electrical apprenticeship program easily enough. The up-timers are absolutely desperate to train enough of them."

"And because of that, they accept girls?" Marta asked.

"That would be logical enough, but it's not the reason. They had an equal opportunity law before they were ever flung into our midst, and they declared it still in effect before the guilds knew what was going on. Anybody who can show a record book with the required experience can sit for the state examination for journeyman or master, and get the license. A licensed electrician can work anywhere in Thuringia and Franconia."

"But we're not in their state, up here."

"No, but let me tell you, a customer with any sense will ask to see a Thuringian license."

Marta looked at him pensively. "And it's a respectable trade? A better opportunity for our Ilsabe?"

"Oh, for certain. Hard work sometimes, but your daughter is a big, strong girl." He turned to Ilsabe. "Look, if you're at all serious about this, I'd be happy to write a letter of introduction for you."

"Oh, thank you!" Ilsabe's smile glowed. "I don't know what to say. Yes, I'd like very much to go see what this trade is really like."

"Yes, Herr Bosboom. I think we all would like to know that."

"Marta, that isn't all Herr Bosboom has to tell us. He said down at the mill that these generators are

making money for other millers." Turning to their guest, he continued, "What's that all about? What makes this an attractive proposition?"

"Well. There's one simple fact about electricity. It's the cheapest and most convenient way to move a lot of mechanical power from where it is to where you want it. That pumping problem Winkler has is just one example. His little generator could equally well supply electric lights to a village of a dozen houses. And that's the smallest model our company makes. Seventeen of our big ones run all of Grantville."

"Electric lights in houses. Yes, I can see what that means, steady income all year round, doesn't it? But if we turned all the power of our wheel into electricity and sold it, there would be nothing left to run the mill."

"Actually, the usual kind of wheel captures less than half the power of the water running over it. And a lot more is lost in the runs along the brook from one mill wheel to the next. There's a fellow teaching water power the way they did it in their nineteenth century. I've attended some of his lectures. That brook out there could deliver at least ten times as much power as you're getting now, if you used all of their tricks."

* * *

There was more. A great deal more. As much as Marta wanted to ask the foreign visitor about his family, his life, all the places he'd been, she put it aside. There was just too much that could be vital to her own family's future. She could see her husband too, struggling to make sense of all these new thoughts fighting for room in his head.

Finally Bosboom sat back and stretched. "Well, thank you very much for all your hospitality. I really should get some sleep now. I need to be on my way soon after sunrise."

Marta answered, "Oh, it was a pleasure. You've been generous to let us ask you so many questions. I'll have a bit of cheese and bread ready in the morning for you to take along. Stefan, show Herr Bosboom where he can sleep tonight."

Their footsteps faded out, up the stairs.

Marta stayed seated, staring across the room at the hearth, her chin cradled in her folded hands. "Gerd . . ."

"What is it?"

"He said we could sell enough power to light a village, and still have enough to run the mill."

"Well, yes . . ."

"Think what that means. Our water rights are enough to make electricity to sell, and still run a mill. That mill could be just as easily run *by electricity, somewhere else.* "

"But, why . . ."

"Ours isn't the only wheel on this stream. Somebody else could put in a generator and sell enough electricity to run a mill, and send it down to the village and run a mill there. And then the farmers wouldn't have to cart their grain all the way up here."

Gerd froze. "Marta! If that happened, we'd be ruined!"

" *Unless* we did it first. Gerd, maybe this is only a fantasy. But if electricity means the mill could be away from the brook and put where the farmers are, then we must be the ones to do it."

"But, wait a minute. We have the only milling rights around here."

"You've been reading the newspapers as much as I have. As strong as the free trade factions have become in Parliament, how much can we really count on that, any more?"

Gerd began to pace. "If, if, if. So on one hand, if we do nothing, all these changes could wash over us and take away our business. But if we do all this and it doesn't work, we could spend a lot of money and get nothing back from it. And we're already short of money. I don't know what we're going to do about a coat for Peter, he's grown so much lately. What have these strange people done, Marta? Made us some bizarre kind of offer we can't refuse?"

"More like . . . given us an opportunity we'd be fools to ignore. But what we *must* do is find out the truth about all of this. The one thing we can't afford to do is guess."

* * *

Thump. Rustle.

"Urrr. Are you still tossing and turning?"

"I can't sleep, Marta. I don't know what's going to happen to us."

"Well, it isn't going to happen tomorrow, or probably even next year. Meanwhile, if it's slipped your fevered mind, there's the flour order for that mysterious army camp on the mountain. And they pay on time, if we ship on time. So the first thing to do is get your sleep."

"Yes, I know. But still . . ."

"Still. Yes." She chuckled softly. "Well, I know what will make you sleep." She snuggled closer. She laid her fingertips on his chest. She nibbled his ear. "Hmmm?"

"Mmmm . . ."

* * *

Their guest came downstairs just as the family was settling down to breakfast. Marta picked up a package wrapped in newspaper and handed it to him. "This should help you keep body and soul together on the way back. How is your shoulder this morning?"

"Better, but I still feel it. I should be able to ride all right, though."

"I'm glad to hear it. Here, sit down." She busied herself setting another place next to Stefan. She looked across the table. Well, Gerd was looking a lot calmer this morning.

A few minutes passed in silence. Gerd looked up from his plate. "Herr Bosboom, we're going to look

into all this. I think before we visit any of these places you told us about, we ought to read up as much as we can first, so we understand what we're seeing. You mentioned books. Which ones would you suggest I order?"

"Hmm. I think, to start with, I'd suggest *The Modern Millwright's Electrical Guide*, and *Installing Antique Wiring*. Maybe the *Thuringia Electrical Code*. They're all available in German."

"*Antique? What?* Are you saying the ancients did this kind of thing?"

"Hah, no." The engineer laughed. "The up-timer electrician who wrote it has a slightly twisted sense of humor. You see, they can't make the materials for the kind of wiring they're used to. Not yet, anyway. So they had to go back to the forgotten methods of their great-grandfathers, and there weren't any books around to describe them. Not in enough detail, anyway. They had to examine surviving examples in a few old barns, and figure out how it was done."

"They didn't pass their skills down? I never heard of such a trade."

"Oh, they did, they did, from one generation to the next one, and that's the funny thing. The materials and the methods changed fast. Very fast. That seems to happen, when the up-timer Americans are involved. After a hundred years, everything was completely different, and there was no use for the older ways."

"So now, they're trying to get back to where they were in just a few years. It's learn the trade, and then every time something new comes along, read another book or manual. I'll tell you, it never gets boring."

Gerd ruefully scratched his head. "No, I don't suppose it does. Things are changing all around us, since those people appeared."

"True. But, you know? We lived in changing times before any of this happened." He laughed. "They've certainly made it blindingly obvious, though."

Three months later

Marta was down at the mill keeping a close eye on things. The batch of coarse meal Stefan was grinding looked satisfactory enough. She glanced over at the new switchboard, with the metal case and the circuit breaker handle sticking out the front, that Gerd had insisted on after he got his hands on an electrical supply catalog. Winkler had squawked like a chicken over that one, but Gerd had roared like a bear. Well, he could look like a bear when he wanted to. The front panel had meters, too—she could see that the frequency was holding right on the mark. She returned her attention to the ledger in front of her.

Halfway down a column of figures, Marta glanced up with a momentary flicker of annoyance as Peter stuck his head out the door for what must be the tenth time that morning.

"Mama! They're coming!"

She put down the ledger and hurried outside, with Stefan right behind her. There Gerd and Ilsabe were, just coming into sight around the bend in the road. They waved, and walked a little faster. Half a minute later they were dropping their traveling bags at their feet, and Marta was seizing them both in a two-armed embrace.

"I've read all your letters over and over. Oh, Fräulein Apprentice Electrician, I'm so proud of you!"

"I'm not an apprentice yet, Mama. I still have to take the entrance examinations. The man at the power company said it will take a couple of months of study here at home, before I'll be ready for that."

"But the director of training was very complimentary, Marta. He said Ilsabe has the skill and the strength of character to take on the responsibilities of an electrician, and that's what they value most. He promised her a place as soon as she passes the tests."

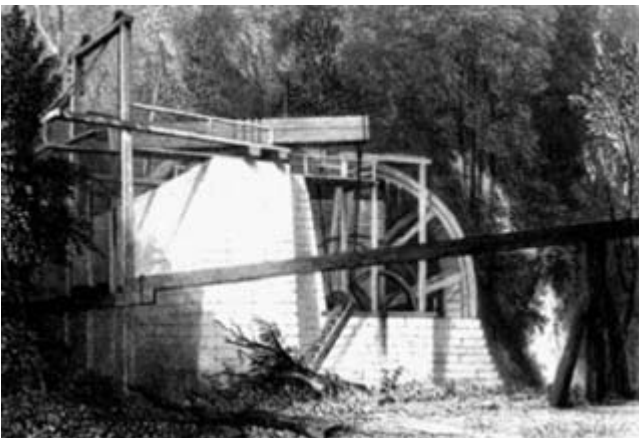
"What an honor for you, Ilsabe!"

"And now . . ." He reached into his bag and pulled out a bank draft. "Look at this!"

She took it with an indrawn breath. "Oh, Gerd! This is most of what we owe. And now that Winkler is paying us, it won't take long to pay off the rest. You wrote about this, but just how did you manage to come home with more money than you started out with?"

"Luck was on our side, for once. You knew that Herr Bosboom advised us to go see the water works at the Braun and Scharff machine tool factory, so we could understand what water power can really do?"

She nodded.



"Well, it was the head millwright who showed us everything and explained how it all works. That was more of Herr Bosboom's doing. Their wheel is so small I could get my two arms around it, and it gives them hundreds of horsepower. Amazing! Anyway, it came out in conversation that he was short of temporary help to get a new part of the building running, and here we were with mill experience. So he hired the two of us for a month's work at good wages, helping his men hang line shafts and doing other mechanical work. We've missed you all terribly, but this was an opportunity we couldn't let slip away. Peter, I think you're taller."

Ilsabe broke in, "One of the men showed me how they put up electric lights, and I did a few myself."

"So she's done a little of the work with her own hands, and liked it. So, I consented to the apprenticeship."

Marta hugged them again. "I'm so glad you're home. You must both be ravenous after walking all the way from the train station. Stefan, you can stop the millstones now. We'll go eat, and then we'll talk."

"Oh, yes, Marta. There's so much to talk about."

* * *

Gerd eyed the pole and crossarm lying on the ground. Peter was taking a turn with the tools Theodor Dränitz had borrowed from the mine. He slammed the heavy bar into the bottom of the hole once more, and worked it around to loosen the dirt. *That boy is getting strong!* Stefan moved in with a post hole digger to lift out what Peter had loosened—a wonderful tool.

"That's deep enough, boys."

The four of them took their places around the pole and picked it up. Into the hole went the butt. Theodor, Gerd, and Stefan pushed up the top end as far as they could while Peter took up the slack in the tackle hitched part way up and belayed it. Then Gerd ran around and helped him haul the pole upright, while Theodor and Stefan steadied it from the side. Gerd walked around with a plumb line, making hand motions until the pole was vertical.

"Okay, Peter, it's straight. You can back fill it."

"It looks okay to me too, and I can tell where you've been lately!"

Gerd looked over his shoulder in surprise. It was Jan Willem Bosboom, riding up the road. Gerd's face lit up with a lopsided grin and a mischievous gleam in his eye. "Oh, yeah? I wasn't expecting to see you, though. What brings you up here?"

"I have a customer to visit nearby, and your mill isn't far out of the way. I thought I'd see how things are going." He dismounted and came over to shake hands.

"Things are going in directions I never imagined. Marta and I were only thinking of buying a generator of our own, you know, and selling what power we could spare from our own wheel."

Bosboom nodded.

"Did you know what all those people you arranged for us to see in Grantville have in mind?"

"Not exactly, but I thought they'd tell you what you wanted to know, so you could decide what to do."

"Hmmp. It seems they weren't interested in anything as modest as that. The government wants some little commercial power plants up here in the mountains, to help the mines get going again. Tiny by their standards, but a lot bigger than we could run with only our family water rights. There are investors ready to finance it, if we can show them a business plan that makes sense. So I asked them why they would think of coming to us to put something like that together, and do you know what they said?"

Bosboom shook his head.

"They said, 'There's nobody else to do it.' I think it must be their favorite saying down there."

"Now that you mention it, you're right. That's just about what they said to me when I was hired."

"So Marta and I have been asking around to get an idea who might buy electricity if we go ahead with all this, and we've been talking to our neighbors up and down this brook to see what kind of deal we might be able to make to combine some water rights. You know that phrase 'sweet-talking' some of the

up-timers use? She has a talent for it. And meanwhile, we're learning all we can about running a power plant, while it's still mostly on Winkler's pfennig."

Bosboom threw his head back and laughed. A second later everybody else was laughing too. He waved his hand toward the pole. "So what's this for?"

"We're putting up a power line to the house. We only need two poles and a small transformer. We'll have one light in the kitchen and one over the dining table. After all, who would take us seriously if we couldn't show electricity working in our own home?"

"Who, indeed?"

"So, will you stay for dinner?"

"I'm sorry, they're expecting me up ahead. I'll just pay my respects to Frau Seidelin, and then I have to be on my way."

"No more Herr Hartmann and Frau Seidelin from you, with all you've done for us! It's Gerd and Marta from now on."

"Well, then, call me Jan Willem." He put out his hand to shake again.

Theodor said, "Herr Bosboom, I'm glad you came by. There's something I'd like to ask you about."

"Yes, what is it?"

"Well, Herr Winkler has been talking about another mining improvement he's heard of, that he thinks will help us dig the ore out much faster." He paused. "Do you know anything about something called nitroglycerin?"

* * *

One Fine Day

Written by John Zeek



Dec. 23, 1633

"Where is it? It's late," Heinrich muttered under his breath as he waited impatiently for the tram. Soon he would be out of this nest of heretics. Soon he would far away from this cursed city, this Grantville, the so-called city from the future. He smiled. Soon he would be rich. Then he heard the rumble of the tram wheels on the tracks. "Finally, here it comes," he said aloud, ignoring the looks he got from the shoppers standing around him at the tram stop.

The tram was one of the "Motor Trams." He thought about finding the secret to that "motor" and how it would make him a rich man. No, he forced the thought to the back of his mind. *I have enough right here.* He patted the pack he carried.

The tram came to a lurching stop. As luck would have it, he had to wait while nine other people boarded. At the front of the line were two boys and an older man; all three had packages. Heinrich took them for up-timers from their clothing, but the boys were chattering away in German. Behind them were four women loaded down with packages and two men carrying tool boxes. When he finally was able to board there were no empty seats.

He had ridden trams for two weeks and they were never this crowded what was special about today? He studied the people. Were any of them here to watch for him? Was it a trap? A man tapped his shoulder from behind. "Move on to the back and make room for the rest of us to board, please."

Heinrich dropped his money in the fare box and moved toward the rear of the vehicle. His pack banged into the ends of the seats and once into the shoulder of a large woman. So much for being inconspicuous. He felt like everyone was looking at him.

"Sir, would like a seat?"

Heinrich looked; it was one of the boys he had seen getting on the tram.

"Sir, would like my seat? I like to ride standing up and you could put your pack in the overhead rack." The boy pointed to the tray hanging from the ceiling over the seats.

Heinrich clutched his pack tightly to his chest. "*Nein.* I will move to the rear." Then grudgingly he added, "*Danke.*"

Heinrich moved toward the rear of the tram until he could see out the rear window. He studied the people on the street; it looked like no one was following him. The tram stopped with a lurch; Heinrich almost lost his footing but was able to recover. Four people shoved past him to get off and he was finally able to sit down.

"Now I'm on my way." He sighed as he sank into the seat and drew odd looks from the people around him.

"Traveling someplace?" the old woman sitting beside him asked. "Maybe you are going to visit relatives?" She tapped the pack on his lap.

"*Nein*, just going home from work." Heinrich pretended to go to sleep. *Stop asking questions, you nose old woman.* Luckily the woman got off at the next stop.

When he opened his eyes, Heinrich saw that the tram was clearing out; each stop saw more people get off than on. Finally there was only the man and the two boys riding behind the driver. The tram bounced to a stop in front of a large house; the man and one of the boys got off. "Is this the last stop?" Heinrich called out. "I need to get off."

The driver answered, "I stop at the top of the hill to refuel. That is the last stop. After that we head back to town."

Heinrich gathered his pack by its straps and started moving to the door. He was surprised to see the boy scoot out the door as the tram came to a stop. Heinrich was just stepping down from the tram when he heard the driver say something out the window to the boy. Heinrich turned to look and his pack tangled with his legs and he stepped on a patch of ice. "Oh, *merde*."

* * *



"Slow down. This is a patrol, not a horse race!" Juergen looked back over his shoulder and could see that Marvin was having a little trouble guiding his horse around the bushes that crowded the path. He realized he had finally found something he did better than his partner. Then his horse side-stepped to avoid a pile of snow and almost brushed him off against a low-hanging branch. Juergen grabbed the saddle horn and decided that "better" was just a matter of "not as bad as" and not a mark of skill. Their horses seemed to be aware of their inexperience and Juergen was sure they ran their riders into things on purpose.

He and Marvin had given up their police cruiser because of a plea from a fellow officer. Just a quick switch in the duty roster and they were doing the boundary patrol and riding the circumference of Grantville.

"Cheer up, Marvin. Look around, think what we would be missing if we were in the cruiser. We wouldn't be able to see the beauty of the winter if we were going past it fast in the car."

"Yeah, I'd really miss having melted snow running down my back under my jacket and freezing my butt off," Marvin grumbled. "To say nothing of the way I'm going to feel tomorrow. That is: how I'll feel, if this nag doesn't toss me off and break my neck before the end of the day."

"I'm starting to think you don't enjoy riding," Juergen teased.

"Well, I think . . ."

"*Squack* . . . Car One to Patrol Two; come in, Patrol Two," the handi-talkie hanging on Marvin's saddle interrupted.

"Patrol Two." Marvin answered the radio after getting his horse under control.

"What's your location?" Juergen recognized the voice of Chief Frost.

"We're about a quarter mile from the Badenburg road, maybe half a mile out from the edge of the Ring."

"Get to the road and ride back toward town. I'll meet you before you get to the edge. Out."

As soon as they reached the road they spotted the chief's Jeep Cherokee. Chief Frost was not alone, but accompanied by two other policemen.

"Get down off those horses, boys. You ride like sacks of potatoes." Chief Frost laughed as he waved to the other two men. "Günter and Horst will take the rest of your patrol. I need you for something else."

* * *

In the jeep Chief Frost explained what was going on. "We have another death that looks like a murder. Since you're my experienced investigators, it's your case."

Juergen felt uncertain; he didn't feel like an experienced investigator. He and Marvin had gotten lucky on solving the Cooper case so fast.

Marvin must have felt the same way because he turned to Frost and said, "Chief, you know we're not that good. Surely there's someone else you could give this one to."

Chief Frost gave them a serious look. "Marvin, Juergen, I know you're not detectives, but you're the closest I have. Besides, the people in town think you're super sleuths, a cross between Sherlock Holmes and Nero Wolfe. Perceptions count. So you're it."

* * *

It was easy for Juergen to spot the crime scene. The ambulance and the police cruiser parked near by gave it away. The crowd of people standing at the end of the tram tracks was also a dead give away.

"You haven't moved the body?" Marvin asked when he saw the ambulance.

"Nope," Chief Frost answered as he parked. "I figured he'd keep as cold as the weather is. We had to let them move the tramcar, but we kept the driver. Other than that, the scene hasn't been changed."

Juergen thought about what the chief had told them on the ride. "Uh, Chief Frost, you said the witnesses said the man was shot as he got off the tram?"

"That's right, just as he stepped off. Why? Do you think it's important?"

"We might need to search the tram. He might have dropped something as he went down."

Frost turned back to the Jeep. "I'll radio and have someone search it."

"Marvin, what do we do first?" Juergen asked.

"Same two and two, just like we did before. We look at the body, interview the witnesses, and then survey the crime scene. We can hope it adds up to four. If not . . . well, we can always hope."

Juergen looked at the body and realized that he hadn't seen many men as dead as this one. The man was lying on his left side and it was clear that most of his chest had been opened up. You could clearly see his internal organs. There was a lot of blood on the ground, mostly under the body but some had started to run downhill and had puddled against the tram track where it was freezing.

He squatted next to the body, trying to keep out of the almost frozen blood. "Marvin, what was he shot with? I never saw a wound like that before."

"Damned if I know. It looks like someone held a shotgun to his chest . . . but it would have to be a big shotgun."

Marvin stood up and called to the other policeman acting as crowd control. "Has someone taken a picture of the body's location? We want to move it to check for an entry wound. This may have been caused by a bullet coming out."

"Way ahead of you," answered Chief Frost as he walked up. "I thought this was worth a couple of Polaroid pictures," he added, then handed over two photographs. Juergen realized that the chief was taking this as a serious case. The police department didn't waste their dwindling supply of precious Polaroid film for anything average.

They rolled the body onto its stomach and pulled up the jacket and tunic. "Damn," Marvin whispered. "I was hoping for another wound. Then we'd know if it was a rifle or not."

When they rolled the body onto its back, Juergen took his first good look at the man's face. It had been a pleasant face. Now it held the slackness of death. "Marvin, I know this man. Well, I don't know his name, but he has attended my church for the past few weeks."

"Maybe Pastor Kastenmayer knows his name. We'll check. Look at that hole in him. I don't think even a ten gauge could make that big of a wound."

Juergen was feeling a little sick at his stomach, but he had to finish this. "Marvin, look at how his clothing is burned around the wound. The gun had to be close."

"Maybe the autopsy will tell us something." Marvin stood up. "Chief, do you know who's doing the autopsy?"

"I just had the dispatcher call the medical center and Doc Adams is ready right now. So when you finish with our victim . . ."

Marvin looked at Juergen. "I'm done for now. Anything more you need to see?" Juergen shook his head and started to stand up, but Marvin stopped him with a question. "Partner, are you sure this guy goes to your church?" He held up a chain studded with jet beads, then let it dangle from his hand.

Juergen could see the crucifix on the end. It was a rosary.

"You are still a Lutheran, aren't you?" Marvin said. "I don't think this man was."

"I to go to St. Martin in the Fields and he was there last Sunday. I saw him talking to Pastor Kastenmayer. Where was that crucifix?"

"Inside pocket of his jacket; it fell out when we rolled him over. Curious . . . why would a Lutheran have a rosary? On the other hand, why would a Catholic go to a Lutheran church?"

Juergen could think of a number of reasons a Catholic might attend a Lutheran church, but they didn't apply in Grantville. "Maybe he was new in town and didn't know he could go to any church."

"Hmm . . . Possible. But I think it's a reach. We'll just file this under clue for now."

Marvin and Juergen walked over to where Officer Ralph Onofrio had the witnesses. "What have you got for us, Ralph?"

"This is Dieter Martens, the driver and Gerd Schultz, who was the only other passenger. I got both their statements, but I knew you'd want to talk to them."

"Thanks, Ralph." Marvin turned to Juergen and added, "Same as before, Juergen. You ask the questions; I watch them as they answer."

Juergen nodded, then studied the two witnesses. He knew the Schultz boy and that his family lived with Henry Johnson whose house was just at the bottom of the hill, so he wasn't surprised to see Henry standing with him. The other man, Martens, was new to him.

He waved Martens over and asked, "Herr Martens, can you tell me exactly what happened? I know you gave Officer Onofrio your statement, but I would like to hear it from you. Who knows, you might remember something new."

Martens seemed to relax a bit upon hearing his own language. "Can your questions in the American be answered? I need the practice," he responded.

When Juergen nodded, Martens continued. "I had just stopped and was watching Gerd, who was on the other side of the tram, when I heard a gunshot. I turned back and saw that man on the ground. No one was near him. He had just stepped off the tramcar and *bang* he was dead."

"Was anyone else on the tram besides you and Gerd?"

"*Nein*, the dead man was the last passenger. There are not many people who ride to the end of the line. Gerd likes to ride up here and ask me questions about the tram. I drop him off when I start back to town."

"Do you remember where you picked up the dead man?"

"*Ja*, he got on in the center of town. The tram was crowded with Christmas shoppers and he kept banging his bag into things."

"He had a bag?" Marvin asked.

"*Ja*, there it is." Martens pointed to a large canvas pack by his feet, then slapped his head. "I am sorry. I forgot to tell the other policeman."

"It's not a problem," Marvin responded. "Let me have it while you and Officer Neubert finish." Marvin took the pack and looked in it.

"Herr Martens, did you see who shot him? Or anyone waiting by the tracks?" Juergen asked.

"*Nein*, there was no one close to him. I didn't look that way until I heard the shot, but there was no time for anyone to run away."

"Do you know the man's name? And did he ride the tram often?"

Martens looked relieved that there was a question he could easily answer. "*Ja*, he rides the tram every day for the last few weeks. But he normally rides out to the other side of town. He was always with two other men . . . rednecks, if you know what I mean. They called him Pickles. I think it was a nickname."

"Any idea who the other two men are?"

"I don't think they are their real names, but they called each other Ape and Monkey."

Juergen swore a small oath under his breath. That had to be the Hart brothers. He had hoped never to have any dealing with Ape Hart again. "After you heard the shot and saw Pickles on the ground, what did you do?"

"First I checked to see if he was hurt. The other officer was quite clear I should tell you I moved the body. I rolled him up on his side. He was face down when I got to him."

"And where was his pack, his bag as you called it?"

Martens thought a moment. "It was under his legs, like he had dropped it and then fell on it when he was shot."

Juergen made sure he noted where the pack had ended up. It seemed important, but he didn't know why. "All right, Herr Martens. Then what did you do?"

"I told Gerd to run down to his house to call for an ambulance. I thought Pickles was dead, but you never know. With all the wonders the Americans have they might save him."

"Herr Martens, are you carrying a gun?"

Martens opened his jacket and revealed a flintlock pistol. "Company policy; all drivers are armed. It's a U.S. WaffenFabrik fifty caliber and I have not fired it today."

Juergen looked at the pistol and confirmed it was indeed a fifty and had not been fired. Then, he turned to Marvin and asked, "Anything else we need from Herr Martens?"

Marvin looked up from the pack he was searching. "Herr Martens, is your tram horse-drawn or do you have one of the motorized ones?"

Martens smiled, "I am trusted with Motor Tramcar Number Four, the newest. I have also driven a bus, but I like the tram better."

The pride in Martens voice made Juergen thankful he had learned to drive. "Thank you, Herr Martens. If we need to talk to you again we will contact you. If you need a ride back to town, I'll get you one in a minute."

"*Nein*, I don't want to be a bother. I shall wait for the next tram." Martens wandered over to join the crowd that had gathered at the crime scene.

Juergen looked over at Marvin. "Have you found any thing we can use?"

"Nope, but it looks like he was planning on taking a trip. He had clothes and a bit of food in here along with a few little things. One weird thing though is this." Marvin held up a yellow legal pad.

"What is written on it, Marvin?"

"Gibberish mostly, or some kind of code. Interview Gerd and we'll look at it closer." Marvin went back to digging in the pack.

"Gerd, I am ready to talk to you," Juergen called. Gerd and Henry walked over.

"Office Neubert," Henry said formally. "I want to be with him while you question him. Sort of 'in loco parentis' as it were."

Juergen recognized the Latin tag from his police training and knew it meant in place of the parents. He was actually glad to see Henry with Gerd. Normally if the questioning had to go very far or if it looked like Gerd was going to be charged with a crime, he would have had to call for a juvenile officer. Now, with Henry here, he could treat Gerd as an adult.

"*Allo*, Gerd."

"Hi, Juergen," Gerd responded. Then he corrected with a smile. "I mean, Officer Neubert. Sorry. I forgot this was official and you are working."

"It is not a problem. Now, can you tell me what you saw?"

"Sure. We were coming home from town. We had just got on the tram and gotten settled when that man over there, the one who was shot, got on. He had that pack and was having trouble finding a seat because the tram was crowded. I offered to let him have mine; but he said no, and stood in the back until people got off and he could sit down."

"Did he do or say anything that caught your attention on the ride out?"

"No. I was talking to Wendel and wasn't paying attention to anyone else. He had a bunch of burns on his hands, though. I noticed that when he bumped the pack into my seat."

"Damn," Marvin said and walked over to the ambulance.

"Anything else, Gerd?"

"Nothing until we got to the house. The man asked if this was the last stop. It was like he had never ridden the tram this way before."

"So you were up front while Herr Martens drove to the top of the hill?"

"Yes. Whenever I can, I ride up around the loop and some times Dieter lets me help refuel the tram from the gas tank." Gerd waved to the large natural gas tank in the middle of the loop of track. "I am going to be a mechanic, and want to learn all I can about vehicles."

"Did you actually see Pickles get shot?"

"No. When Dieter called out last stop and stopped the tram, I was off and walking to get the cover off the fuel hose so he would be able to hook it to the tank."

"So Herr Martens was not fueling the tram?"

"No, but . . . Juergen, is Dieter going to get in trouble? I know he isn't supposed let me touch the fuel hose, but if I help him we have more time to talk."

Juergen looked and saw Marvin was still over by the ambulance. "No, Gerd. We'll leave the part about you and the fuel hose out of the official report. I don't think Dieter had anything to do with the shooting."

"Good. I would hate to get him in trouble."

"Let's get back to what happened. Finish telling me what you saw and heard."

"I heard that man say something and then I heard the shot. Dieter yelled for me to come quick. I ran around the tram and there the man was, lying on the ground. When I saw the blood I froze for a minute then Dieter told me to run to the house and call for help."

"Did you see anyone when you came around the tram?"

"*Nein*, and not when I ran to the house either. After I called, Onkel Henry and I ran back up here. We didn't see anyone then either."

"Gerd, do you remember what the man said right before you heard the shot?"

"Yes. It was just one word and I don't know what it means. As close as I can come is 'Med.'"

Juergen looked at Henry. "Anything you can add, Herr Johnson?"

"Nope. I was filling my bird feeder when I saw Gerd running down toward the house. I didn't even hear a shot. We came up here as soon as he had called the police. But I can tell you from what I saw of the wound that was no ordinary gun that killed him." Henry patted Gerd on the shoulder. "Go on, now. Run and tell your mother that everything is all right."

When Gerd ran off, Henry said, "Juergen, find out who did this. I don't like people getting shot this close to my house."

"We will do our best, Henry. You know we'll do our best."

"Well, that's all a man can ask for," Henry said as he walked away.

* * *

Juergen checked his notes to make sure he had everything clearly written. It had started to snow again so he had to lean forward to shield the notebook with his body. Marvin had finished with the ambulance and walked back to the tracks where they had first seen the body.

When Juergen joined him, Marvin said, "The kid was right. He had a bunch of small burns on his hands that we missed. It looked like they were cigarette burns, but . . . I don't know."

"Marvin, it just doesn't make sense. Pickles was shot at close range, but neither Gerd nor Martens saw anyone close." He looked around the area. "The closest tree is a good twenty paces away. Where did the shooter hide?"

"Good question. We'll put it with the other questions. Who is our victim? We can't keep calling him Pickles. And what was he shot with? And what was he doing out here?"

"Pastor Kastenmayer can tell us who he was. And we are going to have to talk to Ape and Monkey; it looks like they knew the victim. Maybe they can give us some idea what is going on."

"I wouldn't bet on it. Well, we need to search the area before this snow covers everything up. Though with the herd of people that have tromped over the site, I doubt we'll find anything of value."

Juergen and Marvin walked the crime scene. They went out what seemed a reasonable distance for the wound on the dead man and worked their way back to the tracks where the body had been found.

"Juergen," Marvin finally said in disgust. "This is a waste of time. Any clues that were here are covered with snow and have been stepped on by at least three people."

"*Ja*. I am starting to study my own foot prints."

"I know the feeling. Let's get a cruiser and go talk to the pastor. Then we'll hunt down Ape and Monkey and see what they have to say."

As they headed over to talk to Chief Frost, Marvin asked, "I know it is my turn, but would you drive? I want to look through the things I found in the pack."

Juergen was a bit surprised. Since he had learned to drive, they had practiced a strict rotation on driving. Plus, Marvin seemed depressed. "Marvin, is something wrong?"

"You mean other than having a four-legged monster try to break my neck all morning, and spending the last hour looking at a man's insides? Yes, there is. If we don't figure this case out, you know we'll be the laughing stock of the whole town. But if we do figure it out, we'll be the first ones called whenever someone manages to get himself killed. Working a homicide case is damn depressing. I hoped the Cooper case would be our only one."

Juergen couldn't understand what was bothering his partner. As far as he was concerned, this was the best part of police work. Solving a crime, finding the bad guys, making an arrest that was what made everything else worth doing.

After they told Chief Frost what they had found and what they wanted to do next, he waved them to a cruiser. "Take Ralph's cruiser. He can ride back to the station with me. I'll put out a BOLO on the Hart brothers and have them come to the office."

Ralph had a bit of advice. "Be careful. The road back to town has a lot of icy spots." He paused a moment. "I'm glad this is your case and not mine. It looks like a tough one. But not for you and Marvin; I bet you already have a couple of leads, right?"

Juergen then realized what Marvin had meant about being a laughing stock if they failed to solve this case. " *Ja*. We are going to check out a lead right now."

* * *

Just before they arrived at downtown Grantville, Marvin looked up from the material he had been studying. "Pull over. I want you to look at this." Juergen stopped the car and Marvin handed him the legal pad. "Tell me what you think."

Juergen studied the writing. It was block print. The letters were hand-written, with the letters were written in groups that should have been words, but they were not words. It was gibberish or maybe some kind of code. "It doesn't make sense does it, Marvin? It is written like an American would write, but it is not English. And it is not German either."

Marvin smiled. "It's like a Crypto-quip in the newspaper." When Juergen still looked lost, he continued. "A letter substitution, instead of writing A for A, you write B and so on." Marvin placed two strips of paper on the pad. "I found these in the back of the pad."

The two strips were about half an inch wide and the shorter was about six inches long. The longer was about twice that length. Both strips had block printed letters and numbers running their length. On the shorter the letter A was first then B, C, D, and so on until it ended with the number 0. On the longer strip, the lettering started with the number 1 and proceeded to the letter Z, then repeated the entire list.

"Ah, I see. You substitute 1 for A and so on. Without the key no one can read it. JUERGEN becomes 0KH75D."

Marvin nodded. "You got it. But we don't know what his starting point was. With just these two strips there's a possible thirty-six codes, depending on where he started."

"And he might have made another strip one that started with B and ended with A for example," Juergen noted.

"Yes. Or maybe even one with the letters scrambled. We'll just drop this one in the chief's lap. Maybe he can figure it out or take it to the Army and let them do it."



"You think Pickles was a spy, don't you?"

Marvin looked disgusted. "Yeah. And that's all we need to make this case a real loser. We might never figure out who killed him or why. Besides, even if we do figure it out the perp will be long gone. Damn, I hate murder cases."

Juergen re-started the car. "Are we still going to see Pastor Kastenmayer?"

"Yeah. We'll do what we can, but I bet this one isn't going to get solved easily. Maybe not ever. Stop at the police station; we'll drop the pack, the legal pad and the code key off for the chief to look at."

For the rest of the drive Juergen thought about what Marvin had said. He had heard all the stories people were telling about spies and had discounted most of them. He knew that the leaders of the other nations of Europe wanted to know what was going on in Grantville so there would be some spies. He had never expected to find himself in the middle of dealing with one.

Just as they were pulling into the station parking lot, the chief's Jeep appeared behind them. Marvin jumped out of the car and flagged him down. After a quick conference he was back in the car. "On to Saint Martins. The boss is calling in someone from the Army to look at the legal pad."

* * *

Juergen was very careful driving through town. There were areas of ice and piled snow on the streets that got worse as they neared the other side of town and wound their way up the hill that marked the other side of the Ring of Fire area.

* * *

Juergen was pleased to see Pastor Kastenmayer standing by the door of Saint Martin's in the Fields Lutheran Church. It appeared he had just finished sweeping snow off the steps.

"Pastor Kastenmayer, may we speak to you?" Juergen called.

"*Ja*," the pastor answered, "I just finished here, though it looks like a lost cause. There will be more snow."

"Pastor, this is my partner, Corporal Marvin Tipton. We would like to ask you some questions."

The pastor extended his hand. "I am very happy to meet you, Herr Corporal Tipton. I am always glad to help the police."

Marvin shook the pastor's hand. "Pastor, we want to ask about one of your flock. Well, we think he's one of your flock." Marvin pulled out the Polaroid that showed the victims face without showing too much of the wound. "We wanted to check if you knew this man. Juergen thought he had been in church for the last couple of weeks."

The pastor studied the photo. "This man is dead?" When Marvin nodded he continued, "I will say a prayer for his soul. He is Heinrich Grün. He first came to our church two weeks ago. He had letters from a pastor in Luebeck and another in Magdeburg introducing him as a good Lutheran."

Marvin looked closely at the pastor. "Sir, the way you said that it sounds like you had a few doubts?"

"*Ja*. From my conversations with him, I felt he was not, shall we say, a true believer."

"I see. So he was just going through the motions?"

Pastor Kastenmayer chuckled. "I like that turn of phrase. *Ja*, he was just going through the motions."

"Sir," Juergen interrupted, "can you think of any reason he would have had this?" He held up the rosary by its chain, so it dangled from his hand.

"As a Lutheran, there is no reason Herr Grün would have a rosary. But it is silver, so it may have been loot. He was, or had been, a soldier. He never told me that, but from the way he acted I knew."

"One last question, Pastor," Marvin said. "Do you know where he was living and working here in Grantville?"

"*Nein*. I know he had found work, but I do not know what he was doing. As for where he lived, I think he had rented a . . . what you call a small mobile home. But I don't know where."

Marvin flipped his notebook shut. "Thank you. You've been a help. Now at least we know who Heinrich was."

"It is nothing. Tell me, Herr Tipton, do you attend church? Are you a member of a congregation?"

"Yes, sir. I've been a member of the Methodist Church since I was twenty."

"*Ja, gut*. And your wife? You are married?"

Marvin answered realizing the pastor was looking for converts. "My wife, and my son, Danny are also Methodists. Thank you again for your time. We have to run."

At the car Marvin moved to the driver's side door, "It's still my day to drive." Juergen handed over the keys reluctantly.

Once the two were buckled in, Juergen grinned at Marvin's discomfiture. "We are a small church. Like any good pastor he wants to make us a big church." Then in a more serious note added, "Marvin, I do not think that rosary was loot. If Pickles had it as loot I think it would have been in his pack, not a pocket."

The radio interrupted, "Dispatch to Patrol Two."

Juergen answered, "Patrol Two."

"The chief has just changed your radio call sign to Investigator One. So go investigate, over."

That was Mimi Carson, one of the dispatchers. Juergen thought he heard a laugh in the background. It seemed that the rest of the department was expecting the case to be already solved. "Investigator One, clear."

Marvin hit the steering wheel. "Now it starts. I told you we were in for a little ribbing. If we don't solve this, we'll be the butt of jokes for the next couple of years."

"*Ja* . . .but I did not think it would start so soon."

"I think we should swing by the Medical Center and see how Doc Adams is doing on the autopsy. He might give us a clue. If not, all we have left is Ape and Monkey."

"We know we can find Ape and Monkey at the 250 Club later tonight, if no one spots them earlier. There is no sense in scouring the town for them."

Marvin grunted and drive toward the Medical Center. Juergen could tell that Marvin was not looking forward to a trip to the 250 Club. He started to say something but was interrupted by the radio, again. "Dispatch to Investigator One."

"Investigator One."

"We have a medical emergency at the water works. The ambulance is out of service on another call. Code three."

"Investigator One, on our way." Juergen switched on the lights and siren.

* * *

They were met at the water plant by a young woman who was obviously flustered. "Where is the ambulance? We don't need the police. We need an ambulance."

Marvin tried to calm her down. "Stacey, what's the problem? Take a deep breath and tell us slowly."

Stacey continued yelling. "We don't have time for this. Where is the ambulance? Nancy O'Reilly just went into labor. We have to get her to the Medical Center."

Juergen was already on the radio. "Investigator One to Dispatch. We have a woman in labor. We will

transport; alert the medical center."

"Run and open the door of the water plant," Marvin said. "I'll get the car as close as possible."

Juergen ran to the door as Marvin dove back in the car. He heard Stacey, still yelling in the parking lot. "Why today? She was just here to pick up the water records to make up the bills. You can't put her in a car; we need the ambulance."

* * *

The entire staff was gathered around an obviously pregnant woman who was lying on the counter. "Frau O'Reilly, we have a police car beside the door. Do you want us to take you to the Medical Center?"

"Yessss," the pregnant woman answered in a shrill voice. "I think it's time. The baby is coming."

Marvin came through the door carrying a blanket. "Quick! We'll get the blanket under her and carry her to the car." Marvin's plan proved impossible though, when Mrs. O'Reilly screamed. "Now! The baby is coming now!"

Juergen ran to the counter and scooped Mrs. O'Reilly up, one arm under her knees and one under her shoulders. "Get the door, Marvin."

The car was so close to the door that it was a few steps before Juergen had slid Mrs. O'Reilly into the back seat. Marvin got behind the wheel and Juergen called, "Drive fast! I am not a midwife."

* * *

Marvin tore through the streets of Grantville. He was spurred on by the sounds of Mrs. O'Reilly's grunting, gasping, and moaning in the back seat. Just as they reached the Medical Center parking lot, he heard the soft, then loud and healthy cries, of a new born.

"It's a boy, Frau O'Reilly. A healthy boy," Juergen said as he pulled up to the emergency room doors.

Two nurses whisked Mrs. O'Reilly and her new son out of the car and on to a gurney. Marvin and Juergen were left standing there with stunned looks on their faces as mother and child disappeared in to the emergency room.

"*Da-a-a-mn*," Marvin said in an awe-filled voice. "I've been a cop for over twenty years and that's a first. You did good, Partner. Real good."

"I . . . I did very little. Frau O'Reilly did all the work. All I did was keep her calm."

"Well, you handled that like an old pro. Been a midwife before?"

Juergen grinned. "Only for a sow delivering piglets. I do not think we should tell that to Frau O'Reilly."

* * *

"I saw Doc Adams heading for the emergency room," Marvin said. "So we can run past the office and see if the chief has anything and catch the doc later."

"*Ja*, we should see the chief. Then we still need to find Ape and Monkey."

"Yeah, and we need to find out where Heinrich was living."

* * *

As soon as the two had exited the car at the police station, someone yelled, "Hey, Marvin. I heard you were looking for me. Well, here I am."

Juergen turned and saw Ape Hart and his brother, Monkey.

Marvin answered, "We have a few questions about a friend of yours."

"Ask away. We have places to go and people to see, so let's get this over with."

"Inside." Marvin waved toward the police station. "We can use a nice warm interview room instead of standing out here in the cold."

"Sure, Marvin. That's what I like about you. You're always so reasonable." Then Ape pretended to see Juergen for the first time. "Hi Off-I-c-er Neu-b-e-rt." Ape stretched his name out. "I haven't seen you for a while. We still have some unfinished business." Then Ape and Monkey headed for the door.

"Do you want to question them separately or together?" Juergen asked in a low voice.

Marvin thought for a moment. "Together, for now. Ape will want to show off for Monkey, so we might get more out of him than if they are apart. If he starts pulling Monkey's strings too much, we can split them up."

* * *

Marvin led the way into an interview room and soon the four men were seated at the table. "Ape, Monkey, Officer Neubert has a few questions for you."

"Sure, then you get to sit back and watch us. I'm on to your tricks Marvin," Ape answered. "Watch him, Monkey. He's a sneaky old bird."

Marvin laughed. "No flies on you, are there, Ape? Go ahead, Officer Neubert."

Juergen slid the picture of Heinrich Grün across the table. "Herr Hart, do you know this man?"

Ape looked at the picture. Then he really looked at the picture. "That's Pickles Grün. I wondered why he didn't show up for work today. Look, Monkey. Isn't that Pickles?"

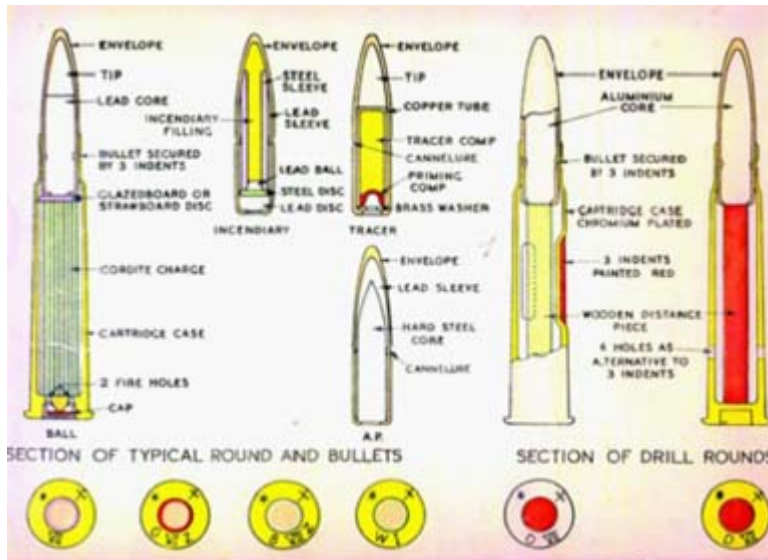
Monkey took the picture and nodded. "Sure as the world. That's Pickles. He looks deader than a rock, too."

Ape had to get a dig in. "When he starts to rot, he'll be a real sour Kraut." Ape laughed at his own joke which started Monkey laughing.

Juergen tried to get the interview back under control. "Where do you know him from?"

"Why, from here in town. Where else? This is where we live." Ape paused, then continued. "Look, Neubert. First off, Pickles wasn't my friend. He just worked for me and I rented him a camp trailer. Second, me and Monkey didn't have anything to do with him getting killed, so I resent you and Marvin here telling every cop in town to look for us. We ain't murderers, as much as you'd like to think so."

"Herr Hart, I never said you were a murderer. We just want to find out all we can about Herr Grün. You said he worked for you. Where is that, and what did he do?"



Ape grinned. "Shoot. Everyone knows me and Monkey are in the primer and percussion cap business. We make primers to reload cartridges and caps for cap locks. Call Paul Santee or Henry Johnson; they both buy from us. I bet every cartridge you cops buy has our primers in them."

"Yes, Ape. I had heard something like that." Marvin leaned forward. "Talk has it you and your brother blew-up about half of Salt Lick Run."

Ape looked a little defensive. "Ah . . . uh, the explosion wasn't our fault. It was the Krauts we had working for us that messed up. We weren't even there."

Marvin leaned back in his chair. "Ape, you surprise me. If I remember correctly you did well to finish high school and Monkey dropped out. Now here you're doing something that takes a working knowledge of chemistry."

Monkey laughed. "It don't take no chemistry. Just mixing stuff together."

"Which might explain the explosion," Marvin said.

Ape slapped the back of his brother's head. "Shut up, Monkey." Then he tried to explain. "Rodney Jessup set it up before he went to Magdeburg. He's our other partner. We're making mercury fulminate. We got a nice little setup over east of town, in a barn. Rodney sends us the mercury and nitric acid from Magdeburg and we make the alcohol ourselves."

Juergen had to ask. "You do this yourselves?"

Ape gave him a condescending look. "Of course not, Neubert. We have, oh, ten or fifteen Krauts working for us. That stuff is dangerous to mix. And it is touchy while it's drying. It'll blow your hand off if

you're not careful. Me and Monkey wouldn't touch it."

"And Heinrich Grün worked for you? Making this fulminate of mercury?"

"Yes, Pickles worked for us. He was one smart kraut. I was about to move him up to foreman."

"Herr Hart, could Pickles have gotten some of this fulminate and taken it out of your barn?"

"Sure. Though why he'd want to, I don't know. Even dry, it's pretty nasty stuff. It only takes a pinch to set off a cartridge and we don't make more than an ounce or two at a time."

Ape jumped up from his chair. "I see where you're going with this. You're trying to say me or Monkey killed him for stealing from us. Neubert, you're almost as sneaky as Marvin. Well, it won't work, boy. We were at the barn all day today and we have witnesses to prove it. Nice Kraut witnesses, just to make you happy."

Juergen also stood. "I don't think you killed Pickles, but I do think he stole from you. And why do you call him Pickles?"

Monkey started laughing. "His name was Heinz Green. What should we call him, catsup?"

Ape looked at his brother in disgust. "Shut up, Monkey. This is serious." Then he looked at Marvin. "We're done here. We have nothing more to say."

"*Ja*, Herr Hart," Juergen said, "I think we have heard all we need from you. You and your brother are free to go. Some one will be out to look at the camp trailer you rented to Herr Grün." Then Juergen used the line he had been saving since he heard it in that old television show. "Don't leave town."

Ape just shook his head, "Come on Monkey, we're out of here."

Juergen had a strong desire to wash his hands. But his thoughts were interrupted when Marvin said, "Idiots. We're overrun with idiots. They just made my day complete, the idiots." Marvin was fuming.

"Calm down, Marvin. Who was it that told me to always stay calm and collected? I remember that was you."

"You're right. I did say that. Well, we can't let *idiots* spoil our day." Marvin almost screamed the word idiots and punched the wall next to the door.

"Feel better now?"

"Yes, I do. Let's go tell the chief what we have."

* * *

They found Chief Frost in conference with another man.

"Boys this is uh . . . Herr Smith. He's with the Army. He's here to tell us about that note book you found."

The first thought that went through Juergen's mind was 'spy' then he realized it was 'spy catcher.'

Marvin was more outspoken. " *With*the Army, but not *in* the Army, Herr Smith?"

Herr Smith laughed. "Well, Chief, you told me they were smart. Yes, I am with the Army, but not a soldier. As you seem to have guessed that I have the honor of working for Don Francisco."

"Boys, have a seat." Chief Frost waved to the two empty chairs. "Herr Smith has been telling me some interesting things about the body we have over at the Medical Center."

"Was he a spy?" Juergen had to ask.

"Yes, and a rather inept one," Herr Smith said. "It was rather silly to keep his code key with his notes. In fact, it is rather embarrassing that we didn't catch on to him sooner."

"We've figured out he was after how to make fulminate of mercury," Marvin said. Then he told Chief Frost and Herr Smith about the interview with the Hart brothers.

"Yes! That explains it," Herr Smith exclaimed. "He had the entire process for making the stuff in his notes. It looks like we're going to take a closer look at the Hart brother's activities."

Juergen smiled. It was nice to know that Ape and Monkey were soon to get a visit from Army Intelligence.

"Herr Smith, can you just lay out all you know about Herr Grün," Marvin asked. "The way we're going, this is going to take some time."

Herr Smith smiled; Juergen noticed his smile didn't reach his eyes. "Ah yes, Heinrich Grün, as you call him was really a Frenchman. From some papers we found in the lining of his pack, his name was really Henri Vert. It was another mark of his ineptness to just translate his name to German. He was sent to Grantville to find out how to make percussion caps."

"By the French?" Juergen asked.

"Well, he might have tried to sell his information to the French, but the person who sent him was an Italian."

"An Italian? Which Italians? What are there, ten or twenty countries in Italy now?" Marvin interjected.

" *Nein*, he was not sent by a country. He was sent by an Italian gun maker; one Giovan Antonio Beretta from Brescia, in the Republic of Venice. It seems Herr Beretta wants to know how to make better guns."

Marvin's hand dropped down to touch the Beretta in his holster. "Yeah, I guess he would."

"So," Chief Frost asked, "what we have is a case of industrial espionage gone bad?"

"Yes, Chief Frost. Exactly," Herr Smith said with another of his half smiles. "It is not really my business, but I am glad to be of help. I hope you will keep me informed."

The Chief's phone rang; the others in the room were only able to hear one side of the conversation. "He is? Well, tell him we'll be right over." Frost hung up the phone, then looked at Marvin. "That was the Medical Center. Doc Adams just finished the autopsy and he wants to give us the results in person. Herr

Smith, if you like you can tag along."

* * *

Doctor Adams was standing beside the sheet covered body. He started his presentation as soon as the door closed. "Well, you gave me an interesting case this time. I haven't seen anything like this for years. In fact, the last time must have been in the first couple of years I was in medicine. That time, it was a miner who had a bad habit of carrying blasting caps in his shirt pocket."

The chief interrupted. "Doc, are you saying he was killed with blasting caps?"

"No, Chief. Your man was killed by a snuff can." When he saw the perplexed looks on their faces, the doctor continued. "Look here." He held out a metal tray covered with small bits of material. "This is all bits and pieces of plastic I removed from the wound. If you look close you can see the paper is still attached to some of them." Juergen leaned closer, he could see a bit of print on one of the pieces. It formed the letters Sk.

Doc Adams nodded. "My best guess is that your man here was carrying something explosive in a plastic snuff can. Not much use for them after the tobacco is gone. He might have been using it for storage. Anyway, he jarred or crushed it enough and it exploded."

"Doc, would mercury fulminate do it?" Marvin asked.

"Yes, and it fits in with the scorching on his clothing. Those burns on his hands are older and are acid burns. From what I know about making fulminate, it fits."

"Herr Doctor, if this man was carrying the fulminate inside his coat and fell getting off a tramcar, would that cause it to explode?" Juergen asked.

"Son, you get enough fulminate in one place, it can explode just from looking at it. Falling on it is sure to set it off."

"Thanks, Doc. You solved our case for us," Chief Frost commented. "Now, if we can find a quiet corner with a desk we'll finish up and be on our way."

"Use my office. It's just up the hall and it's unlocked."

* * *

"It looks like we're going to have to write this one off as 'Death by Misadventure,'" Chief Frost said. "Though, it would be more accurate to call it 'Death by Stupidity,' but I don't think we should put that in the report."

Then the chief looked up from the papers in front of him and saw the look on Marvin and Juergen's faces. "Boys, you did a good job. No one could have done better and everyone will know you did well, because you're now my official investigators. Juergen, sew a stripe on your sleeve, you're a patrolman first class, and Marvin, you're a sergeant."

"Well, it's better than a poke in the eye with a sharp stick," Marvin said after the chief and Herr Smith had left.

* * *

As they were leaving the Medical Center, Juergen walked over to the front desk. "Fraulein, can you tell us anything about Nancy O'Reilly? She was brought in with a new baby."

The receptionist ruffled through the papers in front of her and answered with a smile. "Mother and son are doing well. He was a fine healthy boy; eight pounds, nine ounces."

Juergen and Marvin smiled, then turned to leave.

"Officers," the receptionist called. "Were you the ones who brought her in?" When Marvin nodded she handed him a note. "Nancy made me promise to give you this if you stopped by to ask about her."

Marvis read the note and grinned. "This is what makes police work worth doing. Mrs. O'Reilly thanks us for this afternoon." When Juergen smiled, he continued, "Oh, by the way, she named the boy Sam. Samuel Juergen O'Reilly."

Juergen just stood there with a stunned look on his face.

"You know," Marvin commented, "this has turned out to be one damn fine day after all."

* * *

A Bell for St. Vasili's

Written by Keith Robertsson



November, 1633

"*Ux Te!*" Kseniya hadn't at all expected what she was seeing.

When Princess Natalia Petrovna hired Father Gavril to come to Grantville and set up a church for the people who were coming to study, she'd mentioned that her brother Vladimir had bought a home. She'd even put Kseniya "on salary" as the housekeeper, since Kseniya would of course come to Grantville with her husband.

But, a home *wasn't* supposed to be the size of the Kremlin.

March, 1634, The Rezidentz' Kitchen Office

Kseniya slammed the pen on the desk. " *Durag nummers.*"

Though Kseniya was a merchant's daughter and had been raised to expect a certain level of comfort and the responsibility that went with it, she was never expected to manage what amounted to a small business on her own. Hadn't her father married her off to a priest with the prospects of good parishes? The Grantville *rezidentz* was big, as big as one of these up-timer hotels. Impossible for one woman to handle, simply impossible.

Prince Vladimir had gone all out. The house—if house was the proper term at all—covered what she'd learned to call a "block." It was built to take advantage of natural light, two rooms and a hall wide, and two stories high, on each wing. The four wings made a large square, with a private garden in the center. A large private garden. Some of it was given over to decorative gardens, some was kitchen garden, and they had some chickens for eggs. The back wing was the stables and residential area for some of the servants, the east wing was offices, the west rooms for guests. The south wing was formal reception rooms, more offices and the private quarters for the prince. And his soon-to-be bride, Brandy Bates.

As she was ruminating, a knock came on the door to her cubbyhole office.

"Hi, Mrs. Kotova," said the young lady at the door. "Do you have a moment? I need to borrow some of your brains."

"Good afternoon, *Gospazha* Brandy," Kseniya said. "My time is your time. But are you sure you need to speak to me?" In the months that Kseniya had been in residence, she'd grown close to Brandy and liked the young woman quite a bit.

"Well, Mrs. K, if there's another female Russian in this house who's older than me, tell me who she is," Brandy said.

" *Nu*, if you make those qualifications, I'm the only one in the *rezidentz* or Grantville who fits them," Kseniya said. "Tell me why do you need to 'borrow' some of my brains? I didn't know I had any to spare."

"It goes back to something I heard years ago. If you don't have a lot of brain power but are a good judge of character, you can always borrow or hire the brains. It's a matter of being able to trust your sources."

"Thank you, *moiya gospazha* , for your confidence in me," Kseniya said. "From the sound of it, I think we need a pot of tea. Pardon me for a moment."

* * *

When Kseniya returned to her seat, Brandy took a deep breath and plunged into her not-so carefully planned presentation.

"Mrs. K., I feel like a stranger in a strange land. I love Vladimir to pieces and I can't think of life without him. But sometimes, I think I'm about to go nuts here. I don't know enough Russian, for one thing. Then there's running this house. It's not a house. It's enormous. I'm a reference librarian, not Martha Stewart. I don't know how to manage a household the size of Kudzu Werke. Like Charlie Brown used to say, 'Arrgh.'"

Somewhere, in her venting, Brandy started to cry. Not much, just a few snuffles and enough moisture to cause a need of a handkerchief.

Maria, the maid, arrived then with their refreshments. While Brandy snuffled, Kseniya got up and took the tray, motioning for Maria to leave quickly. She was relieved that she wasn't the only person who was having problems with this situation.

"Oy, you do have some problems, don't you? But we're in the same boat, I'm afraid. I wasn't trained for this, either. Your first problem is easy to solve. I can help you with your Russian; you can help me with my English and German."

"Okay," Brandy said. She stopped sniffing and picked up a cup of the tea Kseniya poured. "That will help a lot."

"I agree with you about your other problems. You'll be the *gospazha* of the household. As that, you have a staff working for you. Right now, Gregorii is your major domo. He's reporting directly to the prince. While my husband is your chaplain, I am the head of the kitchen and female staff. But, like you, I am in over my head," Kseniya said.

"We'll just have to figure something out. Do you have any ideas?"

"I'm not really trained to run a kitchen of this size. It's not just the cooking . . . that I can do. It's also the buying from the different sellers. And I'm not used to all these modern conveniences. I grew up cooking on an open hearth and in a *pech*, a big stove . . . not like the cook stove we have here."

"We need help. Let's think about it and do some investigating. Right now, though, I have to go see Vlad. He got another batch of letters from home. And from the czar. And the bureaus. And, and, and!" Brandy threw her hands in the air. "It never stops."

"In that case, you must be on your way. *S' Bogom* . . . go with God."

"*S' Bogom*, Kseniya," Brandy said. "Oh, yeah . . . could you please send Maria to the office with something to eat in about a half hour?"

"Of course, Branya." Kseniya was still surprised by the offhanded politeness of the up-timers she'd met.

* * *

"Come on in, Brandy," Vladimir called.

The couple embraced and exchanged a kiss or two.

Brandy whispered, "*Ya lublu tebya*."

"Your pronunciation is getting better. Who's been teaching my girl Russian?"

Brandy said, "Mrs. Kotova and Vladimir Troshin."

"I thought I knew all of the Russians in Grantville. Most of them live in this building. *Who* is this Troshin?" Vladimir asked, putting on his Rezydent's hat.

"A singer on a record I borrowed from Ms. Mailey's collection," Brandy said. "While she's in England, Dr. Nichols is house-sitting for her. He lent it to me."

"You learned Russian from a singer?"

"At least the pronunciation," Brandy said. "The record is all Russian big band music."

"We'll have to listen to it when I go into Grantville Saturday. I want to hear your other Vladimir," Vladimir said.

"Sure thing. I think you'll like it. 'Sides it's danceable. But enough about music. What came in today's mail?"

"Mostly the usual contradictory stuff, one office not telling the other what I sent them, so the other writes asking for information I sent months ago. Here's a stack of inquiries. I've made marginal translations for you."

Taking their seats on either side of a partner's desk, the pair set to work. A soft knock came at the study door. Maria had arrived with the tea tray.

"*Mein Herr und Fraulein*, where do you want the tray?" said Maria.

"Here, please, Maria," Brandy said.

Maria placed the tray on the indicated empty spot on the desk.

"Thank you," Brandy said. "Dear, do you want honey on your biscuit?"

"*Da*," Vladimir said, deep in a piece of what was probably arrant nonsense that needed a diplomatic answer.

Brandy gave the stack of correspondence a glare, then repressed a sigh. *Might as well get it done.*

* * *

"Vlad, it's getting on to six o'clock. I need to get back into town."

"Do you really need to go?" asked Vladimir.

Laughing at Vlad's oft repeated query, Brandy said, "I told you I won't have breakfast in this house until after the wedding. Cora would be sure to spread the news all over Grantville. Besides, I'm meeting the girls at Tyler's tonight. Dinner and a brain picking session."

"What do you mean 'brain picking session?'"

"I talked to Mrs. Kotova this afternoon. I found out I need to get my ducks in a row if I am going to be the *gospazha* here," Brandy said. "The girls know folks I don't. And I know folks they don't."

"If you must, you must," Vlad said. "But I'll be glad when the day comes that you don't." He wiggled his eyebrows in a suggestive manner.

Brandy laughed again. "Just hold your horses, fella. It'll happen soon enough. *S' Bogom*, honey."

The next Monday afternoon

"Miss Garrett, this lady is Mrs. Kseniya Kotova. Mrs. Kotova, this is Tate Garret," Brandy said.

As Brandy closed the door, Kseniya gave Tate a once over. She was short for an up-timer, maybe five and four of their feet and inches, solidly built, not too skinny and not too fat, with short, muddy-colored blond hair. And a look of leadership in her eyes.

"Pleased to meet you, Mrs. Kotova," said Tate.

"As am I," Kseniya said, a bit flustered. The girl was much younger than she'd expected.

"Tate, we've got a problem. And I think you're the solution to it," Brandy said. "I asked some people I know and your name came up as some one with the needed skills and experience."

Tate looked startled. "Skills and experience? Brandy . . . Miss Bates, I'm the junior assistant manager at the Willard Hotel. What do I know that you can use?"

"We know that. How big do you think Grantville is?" Brandy grinned.

Brandy wasn't being nearly as formal as Kseniya thought she should be with a possible future employee. Up-timers were very odd that way. "Miss Garrett, we know where you presently work. *Gospazha* Brandy knows of your education and where you planned on going to school after graduation. Someplace called Johnson and Wales . . . and something called hospitality arts?"

"Boy, you ladies really do know about me. Are you sure there's no KGB agents stationed here?"

Brandy laughed. "Who needs the KGB when you've got the Barbie Consortium? We need someone to help Mrs. Kotova. And me, for that matter. You'll be chef de cuisine and other duties as assigned. This place is like a hotel, only with both permanent residents and transient guests. Not to mention, you'll have a wedding to cater in the not-too-distant future. We are also taking you on because you know the food suppliers in West Virginia County. What do you think? Want a job?"

"Good night, Brandy! Most chefs have to spend years to get the position you're offering. You're darn right I want it," Tate said.

"Good to have you with us." Brandy grinned and extended her hand.

"*Da*," Kseniya said. "I'm happy to have the help."

Three weeks later

To the casual observer, the kitchen looked the same as it did a month ago. However, Kseniya saw minor yet practical changes. Over in at the baker's station, Maria was weighing out the ingredients for the afternoon's baking. The prince liked warm fresh baked goods on his supper table. He'd even fallen in love with American-style fruit pies for his dessert. So, he was happy. Everyone else was eating better and she was staying inside her kitchen budget. For that, Kseniya decided to stop by the makeshift chapel and light three candles before the icon of St. Vasili. Her thinking was interrupted by a shout.

"Good afternoon, Mrs. K. How you doin'," Tate asked.

"Fine, Chef, *slava bogu* . . . erm, praise God. And you? The kitchen looks a bit more polished," Kseniya said.

"Ahh, it wasn't any thing a bit of elbow grease and some chlorine bleach solution couldn't cure. The scullery crew needed a bit of encouragement to clean the corners," said Tate. "Are we still having tea with Colonel Makoveev?"

"Yes. He may be a *streletz* , but I don't think he is a colonel. Maybe a captain or a colonel's nephew," Kseniya said.

"What's a *streletz* , Mrs. K?"

"The *streletzi* are the czar's musketeers. The *streletzi* regiments form the czar's guard regiments and the garrisons of the larger cities in Russia," replied Kseniya.

"So, what makes you think he is a fake?" said Tate.

"There are only so many *streletzi* colonels. They are all old, fat and in Russia. This Colonel Timofei Makoveev is too thin and too young to be a colonel and he's here."

Tate laughed. "Let's go in to the office; the mice have ears," she said. Then she waved at Maria. "Maria, have the usual setup brought to the office."

"Yes, Chef,"

"Agreed. After you, Chef," Kseniya said.

The ladies entered the kitchen office and fell to examining the accounts ledger. Kseniya was pleasantly surprised to see the neatness and completeness of the book. She was very pleasantly surprised to see the reduction in costs. One of the scullery crew brought the tea into the office and they came up for air and poured their cups of tea.

"What is keeping Makoveev? I'm on my second cup," Kseniya said. "You'd think his mother taught him better than to let a lady wait."

"I don't know." Tate shrugged. "Do you want me to send out a search party?"

Just then came two raps on the office door.

"Mrs. Kotova, Chef Garrett, I apologize for being late. I was out at the range with the Junior ROTC." Colonel Timofei Makoveev had a pleasant baritone. He also held a full cup of tea, procured from the kitchen's common tea pot, in his hand.

"Good afternoon, Colonel," Kseniya said. "Tell us, please, what in the world were you doing with a bunch of teenagers?"

"Some one talked Prince Vladimir into volunteering me as a range safety officer. I guess with a red coat and yellow boots, the instructors think I didn't look like a target. Now, how can I help you ladies?"

Tate said, "First, Colonel, in this office, unless one of our subordinates is present, we're on an informal basis. Here, I'm Tate, this is Mrs. K, and you're Tim . . . or Colonel Tim if you insist."

The soldier thought for a moment and said, "So, this is something like the Officers' Mess they talk about down at the American Legion Hall."

"*Da*, you're correct, Tima," Kseniya said. "We're here to support the prince and *Gospazha* Brandy. I am happy to see you are familiar with the American Legion."

"As the representative of the *Streletzi* Bureau, I need to make contacts with the various military related organizations in Grantville."

"Tim, I need a date to tomorrow's Legion pastrami roll lunch. I'm not a vet. The vets I know are all too old. If they're young and still free, I've turned them down in high school," Tate said.

Timofei looked the woman sitting behind the desk in her double breasted chef's jacket. She was young, easy on the eyes but not drop dead beautiful and wore a uniform with Prince Vladimir's crest embroidered on it. All things considered, a worthy lunch companion. And there was just something about a girl in uniform . . . "I'll be happy to be your escort for lunch, Tate. Due to the ways armies are organized these days, the Legion allows men from friendly services to buy affiliated memberships. I get to eat and drink there but not vote."

"Tima, I saw that look in your eye. Don't get any ideas about Tate. If she tells me you got out of line, *ya Mama* . I'm mother around here," Kseniya said in full mother-bear mode. "Do you understand me?"

"*Da*, Mama Kotova. I hear and will obey," said Timofei. He looked like a mischievous boy who'd been caught with his hand in the cookie jar.

"Good, I'll watch over the kitchen for lunch," Kseniya said. "Tima, tell Old Sasha to have the carriage ready to take you to the Legion Hall at, say, about eleven o'clock tomorrow morning."

"Yes, Mrs. Kotova," Tim and Tate chorused.

"Colonel, let's get out of here so Chef Garrett can get supper ready."

10:30 am, Saturday

Colonel Makoveev said, "Sasha, I won't need a driver today. Just hitch up the buggy. "

"Vanya, you heard the colonel. Get the buggy ready," Sasha ordered.

Old Sasha watched Makoveev as the buggy was readied and saw the look of a man on a trail.

"Sasha, what do you think of these Grantville horses?"

"Colonel, I never thought I'd be working with so many head of quality horse flesh. These Morgan crosses are beautiful," Sasha said.

"I need a saddle horse for my own use. Keep your eyes out for me," Tim instructed.

"Do you want a fighter or a rider, sir?"

"A rider," Timofei said. "I leave the fighting to the Scots and Finns. Also, find me a decent saddle. After four hundred years, you'd think there'd be some improvements."

As the two dove deep into a discussion of horses and tack, Tate walked into the stable yard ready for her trip into town. She expected to ride in the two horse carriage. Instead she saw the two seat buggy all hitched up and ready to go.

"Okay, Colonel Timofei Ivanovich Makoveev, what's with the seduction rig?" Tate said.

"Good morning, Chef Garrett," Timofei replied. "I thought we'd leave the larger rig for the prince's use. The post was built for cars not carriages."

"I guess the good thing about driving a horse is you need both hands. The boys I knew couldn't keep both hands on the steering wheel," Tate said.

Timofei said, "Don't worry on that account. I remember Mama Kotova and I want to live."

Sasha helped Tate up into the buggy, while Timofei climbed into the driver's position.

"Thank you, Sasha for your help," Tate said.

Sasha gave the couple a polite bow as they drove off into Grantville.

11:20 am, Saturday

The carriage drew up before the whitewashed building. Timofei handed the reins to the hostler and helped Tate down. A sign beside the front door read: "Pastrami Roll Lunch 1100-1300 hours: \$4.00 members and guests, \$6.00 Unescorted Visitors, Benefits Grantville JROTC Scholarship Program."

"That looks like a good price, Timofei," said Tate.

"It is. The price includes cole slaw, potato chips and the first beer," said Tim. "Let's go in. I'm hungry."

The pair went through the door. They checked their overcoats and hats with the cloakroom girl.

"Morning, Colonel McCoy," said a voice to their right.

"Good Morning, Mr. Kindred, and it's Makoveev," said Timofei.

"Sorry, I never could wrap my tongue around those Russki names. Who's this young lady? I've always seen you on your own," Kindred said.

"This is Tate Garrett. She's the new chef for Prince Vladimir. Chef Garrett, this is J.P. Kindred."

"Tate Nadine, isn't it?" J. P asked. "It's good to see you again. You've sure grown up since I saw you last."

"Hi, Mr. Kindred. You're right; it's been a long time."

"I figure you're old enough to buy me a beer back in West Virginia. So, you can call me 'JP'. The same goes for you, son," said J.P. "Please join me. I'd like to eat my lunch without an old codger who wants to re-fight Omaha Beach with the ketchup and mustard."

"We'd be happy to join you, J.P.," said Tate.

Tate, Tim and J.P. found an empty corner table. With a courtly gesture, J.P. seated Tate in the metal folding chair. Their orders were taken by the waitress and they settled into conversation.

Tate looked around the room. "J.P. this place hasn't changed all that much. But, what's with the Imperial Legion posters?"

"It's like this. The boys decided they could either die as American Legion Post 238 or we could live on as Imperial Legion Post 2. We'd have been number one, but Jackson and his gang formed their post up in Magdeburg before we got our act together."

"J.P., you know pretty much all the legionnaires and what they might have in their attics don't you?" Tate asked.

"Well, I know the members. But I don't know all that much about their attics," said J.P.

"Like Colonel Tim said, that Russian prince over in Castle Hills has hired me to run his kitchen. I need to get the place up to speed. Not to mention, the kitchen will be catering Brandy Bates' wedding . . ."

"Yeah, I heard about that. How can the Legion help you?"

"A few years back, I read in one of those food industry trade magazines about the Armed Forces Recipe Cards," Tate said. "The article said there are over a thousand cards and that they cover every course from soup to nuts. I figure I could use a set, even if it's just for daily meals. Of course, for the fancy stuff, they probably won't be much help. But we're cooking for a hundred or so for every meal up there."

J.P. said, "I know a couple of guys who retired out as cooks. Maybe one of them has a set in the attic. Can you give me a day or two to ask around?"

"Sure, J.P.," said Tate. "A day or two won't hurt. But, I'd like to know one way or another if a set came through."

"Since I can charge this to the *Streletzi* Bureau, how about another beer?" said Timofei.

Three Days Later, Kseniya's New Office

Kseniya reached for the teapot. "Another cup of tea, Mr. Kindred, Father Gavril? We'd like to thank very much for the help you and the Legion have given us."

"It wasn't all that much, Mrs. Kotova," said J.P. "In fact, it turned out easier than I thought. Back in the '80s, a legionnaire was a cook in the Army National Guard. He donated a set to the post that the Army had declared obsolete and replaced."

"Do you need the set back soon?" inquired Kseniya. "If the post can wait, we would like to copy them so it we can have a complete set."

"Not a problem," J.P. said. "Just give them back when you're done."

Since her husband wasn't talking much, Kseniya tried to bring him into the conversation. "Father, they tell Chef Garrett she'll need twenty-four pounds of ground meat to make enough *golubtsi* for a hundred."

J.P. said, "What are those? I never saw them on a dining hall menu."

"Sorry, Kseniya said, "That's stuffed cabbage rolls."

"And one of my favorites," Father Gavril said. He finally started talking more. Really, he was going to have to get comfortable with up-timers.

"I'm a bookish sort. If God had allowed it, I'd be in a monastery surrounded by books," Father Gavril said. "However, God in His providence brought Kseniya into my life. I also have a talent for languages. I have the best of all worlds, Kseniya, my two sons and the libraries of Grantville."

J.P. followed up by asking, "I thought married Orthodox priests were parish priests. Does your research interfere with your parish responsibilities?"

"No, not really. I only have twenty or so parishioners at the moment. Most are Russians, but there are a few from the various Orthodox churches who came back in the Ring of Fire. Grantville is much quieter and cleaner than the parishes I would have served in Mother Russia."

"Father, where do you hold services? I don't see any onion domes around here," said J.P.

Gavril smiled. "Prince Vladimir has made room for me in the ballroom. It's not the best but it will do for the moment. We, easterners, stand during services. So, there is no need for space-eating pews."



"Do you plan on building a church and have you decided on a name for it?" asked J.P.

"Oh, yes. It will be dedicated to Saint Vasili the Fool for Christ. The patriarch decreed if the name was good enough for a cathedral in Moscow, it would be good enough for a parish in Grantville," Father Gavril said. "We pray it will be completed in time for the prince's wedding in June."

"Is that a likely date?" asked J.P.

"It is a wishful date. We have few funds from Moscow, my parishioners are few, and time is short," Father Gavril said.

J.P. looked at the clock on the wall. He saw he needed to leave if he wanted to get his story in by the deadline for the late edition. He hadn't bothered to mention that he was an old newspaperman. And, now and then, he still did a human interest story. The first Orthodox church in Grantville certainly sounded interesting to him.

"Father, Mrs. Kotova, I'm happy the post could help you." J.P. stood up. "I need to be getting back into town, so, I better say good bye now."

"May God bless you for your service to Him," Father Gavril said as he made the sign of the Cross.

Kseniya reached one of the pull ropes hanging on the wall. Three sharp tugs sounded a bell in kitchen. One of the duty footmen soon appeared in her doorway.

"Mr. Kindred, Vanya will show you the way to the door," Kseniya said. "The *rezidentz* can be confusing to visitors."

J.P. followed Vanya to the front entrance. He went down to the corner and caught a street car back into town. During the ride, he mentally wrote the story. Soon, he was at the keyboard of his loyal Royal

typewriter pounding out it out.

That night in the Kotovs' bedroom

Kseniya looked over at her husband. He was still awake after what she knew to be a long day of work. "Gavra, what's the matter? Your tossing and turning is keeping me awake."

"Dearest, after Mr. Kindred left, I realized we have a problem. When will she be baptized? And what name should we use? Brandy is not an acceptable name. You know the rules."

"I think, Gavra, we need to light candles to Our Lady and Saint Vasili asking God for wisdom. And I need to borrow some brains," Kseniya said. "Now, we need some sleep to face tomorrow. Good night, husband."

"Good night, my dear."

The next morning

"Gregorii, go find Father Gavril, tell him his presence is requested and required in my office," Vladimir said. "Also find out if *Gospazha* Brandy is here and relay the same message to her. If she is not, let me know."

"I hear and obey," Vladimir's major domo said.

Soon a knock came at the open office door.

"You sent for me, sir?" Father Gavril said.

"Come here; look at these newspapers," Vladimir ordered.

Gavril read the first paper in the stack and his face took on a serious set. "I can see why you are concerned."

"Those are only the morning German papers," Vladimir said. "I sent for Brandy to help interpret the English paper where this story first appeared."

The office door slammed open. A "serious as a heart attack" Brandy Bates stormed in. "Vladimir Yaroslav, this house had better be under attack by the Tartars," she said. "Who do you think you are? My commanding officer?"

Oops. Vlad had forgotten that Brandy could get a bit testy when he "went all over princely," as she called it. "The *rezidentz* is not under physical attack. However, it has made the newspapers without my

knowledge."

"I'll grant that those can be as dangerous as the Tartars," Brandy said. "But Greg told me 'my presence was requested and required.' I think you've been reading too many Hornblower books, buddy boy." She picked up yesterday's evening edition of the *Grantville Times* .

"Father Gavril made the papers," she said. "Not you. And what's the problem, anyway?"

"My wife invited Mr. Kindred over yesterday to thank him for the help he gave Chef Garrett," Father Gavril said. "Something about recipe cards, I gathered. Anyway he started asking questions about the chapel. Kseniya and I didn't think what we said would appear in the papers"

"Still," Vladimir said. "We made the papers without my knowledge. That is a problem."

"Honey, there is no such thing as bad publicity as long as they spell your name right," Brandy said. "The *Times* printed it as a human interest story. J.P. must have liked our kitchen's biscuits, 'cause, he wrote a really positive article."

"We will see how this all develops. Father, no more newspaper interviews without my knowledge and permission," Vladimir said.

"I hear and obey, sir," said Gavril.

"Brandy, I understand you have scheduled us to visit the KudzuWerke showroom," Vladimir said. "If so, we better get going."

Brandy came up to Vladimir and hugged him. She said, "Yes, I did. But ease up on the princey stuff, dude. You're creeping me out." Brandy then gave Vladimir a good kiss on the lips which he enthusiastically returned.

Father Gavril studied the Robin of the CoC cartoon strip in the *Daily News* during the exchange.

The afternoon of the following day

Father Gavril and Kseniya entered the prince's office. Kseniya knew something was up from the way the tradesmen treated her. However, her German and English weren't up to catching their shades of meaning. The pair saw Brandy sitting with her chair to one side of the desk. Her presence would temper the prince's actions.

"There have been developments from that story," Vladimir said. "Look at this stack of mail."

"Now, Vladimir, be nice," Brandy said. "Good afternoon, Father Gavril, Mrs. K. Yes, there have been developments. Positive developments."

"You're right, my dear. Positive, indeed," Vladimir said. "Take a look at these letters."

Gavril and Kseniya sorted through the partially opened mail. The letters were addressed to St. Vasili Orthodox Church, The Fool for Christ Church, Father Kotov, Father Gavril, Father G, The Russian Church, or some other variation. All conveyed the best wishes and prayers of the sender. Some contained donations large and small. Father Gavril was surprised by the number of checks drawn on the Grantville banks. Others had pledges of material support.

"*Gospazha* Brandy, what is this backhoe service?" Gavril asked.

"Here is someone offering a load of bricks," Kseniya said.

"I think we need to get this mess organized," Brandy said.

Vladimir agreed. "Make it so."

"Gag a maggot, Vlad. First, you're Hornblower, now Picard," Brandy said. "I need to keep a closer watch on your reading and TV." She wagged a finger at him. "If you start introducing your gun as 'Clyde,' I'm calling off the wedding."

Kseniya's Office

"Tate, you can't believe the offers we've received to help build my husband's chapel," Kseniya said.

"Yeah," Brandy said. "It's turned into a community project. Not only did folks send in money, but Father Gavril got pledges of material, building equipment and labor."

"Sadly, the only item not pledged is a bell. And we don't have the money to buy one already cast or the time to wait for one before the chapel's dedication," Kseniya said.

"Brandy, have you thought about having a fundraiser for the bell?" said Tate. "Other churches have them all the time. We should be able to put one on here; the place is plenty big enough. We could do a Russian feast; maybe even get some of the food donated. That will help with the profit margin. I know the local fish mongers throw away the roe. We can get the makings for some nice caviar for free."

"You're right, Tate," Brandy said. "Vlad could buy a bell, though . . ."

"For a cause like this," Tate pointed out, "well, it's a community thing. If we let people help, we make more friends, let people get used to our ways. We can make it a 'Night in Moscow.' We'll have Russian food and music."

"This sounds like nothing we did in the old country," Kseniya said. "There we could count on the czar or somebody important to give a new church its bell."

Tate grinned. "There's an old saying. The czar is very far away. Besides, Brandy, you and Vlad need to entertain. He's basically the Russian ambassador here, you know."

"Jeez, Tate," Brandy said. "Vlad's almost as bad about publicity as, as . . . well, whatever. Saint Vasili is

going to get some more. Even if Vlad hates to read about the *rezidentz* in the papers without knowing about it first."

Tate winked at her.

Brandy's sitting room

"Brandy, a problem with your baptism has come up," Kseniya said.

"What's the problem, Kseniya? This will be the first time I've been baptized in any church. Vlad and I settled this long ago," Brandy said.

"It's not the rite itself. The problem is your baptismal name," Kseniya said. "According to the rules, you need a qualified name. That's 'qualified according to church law.' My husband says 'Brandy' is unacceptable."

"Now, that's a problem we never thought of," Brandy said.

"It's also a matter of you're starting, spiritually that is, a new life," Kseniya said.

"You're right. Something other than "Brandy" would show the change. Now what can we come up with that will qualify?"

"Branya," said a now relaxed Kseniya, "your people usually have two given names, right?"

"Sure a first and middle name," Brandy said. "I hate mine; it sounds so old fashioned."

"Well, what is it?" asked Kseniya.

"Margaret. Momma said I got it in honor of Margaret Truman," Brandy said. "I think it smells like mothballs."

"Branya, the name may smell like mothballs to you," Kseniya said. "To me it sounds like a solution to the problem."

"How can the name of a dead president's daughter be a solution?"

"Margaret is the name of a saint, Saint Margaret the Virgin of Antioch. It will work perfectly. Even better, you were planning on a June wedding. We both know Saint Vasili's won't be ready for a wedding by then."

"Yeah, that is a bummer," Brandy said. "I guess we'll have to have it in the garden."

"Can you survive a seventeen day delay? Saint Margaret's feast day is July seventeenth. That will give Gavra two more weeks to get the chapel ready."

Prince Vladimir's office

Saint Vasili's building committee was in session. Not that it was a large committee. In fact, it consisted of Brandy, Vladimir, the Kotovs and Pete Enriques.

"Father Gavril, Prince Vladimir, ladies," Pete said. "I've taken a look at the materials given or pledged for this project. It looks like you have enough to build a basic structure."

"How big a building?" asked Vladimir.

"I'd say about twenty by thirty feet. Call it five hundred square feet. It will be cozy but not too small," Pete said.

"I don't know about square feet," said Gavril. "Please tell me how many people will be able to get inside."

"Remember, Pete, Russians stand for their services. So you don't need to figure in room for pews or chairs," Brandy said.

Pete thought for a moment and scribbled some numbers down. "How, does eighty comfortably or a hundred smooshed in sound to you? That's with leaving space for the altar and other pieces of furniture."

"That sounds like it will be more than sufficient for our needs," Vladimir said.

"What about a bell?" Pete asked. "Nothing in the budget for one of those, yet."

"We plan on having a fundraising dinner. We hope we can get the money from that," Kseniya said.

"By the first part of July? I checked around; the foundries won't be able to deliver in that time frame, they said."

"Then we need a miracle. Let's pray for the Holy Mother's and Saint Vasili's intervention," Father Gavril said.

"Amen, Father," chorused Kseniya, Vladimir and Brandy. Pete kept his mouth shut. As a Grantviller, he wanted to help his neighbors. As a Pentecostal, he wasn't going to amen prayers to the virgin and a saint.

The Day Before a Night in Old Moscow

Timofei walked up to the kitchen's outside table. He knew Tate usually sat out here for her noon meal. The girl was getting to be a nuisance. Why he was trailing after her he didn't know. However, Timofei knew Tate was not only easy on the eyes but easy to talk to. That she was more than just competent at

her job was another plus in her favor.

Tate was eating a meat pie when she heard Tim's military tread on the gravel. The man was getting to be annoying. Sure, he was a colonel, though Mrs. K. had her doubts as to his exact rank. But, he was cute in a Slavic kind of way.

"Tate, may I join you?" Timofei asked.

"Sure, Tim," Tate said. "Take a load off."

"It's a pity we're both going to be on duty tomorrow night," Tim said. "Otherwise, I'd ask if you would do me the honor of being my escort to the dinner."

Tate said, "Yes, it's a pity. Because I'd say yes. I hear the Old Folks Band is playing. Maybe we can steal a dance."

"It will have to be a slow one. I have two left feet," Timofei said.

A Night in Old Moscow

The interior courtyard was ablaze with torches and electric lights. Tables were set up in a horseshoe. The stage and food tables took up the fourth side.

Prince Vladimir climbed onto the stage and said, "Ladies and gentlemen, I want to thank you for coming out tonight for a time in Old Moscow. This occasion could not have come about without the efforts and hard work of many people. In particular, we owe our thanks to Chef Tate Garrett and the kitchen staff for the food, to Mrs. Kseniya Kotova and the decorating committee for all of the finery you see displayed, and, last but not least, to *Gospazha* Brandy for keeping this whole enterprise together. Now, I'll ask Father Gavril to ask God's blessing on tonight."

Gavril came to the front of the stage. In Russian, English and German, he gave thanks to God for the food, the hands that prepared it, and for the money brought in by the tickets.

* * *

Timofei surveyed the security detail. His men and women were without work tonight. He could begin to like these Grantville parties. Nobody was using the festivities as a reason to be drunk and obnoxious. Even, Tate was pleased with the food service. She relaxed standing over to the side. *I think I can dance to this music.* Timofei sent up a fast prayer of thanksgiving. The dance music was uptime ballroom and Brandy had insisted on dance lessons for the senior staff.

"Chef Garrett, would you do me the honor of this dance?" Timofei bowed.

Tate, in her best Scarlett O'Hara manner, curtsied and replied, "Why, Colonel, it would be my pleasure."

Timofei and Tate foxtrotted onto the dance floor to "Moscow Nights."

Tate whispered, "Honey, you don't have two left feet. You're not in Federico's class, true. But not everyone is the second coming of Fred Astaire."

"I guess my other left foot stayed in Moscow," Timofei murmured back. "I do have a question. If you promise not to get offended . . ."

"Tim, you'd have to work hard at offending me," Tate said.

"Good. Since you call me 'honey,' may I call you Tatia?"

"Of course. Turn about is fair play."

* * *

Kseniya walked through the tables, greeting the guests while she kept an eye on the men and women on serving duty.

Good. All of the tables have full beer pitchers. She moved towards the buffet tables. The scouts from Troop 9 busied themselves toting the heavier trays from the outdoor grills and the kitchen. The girl scouts from Troop 29 smiled as they dished out the food to the donors.

"Good evening, Mr. Bolender, Mrs. Walker," Kseniya said. "I want to thank you. Your scouts are a great help. Prince Vladimir is very impressed."

"You're welcome, Mrs. Kotova," said the Troop 29 scoutmaster. "A couple of our scouts are using this as their community service projects. If we had known about it earlier, one of the scouts would have used it for his Eagle Scout project."

"Likewise," said the Girl Scout Leader. "Though I think you need to thank Ulrich. He's the one keeping things moving. He's over there by the fire extinguishers."

"Thank you, Herr Schwarz," Kseniya called over.

Not leaving his post, Ulrich called back, "You're welcome."

"Please excuse me, I need to visit with the others," Kseniya said.

"We understand, Mrs. Kotova," said Evangeline. "Our troops also appreciate Prince Vladimir's donation."

"You're welcome. Though, the idea of donating in return for your help was J.P. Kindred's idea. You need to thank him," Kseniya said.

At that moment, Kseniya spotted J.P. He was sitting with a group of his fellow veterans and their wives.

Walking over to the group, Kseniya saw a small wooden crate on the ground beside the table. It looked rather heavy.

I wonder how these grandpas got that in here. Does the colonel know it's here? Kseniya wondered.



"Hey there, Mrs. K." said J.P. "This is a great fundraiser. Who'd of thought Russians were into barbecue."

"J.P., this isn't barbecue. It's meat on a stick," said one of J.P.'s tablemates.

"Welcome to the *rezidentz* ," Kseniya said. "In Russian, this meat on a stick is called 'shashlik.'"

"What ever you call it. It's good chow," said the unknown tablemate.

"Mrs. K. let me introduce Chief Warrant Officer Louis Tillman," said Kindred. "Boats, this is Mrs. Kseniya Kotova. She's sort of the first lieutenant around this place."

"Pleased to make your acquaintance, ma'am," said Louis. "We have something that will interest your husband."

"You do?"

"Yes, ma'am. It's sitting in this crate," said Louis. "If Colonel Makoveev will lend me couple of strong backs, we can get it out where every one can see it."

Kseniya looked around for the *stretetz* . He was standing so close that she knew he was in on this deal.

The colonel called out in his best parade ground voice, "Bondarev, Antonov, come here. Ivanov, bring a crowbar."

Two Russians, with help from the older scouts, easily moved the wooden crate in front of the stage.

Kseniya joined her husband, the prince and Brandy beside the crate.

Boats Tillman bellowed out, "Ladies and gentlemen, your attention please." With fewer decibels, he said, "Men, loosen up the nails in the crate."

Tillman continued, "The Legion would like to present a memorial gift to the Chapel of St. Vasili. All we ask is there be a plaque located nearby to identify the gift as being given in memory of those who gave their all for their country. Father Gavril, please open the crate."

Gavril took the crowbar from Antonov and started ripping off the boards. The scouts helped him by lifting off the top and removing the sides as the last nails were pulled out.



When the work party moved away, there stood a ship's bell.

"Folks, for years my wife and I went around to different antique shows and flea markets. And you know how I am about naval memorabilia."

The Grantvillers in the crowd laughed. They certainly did, since most of them had been treated to Louis' stories whether they wanted to be or not.

He gave them a grin. "We were in Pennsylvania when I spotted this bell. It comes from a decommissioned Coast Guard cutter, the *Tupelo* ."

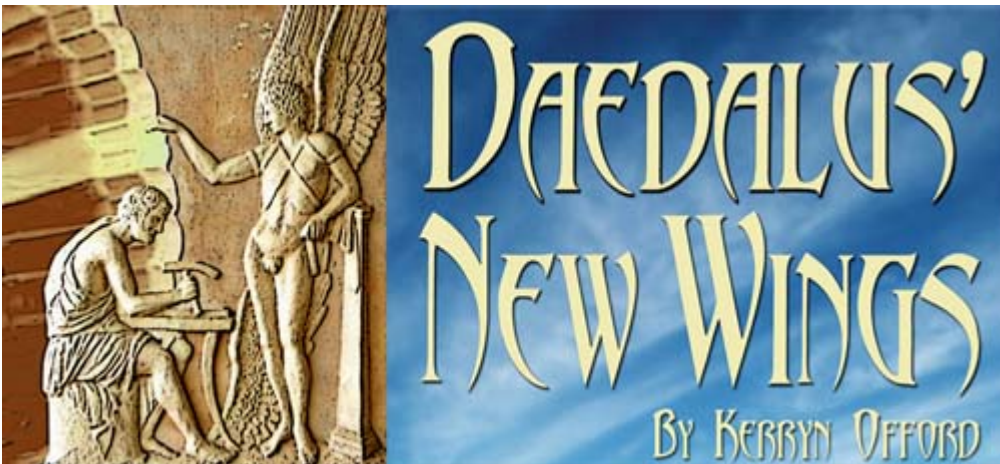
Father Gavril fell on the old salt's shoulders, babbling, "It's a miracle! Praise God, a bell for Saint Vasili."

Kseniya looked over at Brandy and Vlad. They were both beaming. And over in the corner, Colonel Tim and Tate were having an intense conversation. She smiled. There might be yet another wedding here at the *rezidentz* .

* * *

Daedalus' New Wings

Written by Kerryn Offord



Magdeburg, September, 1634

Tracy Kubiak stared at the shop window, not really seeing anything. She was in Magdeburg to inspect the local division of her company, Grantville Canvas and Outdoor, but she was finding it hard to stay motivated. Maybe it was just because she'd turned thirty, but she'd been feeling old and tired lately. What she needed was a new project. Something she could really get her teeth into. Something that would make her feel young and alive again.

"Free at last. Kids are in school and we can rumble." Belle, her cousin, gripped Tracy's arm. "Where do you want to go first?"

Tracy shrugged in disinterest.

"I know, let's check out the progress of the opera house. It's on the way to the navy yard."

Tracy let Belle drag her along. She wasn't interested in the opera house, but her adopted daughter back in Grantville might like to hear an eye-witness report on progress.

Tracy heard the drone of an aircraft flying overhead, looked up and sighed. She'd never felt more alive than when she was skydiving. Unfortunately, there was no way she could get into the air. The Air Force was running Belles and Gustavs. Neither of which was suitable for skydiving. The only aircraft even approaching suitable was Trans European Airlines' "Monster", but they only had the one aircraft and it was either flying the airline's commercial routes or in for maintenance.

Tracy felt Belle stop and looked down to see why. They'd come up to the fence surrounding the work site. "What the hell?"

"Yes, I know. The foundations were laid weeks ago and they haven't done anything since then. Bitty's already had a fight with Carl about the lack of progress. "



Tracy wasn't interested in whatever Bitty Matowski had been complaining about. She only had eyes for the two kite balloons hanging in the sky. She started toward them.

"Hey, Tracy, where do you think you're going?" Belle called as she hastened to catch up.

"Hold it. You can't go in there, Tracy." Carl Schockley, one of the directors of Kelly Construction, and an old friend, was holding her arm.

"Those balloons . . ."

"Romulus and Remus?"

"Is that what you call them?" Carl nodded and shrugged.

What was in a name? Tracy wanted answers to more important questions. "How high can they fly?"

"How high do you want them to go?"

"High enough to skydive from?"

"They can go high enough. That's not a problem. The problem is the tether. That's going to limit you to about a thousand feet. With high performance chutes you might get up to five seconds of free-fall. What kind of chute do you have?"

"I don't have one yet. But I can make one."

"How about making two?"

"You want to skydive, too?"

"Sure," Carl said.

"Hold it. You're not planning on parachuting from one of those balloons are you?" Belle demanded.

Tracy nodded. "I sure am."

"I thought you gave up parachuting when you were pregnant with Justin."

"I gave up sports parachuting, but I had to do some jumps with the army to maintain my jump qualification."

"Still, you had Terrie in early 2000. You wouldn't have been jumping when you were pregnant, so that makes it at least four years since you last jumped."

"It's like riding a bicycle, Belle. You don't forget the skills that quickly."

"But to do it for the first time with a homemade parachute . . ."

Tracy glared at her cousin. "You make it sound like I don't know how to make a parachute. I was a rigger with the regular army for four years and the National Guard for another four. I know how to sew a parachute. I didn't just pack them, I maintained them. All I need is enough of the right kind of fabric."

"Nobody's making any nylon."

"They might not be making nylon, but there's plenty of silk around, and silk is what they used before they had nylon."

"I don't know what Ted's going to say."

Tracy couldn't help the grin. "He'll probably want me to make one for him, Belle."

* * *

"A parachute? To jump off a balloon? You can't be serious?" Ted sounded upset, although Tracy couldn't imagine why.

She gave him her best glare. This was not the supportive response she'd been expecting. "I want to experience free-fall again and Carl said I can use one of his company's balloons,"

"But . . ."

"But?" Tracy waited for Ted to continue. He didn't, slumping into silence instead. "So it's agreed? I make some parachutes and we all jump from the balloons."

"We?" Ted asked.

"Sure. You, me, and Carl."

October 1634, Grantville

Ted stood at the door to the basement work room and watched his wife as she struggled with the clouds of fabric. She'd already prototyped a proof of concept scale model; now she was working on a full-size linen parachute. It would be as functional as a silk parachute, but weigh a lot more. However, it would have the benefit of being considerably cheaper. Tracy, even though she no longer had to count the pennies, didn't believe in being unnecessarily extravagant.

"I'll take Justin."

Ted turned and passed his sleeping son to Richelle, their adopted daughter. "Thanks. I'd better drag Tracy away from her machine or she'll be impossible tomorrow."

"Tracy, do you know what time it is?"

"What?" Tracy checked the clock. "That can't be right."

"Well it is. Come on, Justin and Terrie are going to forget what their mother looks like if you don't surface every now and again." Ted tugged gently at Tracy's arm, pulling her to her feet.

"Just another few minutes . . ."

"No. Shut everything down now. It'll still be there tomorrow."

"But I'm nearly finished," Tracy protested.

Ted smiled. The Tracy that had been missing since her thirtieth birthday was back with a vengeance.

Magdeburg



Tracy stood in the basket dangling below Romulus and looked down. Beside her, Ted was checking the rigging on the test dummy. "That's the signal. We're at the end of the cable. We can let Daedalus go. On the count of three. One, two, three."

The balloon jerked a little when the two-hundred pound test dummy and its fifty pound parachute left the basket. Tracy studied each second of Daedalus' descent. The static line pulled the ripcord of the parachute and the canopy streamed out as Daedalus fell. Then the parachute ballooned open. She felt an arm going around her waist and smiled up at her husband. "Who wants to go first?"

* * *

It had been a rhetorical question. No way was anybody going to jump with her parachute before she did. Right now Tracy was looking over the edge waiting for the signal from the ground. There it was. Four flashes. Damn. That meant they were under a thousand feet. She wouldn't even reach terminal velocity before she'd have to deploy the canopy. Could she afford to stretch the time out an extra second? Probably not.

She gave Ted a last hug before pulling on the skydiving goggles. Kelly Construction hadn't been prepared to cut a hole in one of their baskets so she let her husband help her climb onto the edge of the basket.

Tracy balanced precariously on the rim and held onto the lines with both hands. "There's the signal!"

"Jump," Ted called.

Tracy settled her feet on the wicker rim on the basket, leaned forward, and let go of the rigging, pushing away from the basket.

"One one-thousand."

She adopted the flared position which gave maximum stability while also offering the maximum amount of air resistance so as to drag out the experience as long as possible.

"Two one-thousand."

She knew she was taking a risk skydiving from only a thousand feet. With a static line jump from that

altitude she'd have plenty of time to act if the main canopy failed to deploy. But at nearly a hundred and eighty feet per second, if the canopy failed to deploy at five hundred feet, there wouldn't be time to clear her lines and deploy the reserve.

"Three one-thousand."

Damn. Her period of freefall was almost over. She really needed to get access to a plane so she could really experience freefall. But how could she do that? She reached for the ripcord.

"Four one-thousand."

Tracy pulled the ripcord. There was a crack as the canopy caught the air and deployed. Suddenly her entire weight was pressing against the parachute harness while her plunging body decelerated rapidly. She reached out for the control lines and started looking for a good place to land.

Ten seconds later she hauled back on the brakes and stepped onto the ground. She immediately turned and started to wind in her canopy before the wind could catch it, or the crowd of onlookers could damage it.

With the parachute a heavy bundle in her arms she looked up at the balloon. It had been fun, but she needed more. She wondered if Carl would let her go up again soon.

* * *

Jesse Wood had hot footed it to Magdeburg when he'd heard the rumor that someone intended jumping from one of the Kelly Construction balloons. He'd missed the earlier test using a dummy. Daedalus. When it came to Greek mythology most people could vaguely remember Icarus, the man who flew too close to the sun before falling to his death, but not many remembered that there had been two men in the sky that day, and while Icarus died, his father survived. Daedalus was a good name to associate with a parachute, it implied escape and survival.

A shape jumped from the balloon and fell towards the ground. The gathered crowd exclaimed in horror, thinking the parachute had failed, but Jesse had seen enough skydiving to recognize the parachutist knew up-time freefall parachuting.



Impossibly close to the ground the parachute started to deploy. Then, firmly under the control of the jumper, the parachute was steered into a cleared area where the jumper made a gentle touchdown.

Jesse had to find out more. He made his way towards the jumper. It was hard going as people were crowding the jumper even as he bundled his canopy. Eventually he was able to get close. "Here, let me give you a hand with that." Jesse lifted the bundled up canopy out of the parachutist's arms. "Jeez, what's this thing made out of?"

Tracy ripped off her jump helmet and goggles and wiped sweat from her face with the sleeve of her jumpsuit. "Thanks. It's a bit heavy isn't it? It's a light-weight linen, but even then it weighs nearly fifty pounds."

Jesse sighed. Fifty pounds for a parachute would severely impact the disposable war load on a Belle or Gustav. "Pity. I was kind of hoping that maybe we could get some for the Air Force."

"I can make them lighter. I only used the linen for this one because it was a prototype, and jumping from the balloon, there's no weight constraint to worry about. I should be able to make a simple escape canopy in silk under twenty pounds."

"Is that twenty pounds all up, or just for the canopy?"

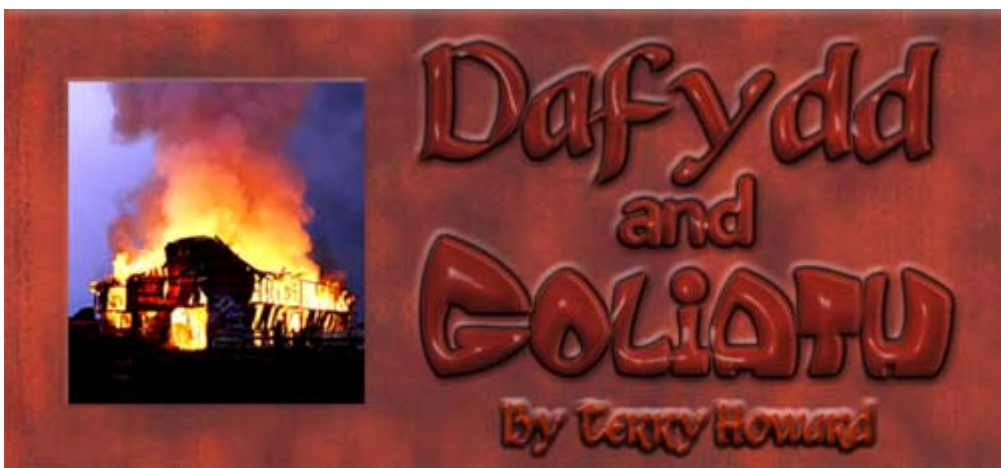
"All up. Pack, harness, canopy, the lot. Of course I'll need access to an aircraft to test it."

Jesse grinned. Lots of people wanted to go up in a plane. This woman was the first one he'd met lately who wanted to go up in one so she could jump out.

* * *

Dafydd and Goliath

Written by Terry Howard



North Anglesey Coast of Wales, August 1635



Squire Dafydd Jones sat at dinner wearing a new velvet jacket over a shirt of the finest linen. The silver on the table sparkled from having been polished and repolished. The finest of everything he had graced the table. His campaign to win the hand of the Lady Elizabeth, a swan whom he had known when she was still a duckling, in the face of rather stiff competition from Lord Sir Anthony Marshall was not going well. The English gentleman had the clear advantage of being frequently at court in London. Dafydd sensed this meeting would be his last chance to sway Elizabeth's father. So he pulled out the stops and spread an elaborate feast.

Over dinner, Elizabeth was friendly enough, but not really warm. Her father was polite, but Dafydd could see the man was wondering what advantage he gained by marrying his daughter to a country squire on the North Anglesey Coast of Wales. Dafydd stressed that Lady Elizabeth would have a comfortable life as his wife, on the strength of the lands he kept in sheep if nothing else. But he talked at length of reopening the flooded copper mine which had once been the backbone of his family's fortune. It was obvious to Dafydd that Lord Wycliffe was of the opinion there was no way to keep the mine dry without costing more to bail it than the copper was worth.

* * *

Actually, Lord Wycliffe was wishing Elizabeth would just state a preference. He would be content either way, as long as she was happy, but the lass told him it was for him to decide.

"Father," she'd said with a pleasant laugh when he had outright asked her, "that is a decision you will have to make. Surely you don't expect a young lady to have enough wisdom to decide something like that?"



The only reason to marry her to Jones would be to give her a quiet, peaceful life. If it weren't for the common fact that the Englishman was known for chasing skirts and had already fathered several spurious offspring, there really wouldn't be any discussion at all. There probably wasn't any reason, really, to discuss the matter further anyway. Still, Squire Jones had sent the invitation to dine and to view the project he was working on, which would allow him to reopen the mine. Lord Wycliffe admitted to a mild curiosity. The project was, of late, a frequent topic of conversation at many dinner tables. Jones was not the only mine owner with a water problem. If the mine could indeed start producing again, then perhaps there was something to discuss after all. So, the three of them sat at the table enjoying an excellent cut of beef and a surprisingly good wine.

* * *

First came the sound of the blast, then the shockwave, followed by falling debris, and finally shouts of "Fire!"

Dafydd threw his napkin onto his barely touched plate, and rushed to the door. The assembly shed was missing half its roof and the walls were engulfed in flame. He sprinted to join a bucket brigade dousing the flames with water being drawn from the trough near the well much faster than the trough could be refilled. When the water was gone, there was nothing to do but to stand and watch the shed burn.

George, the foreman, noted Dafydd dropping his, now ruined, new coat over the face of the man lying on the ground. He started walking toward the estate's young owner.

"George, how bad is it?"

"Well, Squire, you can see the building is a complete loss."

"Damn the building, man," Dafydd nearly shouted. The young squire rarely raised his voice. George's eyebrows went up. Calming himself, Dafydd asked, "How many people did we lose?"

"I think six, including Harold," George said. At the naming of Harold, Dafydd closed his eyes and bit his

lip. "The others, one was a new hire, four were mayflies."

A voice behind Dafydd asked, "Mayflies?"

George spoke past Dafydd to answer Lord Wycliffe's question. "Mayflies is what I call them, sir. People just hanging around getting in the way." The old foreman didn't have a lot of use for a man who would work for free.

"Be fair, George," Dafydd said. "they were just wanting to help." When word got out they were building a Grantville steam engine, the curious started turning up to see it. Some stayed to help and learn.

"Who was Harold?" Elizabeth asked.

"Harold, now, that's a real loss." George said. "He's the one who had been to Grantville. He and Dafydd used to be playmates now and then in their younger days. He came home with this scheme to put the mine back into production. Figured it was good for both families his and Dafydd's. Harold's father was the last mine manager. His brother runs a sheep station from the old mine site now. No, Harold was the real loss, Miss. Someone who has actually seen a working steam engine is not easily replaced."

"Damn," Dafydd's gaze turned to the nearly completed windmill water tower. "Damn," he said again.

Henry approached, hat in hand, limping badly and singed to the scalp on one side. Dafydd stared at the useless tower. "It wouldn't have helped, Squire. The boiler took every soul in the shed to heaven, along with the roof, when it blew." He shook his head. "It didn't need to happen. Thomas said the pressure relief valve would be ready tomorrow, but Harold did not want to wait. Well, we will have a relief valve waiting when we get everything else put back together."

"Is it worth it, Henry?" Dafydd asked. With Lord Wycliffe and Elizabeth standing right there taking it all in, his immediate reason for wanting the mine reopened was now surely lost.

"Squire, for Wales to have the first working steam engine in the Isles, before the damned English?" Henry started to put his hat on his head, but stopped with a wince. "For us to have the railroads, so the English are working for Welshmen instead of us working for them?" Harold's dreams, which he had shared freely with anyone who would listen, were of a grand scale. He had read widely while in Grantville; the almost complete loss of Welch identity in the Grantville histories had annoyed him greatly. Henry continued, "I know you want it to pump out the mine, but that's just the beginning. Yes, it is worth it."

"I've got all of Harold's drawings and notes. I don't know how many times the two of us went over them. He told me everything he knew. The blacksmiths have already done it once. The materials are all on hand. We will see what we can salvage tomorrow when the ashes have cooled. I'll have you a working steam engine within a month, Squire. And I won't be in such a hurry that I can't wait for a relief valve."

Dafydd turned to Elizabeth and her father. "Shall we get back to our dinner?"

Looking at the ruins, the older gentleman shook his head. Dafydd did not have to be told: Lord Wycliffe was of the opinion there was no realistic hope of reopening the mine. "No, young man. I think it would be better if we departed now, so you can get on with the business of cleaning up the disaster."

Considering how he had abandoned his guests to engage in hopeless, desperate, pointless labor, Dafydd was surprised at the mildness of Lord Wycliffe's reproof. "Let me see you to your carriage then," Dafydd

replied. The squire handed Elizabeth into the coach and watched it down the lane, around the hill, and out of sight, with a guilty sense of loss. How could losing the woman who infatuated him, no matter how lovely she was, even start to compare with the loss of six good men? Still, somehow, it was what was foremost in his mind.

* * *



Lord Wycliffe had a surprise waiting for him, once he and his daughter were alone in the carriage.

"Father," Elizabeth asked, "are you still wondering if I have a preference?"

"Well, I think it is settled now, isn't it? He has no hope of reopening the mine now, does he?"

"I don't care. If my preference matters to you, then I prefer to marry Dafydd."

Completely baffled, Lord Wycliffe stared at his daughter, and blurted, "Why?"

"When he asked the foreman what the losses were, the man started counting the cost. Dafydd was sharp with him. He wanted to know how many people they had lost. He is a good man with a kind heart. His children may never live in London, or be presented at court—but they will be loved and well cared for, not just well provided for. When he said, "Damn the building, how many men did we lose?" he reminded me of you. Dafydd cares for people. I think that will mean a lot to me in the years to come. No, Father, not just a lot, I think it will mean everything."

* * *

In the Army Now

Written by Gorg Huff and Paula Goodlett



David Bartley and Johan Kipper got off the train at Camp Saale and looked around. It wasn't the first time they had been here, but it was their first time as regular army instead of weekend warriors. The camp was mostly deserted since it was the middle of the week. The headquarters of the SoTF National Guard was neither in Grantville, nor the new state capital of Bamberg. It could have moved when the state capital did, but they wanted to keep access to the phones and other logistical support. At the same time, they couldn't afford the rent in Grantville or even next to the Ring of Fire so it was located on the far side of Saalfeld. Close enough to the Ring of Fire to have phone and rail access for the weekend warriors.

The national guardsmen could take the train to Camp Saale one weekend a month and drill. The phone service meant that at least a lot of them could be reached in a hurry if a call up were required. All very logical. Then there was the other reason. The distance from Bamberg to the nearest likely enemy was fifty-five miles to the border of Saxony. The base across the river from Saalfeld was all of seven and a quarter miles from that same border. A unit of cavalry leaving Krolpa in Saxony after breakfast would be at Camp Saale by mid-morning. If they waited on the infantry they would still be there before lunch. Of course, everyone knew fat drunken John George would never do that. The up-timer weapons were too powerful. Retribution would be all too certain. Besides, even if Saxony was John George's territory, that didn't mean everyone living there was on his side. If he acted out of desperation there would be warning.

David headed for the supply office with Johan right behind.

* * *

"Well, well, well." Major Walker's smile didn't reach his eyes. "If it isn't the seventeenth century's new financial *Wunderkind*. Welcome, Your Lordship. To what do we owe the honor of your presence?"

David Bartley didn't say a word. His research department had briefed him on Major Tandy Walker. Sort of a last favor. Instead of answering he reached for his orders.

"What's this? A letter from your mommy, perhaps? No. It wouldn't be from *your* mother. Who then?"

"My orders, sir," David managed to get out. His mother wasn't Velma Hardesty by any stretch of the imagination, but she did have a reputation. David's mother wasn't bright, and she hadn't coped all that well with the up-time world. Less because it was complicated than because it lacked some of the personal support that had become available to her in seventeenth-century Germany. She needed an extensive support structure. Major Walker wasn't the first to use that to attack David. And it always hurt because there was some truth in it. But it had been mostly at school; the adults he had worked with had,

for the most part, been more subtle. But then a large part of Major Walker's trouble was lack of subtlety. Major Walker glanced at David's orders but spent considerably more time looking David up and down.



David was wearing a tailored uniform. Officers were expected to buy their own uniforms and, of necessity, there was considerable variation. David didn't think of himself as a clotheshorse. But he did—according to Johan Kipper his aide and Karl Schmidt his stepfather and the SoTF senator from Badenbug, who was considering a run for the USE legislature—have appearances to maintain. Silver-electroplated lieutenant's bars shined on his epaulets and the flaming wheel of supply next to them. His pants were dark blue with a red stripe up the side; his jacket lighter blue with rather more gold trim than David would have preferred. The major's uniform, on the other hand, was a pair of blue jeans that had seen better days and a striped up-time blue dress shirt that was in even worse repair. The jacket was apparently down-time made but the dye job hadn't worked as well as it should have. It was faded in ways that weren't camouflage but were a bit reminiscent of it.

Tandy Walker was the younger son of Coleman Walker, the Fed chair of the USE. But that had earned him no benefits. Coleman—and Tandy, for that matter—avoided even the appearance of nepotism like the plague. In fact, his father being the Fed chair had hurt Tandy because people expected him to be someone that they could use to get to the Fed. Which Major Walker took as a personal insult. That, along with a naturally abrasive personality, was why Major Tandy Walker was back in Grantville rather than on Frank Jackson's staff. David wondered what Coleman had told the major about him. From the report David had gotten, Coleman, who received quite a good salary as Fed Chair, didn't help his sons out financially. The report didn't say why, so it was entirely possible that Coleman hadn't said a thing about David to his son. If he had, it probably hadn't been complementary. David and Coleman didn't get along. In any case, it was quite possible that the uniform Major Walker was wearing was all he could afford. Majors were paid well by seventeenth century standards but Major Walker had a wife and three kids and in spite of the changes clothing was still expensive as all get out, compared to what it was up-time.

While all this was running through David's mind, Major Walker had apparently been trying to intimidate David with his officers' stare. David hadn't noticed. The interview went downhill from there.

* * *

"That went well," Johan Kipper said, once they had left Walker's office.

David gave his friend and aide a sardonic look. "You think so?"

"First day on the job you pissed off your new boss so much that he can't see straight." Johan gave him the look right back. "Couldn't be better."

David snorted. He was pretty sure that there wasn't a whole lot that he could have done that wouldn't

have pissed off Major Walker. Walker—like quite a number of the up-timers who hadn't had the get up and go to get rich themselves—saw David as just one more corrupt jackass. He undoubtedly figured that David was protected by his wealth from any consequences and planning to use his position in supply to make himself and his cronies rich. "So, is the uniform situation as bad as I think it is?"

"Probably," Johan said. "It seems we can't get away from the clothing trades." Walker had given David a budget and a job. However, the budget wouldn't cover the job. Which wasn't Major Walker's fault. The uniform situation had actually been better a year or so ago. The process of turning raw materials into clothing was full of bottlenecks. When an up-timer tech opened one bottleneck, there would be a sudden drop in price causing a rush to buy. Which would be followed by a rise in price. The price of clothing in central Germany was, to put it mildly, erratic. At this point the main bottleneck was producing the raw wool, flax and so on. And that one wasn't going to go away till they grew more sheep or developed large-scale synthetic-fabric production.

"Hemp, I think," David said.

Johan gave him a look. "Sail cloth?"

"Not quite, but close." David said. "It must have been two years ago that Pete Strauss came to OPM with the plans for the hemp processor." The hemp processor had come from *Mother Earth News*, *Natural Living*, or one of those hippie magazines. David couldn't remember. Basically a bunch of gears and cams that twisted and pounded the heck out of the hemp plant. Put the hemp in one end, turn the crank, and out comes hemp fiber ready for carding and spinning on the other. If David recalled correctly the hemp had to be left out to rot a bit before going through the machine. Pete had wanted it to make sails cheaper. Which it had, and in so doing, increased the hemp planting from central Germany to Siberia. Which left hemp as the cheapest of the major materials that might be used to make uniforms. "A few months ago he started experimenting with varying the mix. Hemp and wool, hemp and linen." Cotton was more expensive and harder to get than silk and the limited quantity of rayon that was being produced was still more expensive even than cotton. At this point it was effectively restricted to experimental and limited industrial use. "He says he's been getting good results. Insists that the new blends wear well and get more comfortable with use."

"It's still going to be expensive."



"Yes and no. Pete is trying to break into the linen market. Right now hemp is thought of as poor people's clothes. Something worn by people who can't afford to wear anything else or, as you mentioned, sail cloth. He doesn't need the sales that we would represent but he does need some good press. So if we can make sharp-looking uniforms to display his cloth, we might get a bargain." David paused. His secretary had stayed with OPM to spy on the new CEO. "I'll contact Herr Strauss later. For now we

probably need to meet the staff we have assigned to us."

Johan winced. Walker had made it quite clear the staff he was giving David was the worst he could find, the smallest he could manage and, with one exception, part time. He had justified that using Johan as an example. Johan was one of the many outright defeats that the up-time military tradition had met with in dealing with the down-time armies. Johan was not being paid by the army and for the most part he didn't report to the army. He was David's *Putzer*, or batman, hired by David and reporting only to David. Officers in the USE Army could hire their own subordinates if they had the means, or use those assigned. David was in a position to hire his own staff and Walker expected him to do so. If David insisted on using Army personnel, he was going to get the worst of the lot.

* * *

Sergeant Beckman looked around his little kingdom and dithered. He didn't know whether to be thrilled or seek a transfer. Supply clerk had been a really good job in the USE Army, especially for the SoTF National Guard. Formerly a mercenary with Gustav Adolph's forces in Thuringia, though not Mackay's bunch, he had gotten the job because he spoke English and because no one else wanted him. Which put something of a damper on the transfer idea.

He looked at a set of shelves covered with hundreds of mess kits. Unfortunately, several hundred less than there were supposed to be. David Bartley was supposed to be a sharp one. On the other hand, he was an up-timer and—in Franz Beckman's opinion—the up-timers were rarely sharp on their own. Beckman had been careful; the supplies he had sold off weren't really needed. The troops came out to drill in groups and turned their equipment in when they were done. Most of the mess kits and other gear wouldn't be needed unless everyone showed up at once. *A cursory inspection wouldn't show anything wrong*, Sergeant Beckman reassured himself as the door opened.

Through the door walked a tall thin young man with dark brown hair and blue eyes. Fastidiously dressed in a uniform that probably cost as much as Beckman made in a year, not including gleanings. But disaster followed him into the room. Shorter, with an oft-broken nose, older, but dressed in a uniform almost as fancy, came Johan Kipper. Beckman had never actually met Herr Kipper but he had heard about him. And what he had heard had reassured him. Johan Kipper had gotten rich off the up-timers, parlaying a guard job into a seat on the board of OPM. Rumor had it that he owned a farming village a few miles north of Jena on the railroad. He was married to an up-timer. All of which had convinced Beckman that there was no way he would follow Bartley into the army. Right up until Kipper followed Bartley through the door.

* * *

"Time to call the cops?" Johan asked. The cursory inventory had yielded the expected results. Beckman was in fact a supply sergeant, i.e. a thief. The surprising thing was that he was a fairly competent thief. His books were good—both sets. Given a few more months or, more likely, a few years, he could have justified his thefts as breakage.

"Not just yet," David said. "Sergeant Beckman strikes me as a saving sort of fellow. Not the type to blow his ill-gotten gains on wild women and drink."

Johan looked over at the sweating sergeant. "Could be. Not that it matters. After he's arrested, they will seize his assets."

Now it was David's turn to examine the sergeant and take careful note of the almost hopeful tension in

his manner. "Tell me, Sergeant Beckman, do you invest in the stock market? Yes, I can see that you do. You know, Sergeant, they keep quite good records of stock transactions, with computers. Brokers record who they were buying stock from and for. It's not nearly as good a place to hide money as most people seem to think . . ." Which wasn't true. In fact, with the degree of sloppiness that had crept into the wild and woolly stock market. it was an excellent way to hide money if you knew how. However, most people including, David suspected, Sergeant Beckman didn't know how. And so it proved. It took a bit more discussion to make the sergeant's options clear.

Option one: be arrested and have everything he had stolen and any profit he had made using the stolen money seized. Then spend some years on a work farm.

Option two: come clean with David, make good the missing gear in the form of cash and stocks of equivalent value and a fine to go into company funds. Accept company punishment. The loss of a stripe.

Sergeant Beckman chose option two. David bought quite a bit of stock that day for one dollar and other valuable considerations. Part of those other valuable considerations was keeping Beckman from going to jail, another part would be David paying for the missing supplies out of his own pocket. The rest of the money would go toward the uniforms that the TFMD reserves would need.

* * *

David sat in his apartment in the Higgins Hotel trying to work out who his next call should be to. After he had determined that simply buying uniforms was going to be prohibitively expensive, he had called his step-father to arrange for the loan of a dozen or so Higgins sewing machines. Johan, with the help of some people he had hired, was still going through the Supply Depot, so that was well in hand. David's next call should either be to Ron Stone or to Pete Strauss. He pretty much knew how to handle Pete, but Ron was another matter. Ron was less a businessman than an industrialist. At least that was David's impression. Lothlorien was closely held with the stock distributed between the family and the employees with darn little of it appearing on the Grantville Exchange. After thinking about it for a bit, David decided to call Chad Jenkins. Chad was a businessman and a good one even if he was playing politics these days. He might have some insights into how to handle Ron Stone.

Which left the questions of design, labor and a facility. Well, labor and a facility. Karl had pretty much insisted that they use Bruno Schroeder to design the uniforms. Which David agreed to assuming that he would work cheap and wouldn't go overboard. These were to be work uniforms after all, not dress uniforms.

A week later

"Well, Lieutenant, have you finished your inventory?" Major Walker had not been pleased when David had informed him that he intended to do a complete inventory before taking responsibility for the supply situation.

"Yes, sir. I did find certain minor discrepancies. However, Sergeant Beckman has agreed to company punishment in the matter. So, with your permission, I will go ahead and accept responsibility and pay for reordering the missing supplies out of my own pocket." David handed the major a form.

David waited as Major Walker examined first him and then the form. It already had Beckman's signature agreeing to accept the demotion to corporal without appealing to a court martial. The thing that Major Walker had to be considering was that until David signed his own form it was Major Walker who was on

the hook for whatever minor discrepancies David had found. When Major Walker signed the form, David handed him a check and a stack of requisitions, plus the form making David responsible for the supplies.

Major Walker went a bit pale when he saw the size of the check. Then . . . "Why is it only a single stripe rather than a couple of years on a work farm?"

David hesitated, and Major Walker continued. "From the size of the check, you're spending a lot of money to keep a thief out of jail. Not that it's a drop in the bucket to you, but it's still a lot of money." Major Walker leaned back in his chair and waved David to another. "I'm not going to override you this time because you're the one who caught him. But why?"



David didn't point out that it wasn't his money. It was money that he had, call the thing what it was, extorted from Beckman. Partly because . . . well, it wouldn't have caused him to go broke or anything, but it was considerably more than a drop in the bucket. At least David's bucket. The fact of the matter was that David wasn't nearly as rich as most people thought. David was rich all right. Rich enough that he could retire and live comfortably for the rest of his life on the dividends from his investments. But there's rich . . . and then there's rich. He wasn't in the class of the Stone family, the Lichtensteins, or any number of others. He had made billions of dollars over the last couple of years, but that money had been made for tens of thousands of investors in OPM. It wasn't his money to do with as he pleased. That was why he had sometimes been such a hardass about it. He had been paid well for making that money and he had invested that pay. But he wasn't field-your-own-army rich.

"We're going to need him," was what David could come up with and it had the advantage of being true. The most difficult thing about leaving OPM was the loss of his staff. Secretaries, researchers working at the State Library, and clerks, with accountants, lawyers and engineers on retainer. All available with a phone call. All ready to provide him with the information needed to make the decisions that his job had called him to make. When he had left OPM, only Johan had come with him.

"What are you going to need a thief for?"

"To get the supplies we are going to need if we ever get called to action. Most of the stuff that went missing didn't go onto the civilian market. It went to other units. He got other stuff in exchange and it was

that other stuff he sold. The network of supply sergeants is alive and well and Corporal Beckman is tied into that network."

"You think we will be called up?"

"Yes, sir, I do."

"Why?" Major Walker asked. "Go on, Lieutenant Bartley. Thrill me with your military acumen."

"Because we're tempting target, sir," David said. "We're only a few miles away from Saxony and those few miles are on a good road that runs through an open valley. The closer it gets to time for the ax to fall, the more desperate John George is going to get. It's going to be tempting as hell to do something to back the headsman off for even a few days. Hit the soft underbelly of the USE, the production facilities that provide the arms equipment for Gustav's army, and make him pull back to defend them."

"It would never work. Perhaps in a long war, but Saxony will be gone long before any loss in production would reach the troops."

"I didn't say it was a good target, sir . . . or a smart target. Just a tempting one. John George doesn't have any good targets. Nothing that will stop Gustav in his tracks. Nothing that will even slow him down much. John George is dead meat and he knows it, or ought to. It was over when the League of Ostend collapsed. What he ought to be doing is heading into exile right about now. But if he can't bring himself to admit he's lost, hitting us here is going to look like a way of distracting Captain General Gars from his invasion plans.

"Here along the Saale River, where it's too shallow for Admiral Simpson's river boats, where he can stop the trains by tearing up the tracks. Where he can take rich hostages, loot and destroy factories without getting too close to the real army. I don't think it will work, sir. I'm just a bit worried about how many millions of dollars will be lost and how many people will be killed while John George finds out that it won't work."

"Never happen!" the major said. "Now about those uniforms?"

David gave up. He had talked about it to others and they mostly agreed with the major. It wouldn't work. But David couldn't help remembering some of the desperate things that people had done to keep control of businesses that were going under.

"I can't buy them at a reasonable cost, sir," David told him. "So I am forming a company to make them. Using ex-soldiers and camp followers. There are a lot of the deactivated units that the Captain General has released running around." David didn't mention that the employees of his new company were mostly from the same mercenary unit. Nor that part of the deal for hiring them was that they join the SoTF National Guard. It let them stay together as a unit and stay in the USE and it let them keep their hand in. It also gave them a home, especially since David had essentially bought the village of Gorndorf.

No, David couldn't afford to field his own army or even a company. Not directly.

* * *

~~The End~~

Just Getting Started

SERIALS:

Hallelujah, Part Two

Written by David Carrico



November 1634

" Thus saith the Lord . . . "

"Stop." Andrea Abati closed his eyes. When he opened them again, Dietrich Fischer was still looking at him with that same placid but confused expression he'd been wearing all evening. Andrea scrubbed his hands over his face, then took a deep breath.

"Dietrich, you are not singing a ballad to a girl you want to romance." Dietrich nodded, just as he had in every conversation they'd already had this evening. "You are the prophet of God here. You are the voice of Haggai. You need to sound like that prophet, not like some love-sick swain mooning after a bit of skirt." Dietrich's expression moved toward a frown—or at least as much of one as Andrea had ever seen on his face.

The voice master was beginning to wonder if all the world was playing a practical joke on him. Here, finally, he had found a voice that could sing part of his beloved *Otello*, and the man could not take direction! It was enough to send him to a monastery—well, maybe not that bad, but still . . .

A thought occurred to him.

"Dietrich, have you ever known a stern old priest or pastor with a big voice?"

The confused expression was back, but Dietrich nodded. "We lived in Rostock until I was fourteen. Pastor Johannes Quistorp was like that."

"Did he ever give you a fiery scolding?"

"No."

Andrea wanted to scream.

"Did you ever see him scold some like that?"

A smile dawned on the big man's face, and he nodded. "My uncle." It was apparent he remembered the event well.

"I want you to sing like that scolding, with that kind of scorn and fire. Can you do that for me?" Dietrich's eyes lit up; he nodded with fervor. "Good. Hermann, if you please."

Andrea closed his eyes and leaned back against the wall as the harpsichord sounded the introductory measure, waiting for Dietrich's entrance.

*" Thus saith the Lord,
The Lord of Hosts:
Yet once a little while,
And I will shake . . ."*

The voice master's eyes snapped open at the first note. It was rich. It was resonant. It dripped fire and sternness. It was not the least bit romantic. Andrea listened as Dietrich completed the recitative, almost spitting out the words and taking the moving lines at a run.

" . . . saith the Lord of Hosts."

Dietrich's final phrase was stately, proud, and forceful enough that Andrea almost thought he was hearing one of those old prophets. Whoever that old pastor was must be a veritable Elijah, that the thought of him inspired Dietrich to this level. Andrea muttered a quick thank you prayer to God for that man.

"Good, Dietrich. That is the sound we want." Dietrich's smile was back. "Now, let us make it perfect."

* * *

Despite the cold weather outside, Marla was sweating by the time the evening's rehearsal was over. Part II of *Messiah* was the longest of the three parts, containing twenty-three sections to part I's twenty-one and Part III's nine.

The first half of Part II was definitely not happy music. And it didn't help that five of Part II's eleven chorus sections occurred in the first seven sections of Part II. By the end of the first two, "Behold the Lamb of God" and "Surely He Hath Borne Our Grievs", Marla's arm felt almost numb from the effort of dragging the singers along. They kept making the basic mistake of allowing the slow sad sections to droop in tempo.

Fortunately, the third and fourth chorus sections, "And With His Stripes We Are Healed" and "All We Like Sheep Have Gone Astray", were somewhat livelier. The choir did much better with those; enough so that by the end of the rehearsal Marla's mood had improved and her arm felt better. They still needed work, obviously, but a good start had been made tonight.

She dropped her hands from the final cutoff, allowing the chorus to relax.

"Okay, folks, that's it for the night. Look at your music before next rehearsal. Especially the ones we looked at tonight, the ones that seem so slow. We have to do better than we did tonight. We start practicing with the orchestra in a little over three weeks. You have to know your parts by then—all of

your parts." She waved at them. "Go home."

Franz came up and set his hands to rubbing her shoulders. She started to melt.

"You are tight tonight."

Marla looked back at him. "What did you expect? You heard them. It was all I could do to keep them within eyesight of the correct tempo for 'Behold the Lamb of God,' and 'Surely He Hath Borne Our Griefs' was even worse." She sighed, and leaned back into his arms.

"Do not be so hard, Marla. They do well." She snorted—a ladylike snort, but it was definitely a snort. "'Tis true. At least you've not had to fire any of them."

"True." The thought of what Franz had had to go through with Herwin Vogler made her pause for a moment. It was true; the chorus rehearsals had not had anyone as recalcitrant as the violist that Franz had finally discharged from the orchestra not long before the big concert last July.

Marla's mood mellowed more as the last of the knots were worked out of her neck and shoulders. She turned back to her husband, who brushed sweat-soaked tendrils of hair back behind her ears. "The revolution progresses," he said.

"Yep. But meanwhile, I'm tired. Take me home."

"As you command, my dear."

God Above, she loved that man.

* * *

Marla answered the knock. She opened the door to reveal a young man carrying a bundle. His family resemblance to Patroclus Zopff was so strong that this must be the storied younger brother Telemachus. Franz stepped up behind her and set a hand on her shoulder as she said, "Yes?"

"Herr Sylwester? Frau Linder?"

"Yes?" This time from Franz.

"I have . . . you must . . . my brother . . ."

Marla bit her lip to keep from giggling as the young man, obviously flustered, closed his eyes and took a deep breath. He squared his shoulders, opened his eyes and started again.

"My name is Telemachus Zopff. I am come from my brother Patroclus Zopff."

Marla had to suppress another giggle as Telemachus rattled that small speech off and released a small puff of breath at the end.

"Come in, then," Franz replied. They stepped out of the doorway to allow the young printer to maneuver his bundle into the house. Marla cleared a space on the table that was serving as a desk. A moment later, Telemachus was unwrapping the bundle.

The first thing the printer held up was a familiar lavender book. "Patroclus says to say that we have completed the setting of the treatise." He handed Marla the book with a flourish. "And here is the final set of proof pages." Telemachus laid his hand on the stack of paper tied with twine.

"Good!" Marla resisted the itch to immediately untie the proof stack and get to work. It would be a bit rude, after all. She smiled at Telemachus, and was rewarded by a shy smile in return.

"Will you take some ale, Herr Telemachus?" The young man nodded vigorously in response to Franz's question. While Franz stepped out of the room to fetch the ale, Marla gestured to the nearby seats, and gathered her skirts to sit. Telemachus followed suit just as Franz reappeared with two mugs of ale for themselves and one of water for Marla. She accepted it with thanks. She still hadn't developed a taste for beer or ale. She probably never would.

"So, what other word do you have from Herr Patroclus?" Marla watched as Telemachus hurriedly swallowed the mouthful of ale he had just taken in, choking a moment or two before the ale decided to descend by its proper passage.

"He also said to say that he has ordered one of the Vignelli duplicating machines." Telemachus' smile flashed again. "Speaking for myself, I am glad he has done so. I think we can make good use of its speed to do broadsheets and pamphlets. And I thank you for mentioning Frau Haygood to my brother, because she it was who convinced him that we should buy it." The smile soured somewhat. "Of course, he says nothing of my suggesting months ago that we should get one."

"Hmm." Franz cradled his mug in his hands. "A not uncommon problem. Scripture says something about a prophet not being honored by his own."

"For a prophet is not without honor save in his own country.' Matthew chapter 13 verse 57," Telemachus responded. He grinned at their surprise. "It is a favorite verse of the Committees of Correspondence. Not that we . . . they . . . at all compare themselves to Jesus, but we . . . they . . . have a message of truth for our people that seems to be facing similar rejections."

"So you know something of the committees?" Franz asked. Marla had an idea that Telemachus knew rather more of the CoC than his brother suspected, or would approve of.

"I spend time with them," Telemachus said with a defensive air. "I hold to their beliefs, even if Father and Patroclus do not agree. I help at the Freedom Arches when I have some time of my own, which isn't often."

"Why do you support the committees, in the face of your family's disapproval?"

"Because of my family," the young man replied. "Not because I reject them, but because of our history." Marla felt her eyebrows go up, but she said nothing. After a moment, Telemachus continued.

"You know, of course—you must know—my father ensures that everyone knows—that the Zopffs were once the favored printers and publishers of the Elector of Brandenburg." Marla nodded, echoed by Franz. "But do you know why we are no longer in Berlin? Did Father or Patroclus tell you that part of the story?" Telemachus snorted. "Of course not. They never speak of that, to spare the family some form of embarrassment or shame. As if it matters now, twenty years later and across half the Germanies." A large amount of ale was drained from his mug.

Marla waited. She'd been curious for some time as to why the Zopffs were no longer in Berlin.

The story had simple bones, to hear Telemachus tell it. The Elector of Brandenburg was Lutheran prior to 1613. Conrad Zopff, being desirous of pleasing the Elector, made it plain that he and his house were Lutheran as well. He was so much a Lutheran that he would seek out books and pamphlets to print that would assail both popish beliefs and what he would label the 'misguided Calvinists'.

That changed in 1613. The Elector became a Calvinist. Unfortunately, it had not come to the Zopff family's attention that this change was in the wind. Literally two days before that change was announced, Conrad published a particularly harsh, critical and venomous anti-Calvinist pamphlet. Almost overnight the patronage melted away.

"This was before my birth," Telemachus fumed, "but I've overheard enough late night conversations between my father and Patroclus to know the family tried to keep going for two years, hoping that the passage of time would soothe feelings. But the old Elector had a long memory. They were finally forced to leave Berlin before the last of their silver melted away."

Telemachus brooded for a long moment.

"I was born in Erfurt. Countess Anna Sofie Fürstin von Anhalt-Zerbst und Dessau, the wife of Count Karl Günther von Schwarzburg-Rudolstadt, heard of our troubles and extended an invitation to my father and grandfather to settle in their lands. We stayed there until the rebuilding of Magdeburg began.

"All the time I was growing up, I heard how the Elector's rejection crushed my grandfather's spirit, how we had come down so far in the world. And even as a lad it made me angry that our lives had been almost ruined because of one man's whim about which church he wished to believe in. I despise the Hohenzollerns, root and branch." The angry glint in Telemachus' eyes was almost enough to be a fire.

"So I work with the committees at every opportunity. Someday that will be my lifework, to help change the world so that such things don't happen again."

* * *

*". . . Los peces en el rio
Pero mira como beben
Por ver al dios nacido
Beben y beben
Y vuelven a beber
Los peces en el rio
Por ver al dios nacer."*

Marla held the last note out, listening to hear if the girls wavered in tone, but they held true. Finally she had mercy on them and cut off the note. There was a melodramatic "Uhhhh" of inhaled air from the front row. "Knock it off, girls." She didn't even look up from her music as she spoke.

There were giggles scattered around the choir. Marla's mouth curved a little as she remembered her junior high days. It still amazed her sometimes that some of the things she'd done in choir hadn't gotten her in serious trouble. Like the time she and Becky . . . well, that didn't bear thinking about.

"Okay, ladies, that was good." Eyes brightened around the room and everyone stood up straighter. The girls had learned that whenever Marla called them "ladies", she was pleased. "The French song next." That drew groans. French wasn't as easy as Spanish or Italian or Latin, and the girls always hoped Marla would overlook that song during choir rehearsal. She never did. You'd think they would have learned.

Marla looked up and raised her hands. The girls snapped to, all eyes on her. Marla hummed a pitch; the girls hummed it back to her. She gave them three small beats, and they began.

*"Un flambeau, Jeannette, Isabelle,
Un flambeau, courons au berceau
C'est Jésus, bonnes gens du hameau,
Le Christ est né, Marie appelle,
Ah! ah! que la mère est belle,
Ah! ah! ah! que l'Enfant est beau! . . ."*

* * *

Franz set his baton down carefully before looking around at the orchestra. Silence grew as he stared at them, moving from section to section, saying nothing. Bit by bit the smiles of the musicians faded away. At length he spoke.

"Gentlemen, that was almost pathetic." There was iron in his voice. No one would now meet his gaze. "We played this section, this Pastoral Symphony from *Messiah*, in our concert only four months ago. And we played it well. That is why I left it until now to rehearse again, thinking that you would have retained that work. But now, now we sound like . . . like . . ." Words failed him, and he looked down.

The breathing of over forty men was muted. Someone coughed, sounding like an explosion in the silence.

Franz looked up again, to find every eye now on him. "You are better than this." His voice was quiet but was heard by every ear in the room. "You know that. I know that. Do not shame the name of Master Händel like this." He closed his score.

"I will not accept your complacency. Decide tonight what you will do." Franz gathered his jacket, score and baton, then walked the length of the room to the door.

* * *

Matthaüs Amsel stood and watched as Franz left. The others gathered around him. They all looked at each other as the door closed—all but Matthaüs, who continued to stare at the door.

"Will . . . will he tell Master Heinrich?" That was his youngest brother Johan, Matthaüs knew. There was muttering among the others.

"No." The lead violinist did not turn around. "He will do no such thing. He would not think of it, unless we drive him to it." Now he turned, and everyone, even his brothers, stepped back. "And that we will not do. We will *not* fail Master Franz."

It was the first time that any of them had called the young conductor "Master." All of them noted it; none of them objected.

"I told you," Matthaüs looked around the group, "I told you what he said of Master Abati's words at the choir rehearsal, about the call to greatness. That man . . ." Matthaüs pointed to the closed door. ". . . that man has the vision to lead us, to mold us, to make us more than we ever dreamed of being . . . to lead us in making the greatest music that our world, our history, has ever known. And if we will not commit to greatness, he will leave us and find those who will."

There was no sound. Everyone but Matthaüs was staring at the floor, clutching instruments and bows in white-knuckled hands.

"This will not happen again." The lead violinist's voice was weighted. The others felt the words as much as heard them. "We will not do this again. Before God, gentlemen, we will never again come to a rehearsal unprepared, or unready to offer less than our very best." There were mutters of agreement. His voice grew colder. "Mark me well, gentlemen. You will answer to me if you do. This will *not* happen again."

The agreements were louder this time. Matthaüs looked around. Everyone caught his eye and nodded.

"Good. Now, there is daylight left. Learn your parts anew."

Simon Bracegirdle stepped to his side as the others took to their chairs and began practicing with fever, fervor and focus. The two of them turned away from the seats and took a few steps towards the door.

"I do not know about them," Simon nodded back toward the others, "but you have convinced me of your intent."

"Good." Matthaüs snorted.

There was a moment of silence between them, then he saw the Englishman look to him with a sideways glance. "His gaze marked you as well, then?"

"Oh, aye." Sigh. "Not simply marked, but pierced to the innermost. I almost felt the very Judas in that moment, Simon, almost as if I had betrayed him by being less than the music required. I would rather he had screamed and thrown things." Matthaüs' right hand fisted into the palm of his left, again, and once more. "I will not abide that look from him again. And if that means I must belabor you and our fellows, then so be it." He smiled slightly, but the look he turned on his friend had more than a touch of steel to it.

Simon tugged on his forelock in a display of false servility. "Yes, sir, absolutely, sir, without delay, sir."

That sparked a brief laugh in the lead violinist as they turned back to pick up their own instruments and add to the general cacophony within the room.

* * *

Marla listened as the girls sang the old carol. No way around it, "O Come, O Come, Emmanuel" just sounded more impressive in Latin than in English—but then, it was originally a Gregorian chant, so it should. The girls were doing a good job, even the ones who a couple of months ago couldn't pitch match for anything.

Ingram had really come through for her when he'd found the two pieces of semi-circular 3 inch PVC pipe. Putting one end by the singer's ear and the other by her mouth really helped each girl to hear what she was singing and how it was different from the others. They would never be world-class singers, but at least they were able to blend in now. The girls thought it was due to some miracle of the plastic. Marla didn't disabuse them of the notion, but she knew that a length of hose or even a similar construct of wood would have done just as well.

The poor monotone, Frieda—such a pleasant child—alas, was still a monotone. Her speaking voice was a little unusual in sound, as well, so Marla wondered if she was a child who had often suffered from ear infections. She'd heard from Aunt Susan that the medical staff had already noted how prevalent some degree of hearing loss was among the down-timers because of the childhood illnesses that were suffered without antibiotics.

It was fortunate that Frieda's voice was soft and didn't carry beyond an arm's length. Stationed in the center of the choir, with strong voices surrounding her, she was not noticeable.

They finished the song and Marla cut them off with a circular motion of her hand. "Very good, ladies." She almost laughed as the girls preened a little. Such vain creatures they were, but so much fun.

"Gerde, pass out the new song." As the mimeographed sheets were being passed amidst murmurs and the rustle of pages, Marla continued. "This one's in Italian. Most of you have had enough Italian or Spanish to have a good guess at how the words should sound. We'll go through it once to get a feel for it, then we'll start working notes and words. Ready?"

The girls nodded, caught the pitch that Marla hummed to them and hummed it back. She gave them the preparatory beats, and they began.

*"Tu scendi dalle stelle
O Re del Cielo
E vieni in una grotta
Al freddo al gelo
E vieni in una grotta
Al freddo al gelo . . ."*

* * *

The Green Horse was in full form tonight, Isaac decided as the noise poured out through the doorway. He stepped around a man who was leaving, made his way to the bar and ordered ale.

"It is good to see you tonight, Herr Fremdling." The tavern owner set the mug on the bar. "I miss you and your friends playing."

Isaac looked around the crowded room, and laughed. "It does not look as if you miss us much."

"Oh, aye, I've the custom," the other man shrugged. "But I miss the music. Especially the Irish songs. Frau Marla could make a stone weep or a cripple dance."

"Aye, that she can. But, as the Grantvillers say, she and the others are up to their eyebrows in other work. I would not expect to see her much before January, my friend. But I will remind them of our

promise to play here. They will come."

The tavern owner was called to another customer. Mug in hand, Isaac turned to face the room. He hadn't expected to see anyone he knew, but standing there across the room was Lucas Amsel, waving at him. Isaac waved back and made his way across the room to the table, where he found Lucas fulfilling his role as Master Schütz's attendant, accompanied with his three brothers and a man he did not recognize.

"Isaac," Master Schütz said in his rich and resonant voice. "Be welcome. Do you know Herr Patroclus Zopff?"

From the ink on his hands, this must be one of the family of printers. Isaac knew of their connection with Marla's projects, which explained why the man was known to the master musician.

"I have not had the pleasure, master." The next few moments were spent in introductions. Lucas and Johann Amsel squeezed together even more to make room on their bench for Isaac.

"So, young Isaac, how goes it with you this season?" Master Schütz focused his interest on Isaac.

"Well enough, sir. I participate in the orchestra rehearsals that do not involve *Messiah*." Master Schütz, of course, had heard of Isaac's decision. "I play at weddings and parties and teach violin to students, one or two of which may become passable players if they exert themselves even a little."

"Ha! That is always the problem, is it not—the exertion. As others have discovered recently." Master Schütz directed a sidelong glance to the other players at the table. Isaac was surprised to see Johann blush and Marcus and even Matthäus look somewhat discomfited. He looked to them with expectation. "Go on. Tell him."

"We, ah . . . the orchestra grew lazy, and came to rehearsal a few days ago with most of us unready to play the selection scheduled for work."

Isaac whistled. "Oh my . . ." He almost choked to avoid saying the name of the Most High. "Not a good idea, my friends."

"So we discovered." Matthäus looked down at his mug. "I have not felt so flayed in years."

"But he was so quiet," Johann spoke up, himself barely audible in the noise of the common room. "He did not rant, he did not shout, he was not mean at all. Yet I felt so horrible after he left."

"There are those who can do that," Schütz chuckled. "You would not think it of him, but it is the quiet ones who will most surprise you. And it is their criticisms that hurt the most . . . especially when they are well-deserved."

"Truth," Isaac said. "He stands in Frau Marla's shadow so much, it is often surprising to know just what our Franz is capable of. You see her, you overlook him." Heads nodded around the table. "Yet consider this . . . for all that Frau Marla may be strong-willed, resolute and . . . intense, shall we say . . . for all of that, Franz is her equal. Our friend Rudolf once said that her spine is fashioned of sword steel. I tell you that Franz is as strong, if quieter."

"They are so alike in so many ways, not least of which is their passion for the music; they will tell you the truth as they know it, no matter the cost to themselves; and what they say, they will do."

"That is comforting to hear." Patroclus waved at a passing barmaid and handed her his mug. "For I tell you that I have wagered the future of my family on what they say."

"The printing for the Leipzig book fair?" Master Schütz questioned.

"Aye, but even more than that, the tying of our business so closely to them. We turned down work to complete the music printing projects. I fear we may have lost customers. The trip to the Leipzig fair will drain most of our funds. If things do not go well, we may be forced out of business."

"Fear not. They have, if anything, understated the impact of this music and the treatise. Your fortune will be made from these, and the other things they will bring you to print."

The refilled mug appeared on the table. Patroclus lifted it, looking at Schütz over the rim as he took a long pull. He seemed to find reassurance in the lined face of the old musician.

"Truth," Isaac repeated. "Just as Grantville cannot be ignored in the areas of the mechanical arts, in politics and in philosophy, so she cannot be ignored in music. Herr Patroclus, ere long every musician of any note will know of the up-time music. There are those who will try to ignore it—they will not succeed. There are those who will try to fight it—they will be no more successful than those who ignore it. There are those who will try to take control of it—they will also fail. But those who embrace it—ah, they are the ones who will write the music of the future.

"My friend, the bell of the universe has been rung. The reverberations will resonate for generations. *Everything* will change, just because Grantville is here. There is no escaping that. But those of perception, who have the courage to grasp an opportunity when it presents itself, those folk will prosper."

"Well said," Master Schütz declared. "Wisdom indeed, Herr Patroclus, if you will hear it." The printer gave a slow nod, a thoughtful expression on his face.

The conversation turned to lighter things for some time. At last, both Herr Zopff and Master Schütz claimed a need to prepare for the morning. They left, Lucas trailing in the master's wake.

Isaac and the remaining Amsels called for one more round of ale, then spent some time talking about the orchestra rehearsals. Isaac was hungry to hear how things were progressing. He knew when he made the decision that not playing for *Messiah* would be difficult to bear. It had proven to be difficult indeed. But he would not back away from his choice to honor the faith of his fathers.

That conversation wound down at last.

"I leave you with one last thought, my friends." Isaac prepared to go. "Franz was annealed in a very hot furnace indeed, and the blows of the smith were hard. 'T would be wise to not stand against him."

"Funny." Matthaüs gave a wry grin. "He says much the same of you."

December 1634

There atop the heads of every grinning tenor and bass were constructions obviously meant to be rams' horns. That on Dietrich's head was truly impressive. He had somehow contrived to craft a set of horns out of paper that did a full curl, with the tips jutting out past his mouth. His "fleece" was more noteworthy as well; where the others had used curled wood shavings or strips of cloth or paper, Dietrich had made his out of many short scraps of yarn, obviously acquired from the cloth manufactory at which he worked. The many colors produced an odd but still impressive effect. And somehow he had managed to blacken the tip of his nose with charcoal. Yes, there was no doubt that Dietrich was the alpha ram of the flock.

After the initial moment of shock, Franz's first thought was that Marla had set up another joke. He shot a glance at his wife, to find her leaning on Master Andrea. The two of them were laughing so hard that tears were streaming down their faces. Marla caught his look and, reading his expression, shook her head.

Franz looked back to the men, and as he did so noticed that his hands were still suspended in the air. Chuckling, he lowered them, set his baton down and began to clap. Within a moment, the orchestra and the sopranos and altos had followed suit.

The applause lasted for some little time. It finally dwindled and faded away, replaced with chuckles, giggles, and the flourishing of handkerchiefs all over the room as people dried their eyes and blew their noses. After a moment, Franz held up his hand for their attention.

"Well, I see that we have been visited tonight by Brillo and his gang of scruffy, rascally rams, come from Franconia." Laughter welled again, and Dietrich stuck his thumbs under his suspenders and beamed. "Well done, my friends. You have given us a moment to laugh together. I also declare that you are probably the slyest bunch of japesters I have encountered in some time, surpassing even Simon Bracegirdle." Simon adopted an expression of mingled shock and hurt after hearing his name slandered, which caused a moment of laughter in the orchestra.

"We have had our moment of fun, friends." Franz got serious again. "Now let us return to our work." He shot a mock glare at those who were doffing their ram hats. "And if I hear another 'Baa', someone shall become a wether instead of a ram."

"If it would make us sing like Master Andrea," Dietrich rumbled, "it might be worth it, Master Franz."

Andrea straightened from where he had been whispering to Marla. "Actually, boys, I believe my surgeon is still practicing. I am certain I could arrange for him to come to Magdeburg." The women laughed to hear the rapid negative expostulations from the men.

Franz rapped his baton on the music stand. "Tenors and men . . ." He gave a grin and lifted his hands. "Measure 19—where we left off before the sheepish interruption." He gave the downbeat and they were off again; this time with the right words.

* * *

"Are you sure you did not put them up to that?"

Marla laughed in response to Franz's question after the rehearsal. "No, love, I didn't. Although I might have, if I'd thought about it."

Franz looked to Andrea, who held up his hands. "Nor did I. I wish I had. The expression on your face was beyond all price." The three of them shared another quiet laugh.

A thought occurred to Franz. "Master Andrea, if my comment concerning wethers and rams offended you in any way, please accept my apologies."

"None needed, my friend." Andrea waved a hand as if to brush something away. "What you said was nothing compared to the quips and gibes we of the *gentilhuomi* make among ourselves." He chuckled for a moment, then grew serious again. "No, I, ah, 'came to grips' with what had been done to me years ago. And though there are times when I still wonder what I would otherwise have been, on the whole I am content, even in the midst of this barbaric wasteland."

Andrea smiled to take the sting from the last comment, then continued. "No, the only deprivation I really felt was the lack of a successor. My brothers carried on the family name, but I had no one to follow me . . . until I came to Magdeburg. Now, in Marla, Dietrich and others, I have my legacy. I am content."

Thursday, December 21, 1634
The Feast of St. Thomas the Apostle

Marla looked at her clothes laid out on the bed. She had decided several weeks ago that she wouldn't dress in one of her performance gowns for this concert. This was the girls' night, not hers, so she had selected clothes that were good but not ornate, in order that most of the attention would be focused on them.

She smiled as she thought of working with Frau Schneider the seamstress to create clothes she could wear for teaching. She didn't want more of the Empire gowns. They would have cost too much. Fortunately, the good frau had been working on new designs of divided skirts, one of which was very close to what Marla had been looking for. In a few days, she had taken ownership of several ankle length skirts that, while not as full as a down-time dress, did have something of a flow to them while she moved. They weren't jeans, but they did qualify as pants . . . sort of.

Most of the skirts were of durable, serviceable material . . . things that would wear well and hold up under the stress of a school teacher's work day. The day she ordered them, however, Frau Schneider had a piece of velvet that was the shade of claret, or maybe merlot . . . a dark wine, anyway. Marla hadn't been able to resist ordering one skirt in that fabric, and now it lay on the bed.

Marla reached out a hand to stroke the blouse that lay beside it. Alison, her mother, was a good two and one-half inches shorter than her daughter, and had generally worn her skirts above the knee, so after the Ring fell there was nothing in her closet in the line of dresses, pants or skirts that would fit Marla. Above the waist, however, they were very close in size, and Marla had drawn several shirts, blouses and sweaters from that closet when she moved to Magdeburg. The best of them lay on the bed with the long skirt.

It was a white silk blouse, with long sleeves and a tall collar. Marla's vision blurred as she remembered how much her mother had loved wearing it. Slow tears rolled down her cheeks as she recalled the memories of the last time she had seen her mother in it, laughing, on the way to a Christmas party with her father. Three and a half years later, it still hurt to think that she'd never see them or her brother again.

"Stupid," she muttered, wiping her face with sharp movements. "She'd want you to wear it."

A few minutes later, just as she was ready to put the finishing touches on her ensemble, Franz entered the room. "Marla, it is almost time to . . ." He stopped dead in his tracks. After a moment, he smiled. "I thought you said you were 'dressing down.'"

"I am." She twirled in place.

"My dear, you will capture the eye of everyone in the room; the men with admiration, the women with jealousy."

"Piffle. Help me with this, please." She handed him the ribbon that matched the hue of her skirt. Mounted on it was the only piece of jewelry she had from her mother.

Alison Linder hadn't possessed much real jewelry, and most of what she did have was on her person the day the Ring fell and she was left up-time. But she had left behind in her jewelry box a Victorian-era cameo that had belonged to Alison's great-grandmother Dorcas, the one she had always said was half Black Irish and half Cherokee. It was ivory, somewhat yellowed with age, but Marla had mounted it on the new ribbon, wanting to wear it for the sense of connection it gave her. Between the blouse and the cameo, she felt as if somehow these women would know what she was doing, what she had become.

Franz stepped behind Marla, looped the ribbon over her head and drew the ends together, fastening the hook and eye. Marla turned to face him. He shook his head.

"Hopeless."

"What?" Marla looked at him with a bit of suspicion.

"No one will look at the girls."

Marla slapped his arm. "Stop it." She looked at her watch. "Yikes! We've got to go!"

"That's what I was saying." Franz followed her out of the room.

* * *

Where has the year gone? Lady Beth wondered. It seemed like only last week that she had moved to Magdeburg in the spring to assume the administration of the Duchess Elisabeth Sofie Secondary School for Girls, yet here it was only a few days before Christmas. She settled back in her chair next to Casey Stevenson at the rear of the pack of patrons, families and teachers, waiting for the first annual DESSSFG Christmas Choir Concert to begin.

Casey, who had been looking around, now leaned over toward her boss. "Quite a crowd we've got here. More than just parents."

"Yep. As soon as word started getting around about this concert, I had patrons and parents and prospective parents sending notes and requesting seats. It looked for a while like I was going to have to ask Marla to schedule two performances, but at the end we didn't need to." She looked around the very full great room of the townhouse that was the temporary location of the school while their permanent buildings were under construction. The Zopffs were to her right; the Drechsler family was ahead and to her left. "But it was close. We might could squeeze two or three more people in here—but maybe not."

At that moment the side door opened and the girls—sorry, the young ladies—walked in and arranged themselves on the three rows of the risers that Marla had commissioned. Lady Beth smiled a little as she remembered Marla's adventures in getting the risers built. First there was the problem with the design: she wanted them to be fold up for portable use. It took some work with a carpenter to achieve that. Then she wanted them carpeted on top to muffle footsteps—until she saw the cost of the cheapest carpet available. After that, a good dark stain was fine. Lady Beth still wasn't sure where they were going to store the risers after the concert, but she knew there had to be the odd nook or cranny around a house like this.

A disturbance sounded behind them, and both Lady Beth and Casey looked over their shoulders. Lord Above, it was Mary Simpson and Princess Kristina coming in the door! Lady Beth stood and moved to greet them, asking herself what they were doing here. A moment's thought told her the answer was pretty obvious. From the footsteps behind her, she knew that Casey was following.

"I'm sorry," Mary whispered after Lady Beth made her quick curtsy to the princess. "Princess Kristina just heard about the concert a little while ago." Mary gave a small shrug.

The young princess stared up at Lady Beth. "Frau Haygood, I would really like to hear this concert." Her face had a composure that seemed beyond her years.

Lady Beth thought for a moment, "Princess, you can have my seat, and two of my teachers will give theirs up for Mrs. Simpson and Lady Ulrike." She cast a quick glance over her shoulder to Casey, who read the message and swiftly moved back to their row to get Staci Matowski out of her seat as well.

"My thanks to you," the royal daughter replied. Mary Simpson mouthed "Thank you" over the head of the princess.

Lady Beth became aware of rustling and murmuring behind her. She turned to lead the princess and her companions to their seats and was faced with the sight of the entire audience standing. That took her aback for a moment, until it dawned on her that the princess was a member of the royal family and this was a formal occasion. No one would be seated while she was standing.

Casey hurried back to Lady Beth's side. "We can't put them in our seats in the back row," she whispered. "We moved three chairs down front and made the front row that much wider. They have seats in the middle, right next to Duchess Sofie and her parents."

"There was room?" Lady Beth hissed.

"Barely."

Lady Beth straightened and turned to the princess. "If you'll come this way, Your Highness." She led the way to the front of the audience, then gestured to the empty seats. Princess Kristina seated herself on the center chair, wiggling a little to set her back against the back of the chair. She looked around with aplomb, feet not quite touching the floor. There was another rustle of movement as the audience resumed their seats.

Mary Simpson stepped to Lady Beth's side as Lady Ulrike sat to the princess' right. "I owe you one," Mary murmured.

"Too right you do." They exchanged small smiles as Lady Beth passed some programs over, then Mary took her seat as Lady Beth returned to the rear of the room and joined Casey and Staci standing against

the rear wall.

"I thought you said there were two or three seats left open," Casey muttered.

"I guess I was wrong." Lady Beth straightened up as the side door opened again and Marla stepped through. "Oops. Here we go."

* * *

Marla closed the door almost all the way after her girls walked out, leaving it open just a crack to peer through. She waited for them to arrange themselves on the risers, waiting for her moment to walk out. Just as she was about to do so, three people came in the back of the room. A moment later, Lady Beth and Casey were up and talking to them. Marla's jaw dropped as she recognized who the late visitors were. She spun from the doorway.

"Franz!" Marla hissed. "It's Mary and Princess Kristina! What are they doing here?"

Franz stepped over and applied an eye to the crack. "Well, at a guess, it appears the princess has come to hear the concert, bringing Frau Mary with her as a companion."

Marla backed up, wiping her hands on the jacket she was wearing. "Nobody told me they were coming."

"Mm-hmm." Franz was still looking through the crack. "From the looks of it, no one told Frau Lady Beth either. Some of the teachers are moving chairs down to the front row."

"That's not fair," Marla muttered.

Franz turned and placed his hands on her shoulders. "You have performed before her before."

"But that was different."

"In what way? You sang, and played your instruments. Remember how Maestro Giacomo described conductors—we are those who play the musicians. There is no difference between using your hands to evoke music from the piano and using them to evoke music from those girls. Now go," he slipped the jacket from her shoulders, "go and make music."

Marla took a deep breath. Franz was right—there was no difference. It didn't matter who was in the audience; she was ready, the girls were ready, it was time to sing. She turned and gave him a kiss. He touched her nose afterwards and she wiggled it in reply, bringing forth the smile it always did. Bowing, Franz opened the door. She squared her shoulders, and stepped forth.

* * *

Lady Beth watched as Marla strode out to stand in front of the risers. In the soft light of the great room, wearing the deep red skirt and gleaming white blouse with long black hair falling past her shoulders, the young woman looked very stately as she took a bow in acknowledgment of the applause.

"She looks just like she knows what she's doing," Lady Beth murmured. She didn't realize she'd said anything out loud until Casey leaned over to her.

"She does," Casey whispered. "Mom was one of her first teachers, so I've kind of kept up with what she's been doing over the years. She's very good."

"Yeah, but being good yourself doesn't mean you can teach it. How many mechanics or flat-picking guitarists have you seen that know how to do the work but couldn't put it in words to save themselves?"

"Ssh. She does. Watch."

* * *

Marla turned to face her girls. Everyone was in their best dress, faces were scrubbed clean, and most of them were smiling. A few looked nervous, but most were smiling. She looked at them all, gathering their eyes with her own. When they were all focused on her, she touched her chin with her index finger, the signal that she was ready to begin. Smiles disappeared as the girls seemed to lean forward a little, watching her intently. Marla hummed a pitch; they hummed it back. She raised her hands, gave the subtle movements of the right hand that gave them the beat, and began.

* * *

*"Veni, Veni Emmanuel!
Captivum solve Israel!
Qui gemit in exsilio,
Privatus Dei Filio.
Gaude, gaude, Emmanuel
Nascetur pro te, Israel."*

"She's not using music," Lady Beth hissed.

"I told you," Casey whispered back, "she's good."

*"Veni, Veni O Oriens!
Solare nos adveniens,
Noctis depelle nebulas,
Dirasque noctis tenebras.
Gaude, gaude, Emmanuel
Nascetur pro te, Israel.
Veni, Veni, Rex gentium,
Veni, Redemptor omnium,
Ut salvas tuos famulos
Peccati sibi conscios.
Gaude, gaude, Emmanuel
Nascetur pro te, Israel."*



Lady Beth joined in the applause. She didn't understand the Latin very well, but she had heard the English words in her mind, and 'O Come, O Come, Emmanuel' was one of her favorites. What the girls had sung was absolutely beautiful—a unison sound, so pure it was almost perfect, quiet enough that it seemed hushed, loud enough that everyone in the great room could hear it. Chills ran up her spine and the hair on her neck tingled.

She leaned back over to Casey. "Okay, she knows what she's doing.

* * *

The rest of the concert held true to the spirit and sound of that first selection. And what impressed Lady Beth was all were sung without accompaniment, yet the young voices were true.

'*Adeste Fideles*'—also in Latin, of course. 'O Come, All Ye Faithful,' to Lady Beth.

'Joy to the World' in English.

'*Un flambeau, Jeannette, Isabelle*' in French. Lady Beth kept singing 'Bring a torch, Jeannette, Isabelle,' under her breath until Casey poked an elbow into her ribs.

'Greensleeves' in English.

'*Los Peces in el Rio*' in Spanish. Lady Beth didn't recognize it.

'Coventry Carol' in English. She sort of knew this one.

'*In Dulci Jubilo*' in Latin and German. Lady Beth knew it as 'Good Christian Men, Rejoice.'

'*Tu scendi dalle stelle*' in Italian. Another one Lady Beth didn't recognize, but very pretty nonetheless.

Marla had made short little introductions to each of the subsequent pieces of the concert, repeating some of the information in the printed programs. True to form, she turned and spoke to the audience again. Lady Beth admired how polished her German had become.

"For the last song on the program, we will sing a song written in the up-time by a German pastor, Johann Grüber. Those of you who heard my recital last year heard this song then. I trust you will enjoy it."

Marla turned back to the girls. A moment later, her hands were in the air, and they began.

*"Stille Nacht, heilige Nacht,
Alles schläft, einsam wacht
Nur das traute, hochheilige Paar,
Holder Knabe im lockigen Haar
Schlaf in himmlischer Ruh!
Schlaf in himmlischer Ruh!
Stille Nacht, heilige Nacht,
Hirten erst kund gemacht
Durch der Engel Halleluja
Tönt es laut von fern und nah:
'Christ, der Retter, ist da!'
'Christ, der Retter, ist da!'
Stille Nacht, heilige Nacht,
Gottes Sohn, o wie lacht
Lieb' aus deinem göttlichen Mund,
Da uns schlägt die rettende Stund'.
Christ, in Deiner Geburt!
Christ, in Deiner Geburt!"*

Lady Beth had a good vantage point from where she stood in the back of the room. She watched as Marla's expressive hands shaped the music coming from the fifty-plus girls on the risers. She listened to the purity of the voices, to the sound of love expressed, and was brought to the point of tears. It wasn't a bravura performance of what was to her a beloved old carol, but it was one of the most beautiful she had ever heard.

There was a hush after the song ended. It stretched for a moment, until Marla dropped her hands and stepped to one side. Then the applause erupted. Marla waved to the girls, and they took a bow as the applause continued. Finally, as the applause began to wane, Marla held up a hand and stepped to the center again.

"Thank you. On behalf of the girls, thank you for your support." She looked back over her shoulder at the girls, then looked back with a mischievous grin on her face as the girls started to giggle.

"Uh oh." Lady Beth wasn't sure what was coming next, but she was certain that it was going to be something unexpected.

"As it happens, we have one last song to sing tonight, even though it's not in the program. It's a fun song, so we hope you enjoy it as well."

Lady Beth sagged back against the wall with visions of the girls singing 'I Saw Mommy Kissing Santa Claus', or something equally inane. She watched as Marla raised her hands again and launched the girls into song.

The melody was very familiar. She recognized it in the first measure of the song. But the words—they weren't what she expected. It wasn't until the first phrase was completed that Lady Beth realized what she was hearing. She clapped both hands over her mouth to keep herself from laughing out loud until she

could gain control of herself. Once she thought she could trust her voice, she dropped her hands and leaned over to Casey, who had a hand up to cover her face as her shoulders shook.

"Tell me . . ." Lady Beth had to stop and force down a giggle that was trying to climb out of her throat. "Please tell me that isn't 'Rudolph, the Red-Nosed Reindeer' in Latin."

"I can't . . ." Casey whispered back, ". . . because it is."

"Where . . . how . . ."

"Marla showed me the music. An up-time church music director named Philip Brunelle did it. I don't know where she found it."

"You knew about this?" Implied was, "and you didn't tell me?"

"Mm-hmm. She wanted it to be a surprise."

Lady Beth forced more giggles down. "Oh, it is that."

The song finished a moment later, amidst the chuckles and guffaws and clapping of the parents and patrons. As she joined the laughter and applause, Lady Beth decided that not only was the concert a success, but so was Marla.

Monday, January 1, 1635

The Feast of the Solemnity of Mary

Master Giacomo Carissimi looked around the great room. In front of him he could see Admiral Simpson and Mary, returned from her adventures. He could see a few other naval uniforms in the room. With Mary and the admiral were Jere and Lady Beth Haygood, Mary's voice and hand for the arts programs in Magdeburg. The two women were looking at the program and chattering away. Giacomo smiled when he noticed that both husbands looked to be a bit bored.

Giacomo's friend Girolamo Zenti sat to one side. To the other was Master Heinrich Schütz with Amber Higham on his arm and accompanied by his assistant Lucas Amsel.

He was ready for the Royal and Imperial Opera Hall to be completed. This time next year the concerts would perhaps be held in a proper hall, not just in the biggest room that could be found.

Conversations washed around him as he thought about that: about the stage where operas—including his own *Brutus*, completed earlier in the year—and ballets and concerts would be staged, about the organ to be built, about the oh so many details that had to be worked out with Kelly Construction and then monitored. A lot to do . . . but when it was done, what a pleasure it would be!

"Master Giacomo!" Girolamo's voice was quite loud.

He was startled. "Yes?"

Everyone laughed.

"See?" Girolamo said. "He was off in paradise, thinking about something undoubtedly to do with music. What was it this time, master, the treatises to be published?"

"No," Giacomo replied. "If you must know, I was thinking about the new opera hall." His expression was sober, but when everyone laughed he laughed with them.

At that moment, as if by signal, people all over the room began standing. Within a moment, everyone was standing, including Giacomo and his friends. He watched as the royal family, King Gustav and Princess Kristina, proceeded to the royal seating area, followed by the Stearns family and Don Francisco Nasi. Once the king was seated, everyone sat.

Giacomo leaned forward a little with anticipation.

* * *

Franz stepped through the door of the great room and strode to the podium. He already knew the room was filled to the bursting point. Marla had already told him that up-time fire-marshals (whatever they were) would have prevented the performance on the grounds of too many people in the building. There were more people here than for the July concert, more glittering dress, more jewels, more . . . everything. Some of that was due to Mary Simpson being present in Magdeburg again, spurring her arts league cohorts to achieve her goals. But even more of it was due to the two people present in the royal seats tonight. He came to a stop beside the podium, laid his hand on the music stand and made two bows: one directly to the presence of Princess Kristina and her father, Gustav Adolph II, King of Sweden and Emperor of the United States of Europe; the other to the audience in general.

* * *

Marla was so excited she was almost vibrating where she stood next to Master Andrea in the front row of the soprano section. This was it! Tonight! The first performance of *Messiah* in this universe, this history, this Europe, the first of several performances this week. She was sure that the audience of nobility and influential burghers would accept it. But to her, because of the work of the Zopffs, this was the first step in bringing all of the up-time music to Europe. Tonight!

Master Andrea leaned toward her ever so slightly, and whispered from the side of his mouth, "Stop bouncing!"

* * *

Franz stepped onto the podium and drew his baton from his sleeve. Holding it in both hands, he looked around the performers gathered before him; the orchestra on the floor, and the choir of fifty voices on the risers behind the instruments. His gaze ended on his wife, almost luminescent in her blue gown, and he touched a fingertip to his lips for her. Her smile broadened as he thought he saw her nose wiggle in reply.

He looked down at the baton held before him in both hands and took a deep breath. When he raised his head again, he found all eyes on him, waiting expectantly. With deliberation he raised his hands. Instruments were lifted to the ready positions. Vocalists focused on him even more intently.

With a slight lift of the baton, he led them into the wonder of *Messiah*.

* * *

Master Heinrich Schütz closed his eyes and let his chin rest on his chest. His statement at the beginning of the *Messiah* adventure that he had expected to learn from Master Händel had been nothing but the truth. He had studied the music until he almost had the full score—he had copy number two—memorized. He had been present in as many of the rehearsals as he could manage, including two of the full dress rehearsals. But tonight, tonight was when he would put the capstone on his learning, here in the audience as it was performed for the first time. Here where he would feel the feelings of the audience.

Schütz had learned much of the man Johann Sebastian Bach, had read and heard much of his music. There was no question in his mind that of the two, Bach and Händel, Bach was the superior musician. His music was often exquisite, often powerful, and always so very well done. As a contrapuntalist, in particular, Händel could not be compared to Bach. Yet Schütz in many ways preferred Händel's music—there was a quality to it, a . . . a joy in most of it that was often lacking in Bach's. And so, tonight, he was to hear the masterwork of Georg Friederich Händel.

The opening chorale section of the opening section, the *Sinfonia* , sounded, *forte* and deliberate. It was indeed a stately piece, and Schütz soaked it in. It repeated in a *piano* dynamic, almost as if there was a quiet echo in the room, concluding in a sustained chord.

He opened his eyes to watch as Franz gave the cut-off for the chord, then literally in the next moment gave the attack to begin the fugal section of the *Sinfonia*. The violins carried the opening line alone, until four quick measures later Franz cued the second violins to their entrance, followed four measures later by the violas, cellos and basses. There had been several discussions, Heinrich remembered, as to what tempo this section should be played at—the slower tempo that was the score's direction, or the faster tempo that was more traditionally used. He was glad to hear that Franz had settled on the latter.

Eyes closed again, Schütz listened as the string parts chased each other through the fugal section, now *forte* , now *mezzo-forte* , now *forte* again, until they reached the concluding chords.

* * *

There was something in the air tonight, Marla decided; something that conducted excitement. The choir had reached that fine point where every person was so focused, so poised, so *ready* for what was coming that the air almost sizzled. Her brother would have said they had their game on.

The tenor soloist stepped forward. Archard Daecher looked like a walking skeleton, but the young man had a voice that in its own way was nearly the equal of Dietrich Fisher's. Marla could see heads nodding in the audience as he sang the opening words of the arioso "Comfort Ye, My People."

* * *

*"The voice of him
That crieth in the wilderness,
'Prepare ye the way of the Lord.
Make straight in the desert
A highway for our God."*

Master Giacomo Carissimi sighed as the tenor arioso ended with that declamation. Such a strong voice. Such precision in the singing. His friends Master Andrea and Frau Marla had done well indeed in preparing the singers if they were all up to this plane of musical offerings.

* * *

Mary Simpson smiled as the tenor launched into the air "Every Valley Shall Be Exalted." Oh, how she had missed this music. It had been part of the annual cycle of great music that had once been part of her life as the Dame of the Three Rivers. Every Christmas and Easter, all or part of *Messiah* was being performed somewhere in town, and she almost always managed to attend at least one performance. She hadn't realized how much she had missed it until she made it back to Magdeburg after her adventures and discovered that her arts league had marched on without her. Did they ever! First the July orchestra concert, and now this staging of the greatest of oratorios, which did a lot to fill a void in her heart.

She was glad that Marla wasn't so traditional that she staged the work in the original voicing and instrumentation. Mary had never been fond of the massive performances that had been so common at one time—three hundred voice choirs, and the like—but she did like something larger than the sixteen singers and twenty instrumentalists that were what Handel—no, Händel, must get that right—had used in the original performances. The fuller sound was appropriate.

Mary shook her head. *Enough thinking, woman. Listen to the music.* She abandoned herself to the sound of the finest of the tenor selections of the work, letting the sheer beauty of it drive every thought from her mind.

* * *

The evening progressed. The opening chorus "And the Glory of the Lord" was received well by the audience—as it should have been, Master Giacomo decided. The voices were so together as to sound as if they were produced by one throat. Hearing the music like this had so much more impact and beauty even than the recordings that he had heard in Grantville. No matter how beautiful the sound of the recording, it was not the same.

This was the future! This was what he was working for, why he had accepted the challenge from the royal family of establishing the Royal Academy of Music—to bring this music to the world.

* * *

Dietrich Fischer stepped back into the ranks of the men. His *basso* had been appropriately *profundo* on "Thus Saith the Lord, the Lord of Hosts" and "But Who May Abide the Day of His Coming." His huge voice had almost made the audience's curls wave, Franz thought to himself. No wonder Master Andrea had worked so much with him.

The chorus "And He Shall Purify the Sons of Levi" went well, with the appropriate parts light and dancing as Marla had drilled into the singers. He smiled a little as he led them, having a brief flash of the rehearsal where she had compared the singers to heavy-footed dancers.

Wilmold Eichelberger, the twelve year-old boy who had earned the contralto solos—much to everyone else's surprise—stepped forward to sing "O Thou That Tellest Good Tidings to Zion". Some of the women in the alto section had resented that choice at first, but by now all were behind him. Franz suppressed a wince when he recalled what Andrea Abati had said about the boy: "If young Wilmold had been born in Italy, he would have been a *gentilhuomo* of some note." That was high praise from the

sometimes acerbic Italian; high praise, indeed. But it still hurt to think about.

Franz caught Wilmod's glance, raised his baton, and cued the orchestra for the beginning of the recitative and solo.

* * *

" . . . the Everlasting Father, The Prince of Peace."

Marla took a deep breath as the choir released the last note and the orchestra finished the conclusion to "For Unto Us a Child Is Born." So far everything had gone well. Next up was the "Pifa", or "Pastoral Symphony." After the opening "Sinfonia", it was the only purely orchestral selection in the work. Its placement in the work was fortunate, coming as it did after the longest choral section. It gave all the singers a chance to catch their breaths, especially she and Andrea, who would be singing solos after the "Pifa" was done.

The orchestra was doing a superb job on this, she noted with a slight smile. But then, if there was any one section that they should play perfectly, it should be this one. When Franz had told her of what happened on the day when the players had tried to slough their way through the "Pifa", she hadn't known how to react. Did she go strangle some players, did she remonstrate with Franz for being so harsh with them, or did she chew her nails about something like that coming up so late in the rehearsal process? In the end, she had settled on feeling very proud of how Franz had handled the whole thing. It showed a mature grace that she wasn't sure she could have measured up to.

Oops, that was the end of the "Pifa." Time to sing again.

* * *

Mary almost licked her lips in anticipation as the performance progressed. There was a cluster of soprano recitatives and ariosos after the "Pifa." Andrea stepped forward to sing them. The last of the soprano ariosos led directly into the chorus "Glory to God in the Highest," one of the brightest of the choruses that was just full of energy. With a bit of a musical joke, the chorus stopped several measures before the end, and the orchestra parts dwindled to just a few short chords played *pianissimo*.

Andrea and Marla exchanged places. The orchestra played the introductory measures and Marla began "Rejoice Greatly, O Daughter of Zion", one of the two greatest soprano airs of the work. She had done it during her recital last year, but as Mary just bathed in the music, it seemed as if this performance was even more . . . she searched for a word . . . *brilliant*, perhaps, like a jewel that had been cut and polished to its finest potential. There was no doubt in Mary's mind now that Marla would be a force in the music of Europe for years to come.

This performance was undoubtedly bravura, and when it came to an end Mary clapped along with the others.

* * *

And so the evening went. Master Carissimi was almost enthralled as the various choruses, airs, recitatives and ariosos followed one another through the course of the performance. He drank it all in, rising with the music until he felt as if he were floating. After an intermission of a few minutes, they moved steadily through Part II, of which he thought the high point was the very fine performance of the air "Why Do the Nations so Furiously Rage" by the young bass Dietrich Fischer. He found the nature of that

particular text more than a bit ironic given the times, which drew a bit of a smile from him. Still, it was now very apparent why Andrea truly wanted to take this man under his wing.

* * *

Marla took a deep breath as Archard finished the air "Thou Shalt Break Them With a Rod of Iron". She had organized this performance of *Messiah* along traditional lines, omitting the handful of sections or portions of sections that were not usually performed even during 'full' performances of the work and keeping to the traditional order and sequence of the sections. However, she had made one significant change: she had moved the "Hallelujah" chorus from the end of part II—directly after the solo that Archard was even now completing—to the end of the entire work. She had her reasons, which were based on something she had told no one. She suspected that Mary Simpson might guess.

There would be another short intermission, then it would be time for her to step forward again to open Part III.

* * *

Master Carissimi closed his eyes as Marla began to sing.

*"I know that my Redeemer liveth,
And that He shall stand at the latter day
Upon the earth."*

The purity of her tone always amazed him, just as the timbre of her voice always enraptured him. If ever there was a golden voice, if ever God had so blessed someone, it was this voice, this young woman. *La fiamme sacre*—the sacred flame, that was all he could call it. The touch of God on her.

". . . and He shall stand at the latter day upon the earth, upon the earth:"

Here was no showpiece. Marla sang with some intensity, true, but it was a quiet intensity. There was a slight smile on her face, Giacomo noted, but her voice floated effortlessly. It was almost as if music was simply arriving in the air by Divine providence.

*"And though worms destroy this body,
Yet in my flesh shall I see God,
Yet in my flesh shall I see God."*

Ah, Giacomo thought to himself. He understood something now, tonight, which he had not observed

before. Here and now, Marla was singing not just words, not just a song, but her belief as well. How beautiful, to hear someone—even though a Protestant—sing in such a way that everyone who heard knew without a doubt that she believed what she was singing.

*"For now is Christ risen,
For now is Christ risen from the dead,
The first-fruits of them,
Of them that sleep."*

The air came to an end, Marla's voice finally concluding as it floated over the strings. They carried on for a few more measures to finish in a quiet chord. Marla stepped back into her place, the audience quiet in its place, subdued by the quiet piety they had just experienced. Giacomo opened his eyes again with a beatific smile. *La fiamme sacre* indeed.

* * *

Mary listened as the performance approached its conclusion after Marla's exquisite performance of "I Know That My Redeemer Liveth." Section followed section. That amazing young bass hammered "The Trumpet Shall Sound." Moments later, the boy alto—where did Andrea Abati find these people?—teamed with the tenor to sing "O Death, Where is Thy Sting?". That in turn led directly into the chorus "But Thanks Be to God", another of those joyful choruses which Händel was so adept at crafting.

Speaking of Andrea, he sang the final soprano air, "If God Be for Us," and did superbly—of course.

Chorus followed chorus followed chorus, until they at last arrived at the final section of the work: the "Hallelujah" chorus.

Mary gripped her hands together as the orchestra began. The custom she had known from up-time was not valid here in Magdeburg, but she though she knew what was in Marla's mind. Only moments were left to see if her thinking was good.

* * *

"Hallelujah! Hallelujah! . . ."

The end was in sight for Marla. It had been a long evening; almost three hours since they began, at least two and one-half hours of performing. Fortunately, none of them had been singing that entire time, but it was still hard work. Now if only . . .

* * *

"For the Lord God Omnipotent reigneth . . ."

It might be just the setting, Mary thought, but this was one of the most *stirring* performances of *Messiah* she had ever seen. The chorus was incredibly powerful for no larger than it was. There was no perhaps to it, she was being touched by tonight's work as much as she had ever been.

Despite water in her eyes, she was watching an area in the seating that Marla kept glancing at.

* * *

*"The kingdom of this world is become,
The Kingdom of our Lord,
And of His Christ . . ."*

Master Schütz was sitting straight now, eyes open, listening to the great work as if it was a word from God . . . which, in one form or another, it was. His original expression of determination had changed over the course of the evening, moving through pleasure and joy to one that verged on awe. The up-time books had called him the Father of German music, so in a way what he was hearing, what was pouring through his body, was a child of his work, crafted somehow 120 years in his future, and brought to him by Grantville from a time over twice that again. His eyes filled with tears.

* * *

"And He shall reign forever and ever . . ."

Marla had made sure that her position in the chorus allowed her to watch a portion of the seating without losing sight of Franz. The song was almost half over, and nothing.

The tenors came in with their heroic entry in this section, followed by the altos, who were in turn followed by the sopranos.

*"King of Kings, and Lord of Lords,
King of Kings, and Lord of Lords . . ."*

The sopranos were beginning what Marla had always thought of as climbing the ladder, repeating the King of Kings line over and over, raising the pitch a step every time, unison with the high trumpet.

The movement, when it happened, was so slight she almost missed it. It took a moment to dawn on her that Princess Kristina was standing. Standing!

The sopranos continued to climb.

"King of Kings, and Lord of Lords,

King of Kings, and Lord of Lords . . ."

Higher they climbed, sounding with the trumpets and supported by the lower voices.

". . . and Lord of Lords . . ."

Finally, on the last rung of the climb, it happened.

* * *

Mary gasped when she saw Gustavus Adolphus stand to his feet. It had happened! She shot to her feet, followed a moment later by the rest of the audience. Mary was smiling at what had just happened. A correlation between a future German who was undoubtedly butterflied out of existence now, George II of England, and the master of northern Europe, Gustavus. Oh, sure, the story of George being so moved upon hearing *Messiah's* "Hallelujah" chorus that he stood was probably apocryphal, but it was such a lovely legend. And here, now, it was *fact*, not legend . . . with the note that it was the princess who led her father.

* * *

Joy shot through Marla when she saw the king climb to his feet and set his hand on his daughter's shoulder. He stood there, tall and straight, a sober expression on his face, as the chorus continued praising the God that he claimed to serve.

Marla's mind was so full of happiness that she almost lost track of the words. She did kind of hiccough one, which earned her a sidelong glance from Master Andrea. He would undoubtedly have words for her about that one at her next lesson.

The king stood!

It was a seal on their work. It was a seal on the up-time music. It was the capstone of everything she had been trying to do, and it meant that all of it, music, women musicians, now had visible royal approval. Suddenly, the future looked both brighter and easier.

Marla abandoned herself to the music with elation.

*"And He shall reign forever and ever,
Forever and ever, forever and ever,
Hallelujah, Hallelujah,
Hallelujah, Hallelujah,"
"Hal – le – lu – jah!"*

* * *

Turn Your Radio On, Episode Two

Written by Wood Hughes



Chapter Four

"Good morning, Europe. Guten Morgen, Europa! You're listening to Voice of America as we begin another broadcast day from our studios on Mountaineer Lane in Grantville, New United States. Today is September tenth, Gregorian; August thirty-first Julian and at the tone it will be five thirty Grantville Standard Time."

September 1632, Grantville, New United States

It wasn't on a fancy cul-de-sac. Rather, the house was at the dead end of a one-lane paved street where the hills had become so steep that the road builders gave up. Before the Ring of Fire, the small, cedar-shanked, one and a half story house with a basement opening up to the valley below had been distinguished only by being where strangers occasionally had to pull into the driveway to turn around or just start backing up. Now, on that red siding below the front porch, someone had painted around the two diamond shaped basement windows in red, white, and blue, star spangled Gothic lettering, "VOA-650" with "Voice of America" spelled out in foot-high black block lettering underneath.

A hundred-foot-tall steel tower stood high on the hilltop behind the back yard, looking very much like the cellular telephone relay tower it had begun life as. In other relatively level parts of the yard, men and women were busy building new buildings to house new projects for this bustling new world.

Gayle Mason turned toward John Grover. "Who would have believed it the day I went in to talk to Coleman Walker? What was it? Less than a year and a half ago. Not quite a month after the Ring of Fire happened."

Gayle laughed. "And Coleman named it Voice of America, even though he didn't want to fund it at first. Come on in and have a cup of something hot."

What had been—until recently—a little three bedroom, two bath, with a combination living-dining room and a galley style kitchen home, was now the headquarters of the most state of the art electronics corporation on the planet.

"It's all so scary, John," Gayle said, allowing her self to show her uncertainties. "All I ever wanted was to fiddle with my ham rig and do my electrical thing in the mines until my pension vested. Maybe someday, find a guy who isn't afraid of letting me be who I am."

She pulled her feet up under her and wrapped her arms around her midriff. "Now, we've signed the papers to make me Chairperson of General Electronics, *Incorporated* . I just signed a deal with the government for unlimited funding and who knows how many guaranteed profit contracts for redeveloping an entire electronics industry, and Mike wants me to take personal charge of equipping an entire army and navy with communications gear as soon as I can finish turning everything over to you, Mr. Chief Executive Officer and Station Manager."

She allowed her shoulders to slump and frowned, "It's just too much."

John Grover smiled and wondered again at the way some strong women often seemed to want to hug their daddies for comfort when things were going good. "Yeah. It is more than a bit overwhelming, isn't it?"

"I know exactly how you feel. When they made me vice president of the construction company back up-time in Fairmont, I remember thinking, 'Wow, and me a high school drop out.'"

"But you've made some really good decisions so far and we are so far ahead of where we have any right to be simply because of you. So take your time, get used to it, and then forget about all the titles. It's just you and me and Deanna Dee, just like always."

Smiling, Gayle allowed herself to come back to the present. "So how long do you think it'll take to get the tube research project going?"



"Well, when the new building is finished, we can finally move our jewelers and glassblowers into the same facility. We should be able to start training new supporting staff by the first of the year. It's going to be an example of having to build the tools to build the tools to build the tools. The rest of it . . ." John reached over to the desk and picked up a pile of freshly signed government contracts and read a few bits

from them. "The first thing we've got to do is build radio receivers to go along with all those crystal set instruction flyers you've been spreading around. That's the only way our new neighbors can start getting the hang of seventeenth-century radio! For sure we won't die of boredom!

* * *

It was a warm late September morning as the Council of Elders of the Grantville Pentecostal Church gathered together at the spot on the banks of the new Ring-of-Fire-created lake where they had become accustomed to performing their baptisms. Brother Chalker's message had been somewhat nebulous as to what the event was that they were meeting about.

Pete Enriquez, as chair of the council, arrived first and set up the chairs. Elder and choir director Jennifer Copenhaver and her husband Roy brought drinks and some fresh homemade cookies, and Elder Paul Nemeth and Ingrid arrived in their newly-converted natural-gas-powered company pickup truck just on time. Ingrid had driven and had to help her husband out.

"We passed Brothers Chalker and Fischer along the way." Paul smiled faintly as he added, "Esau was a bit ornery this morning and fought taking the bit, so they're running a little late."

Chalker had named his lead two horses Esau and Jacob, the first twins mentioned in the Bible. The horses weren't technically twins, but they were a matched set, so Chalker found that appropriate.

"How are you feeling, Paul?" Jennifer inquired.

"Blessed, Sister Jennifer, blessed." Paul sat down as Ingrid continued to fuss over him and gather his blanket over his bony shoulders. "We may not have chemotherapy in this world, but we do have great opium to kill the pain."

A few minutes later Chalker and Fischer pulled up. After Chalker tied his harness to the wagon's brake handle, Fischer and he climbed down and took their places in the circle. "Sisters, Brothers, something wonderful has happened!" Chalker beamed as he announced the news. "Brother Fischer has been given the gifts of God!"

Chalker paused, trying to catch his breath. He then asked Pete to briefly explain the miracle that Fischer had performed.

When Pete finished, the Elders broke into applause and praised God for the gifts given Fischer.

"If he's succeeded in bringing Slater Dobbs back into the way, it truly must have been a miracle," Jennifer commented with a smile.

"It turns out that, like Saul on the road to Damascus, Brother Fischer here has been under the shelter of the Holy Ghost since long before arriving in Grantville," Chalker continued. "He had been blinded to the signs he has been given. When I realized that the protection that had been given Brother Fischer was from the Spirit, he was finally able to open his eyes."

"Hallelujah to that!" Pete Enriquez blurted out. "Fischer, I've gotten to know you so well. I knew that the Holy Spirit was in you. I'm so glad you've finally embraced it."

Ingrid and Paul Nemeth nodded. Paul coughed, then contributed, "I agree. I feel like I need to tell you all about something."

"When I went to the doctor's office for the checkup that found this cancer, it wasn't just my coughing that made me go." Paul paused before continuing. He described to the others in great detail the vision that he had received.

"I now think that the flames behind Brother Fischer was the Holy Spirit that's evidently been protecting him. I feel the dream was trying to show me that he is destined to become a powerful force in the future of our church."

The others were surprised by Paul's revelation at this point. Jennifer took hold of the hands of Brother Fischer to her left and Ingrid to her right and the rest joined in to form a prayer circle.

After much prayer, Chalker took hold of his cane and stood, "Seeing you all in agreement, I'd like to make a motion that Brother Fischer be confirmed as a full-fledged minister of the Pentecostal Church. Further that we give him the Call to serve as our Chief Minister of Down-timer Outreach, a role that he's been performing so well already. Do I hear a second?"

Almost simultaneously, all three Elders called out, "Second!"

"In that case, I guess we don't need a voice vote. Brother Fischer, would you please join me." Chalker smiled. He then turned to Fischer and leaned on his cane to lower himself to his knees. There was a catch in his voice as he began the ceremony.

Fischer's eyes swelled up with tears as he knelt down next to Chalker. He folded his hands together and bowed his head over them in prayer, waiting for Chalker's next words.

The old man placed his hands on Fischer's head. Now the three Elders came over and laid their hands onto Fischer's shoulders as well.

"Dieter Fischer, in the name of the Father, the Son, and the Holy Ghost, in the presence of this Council of Elders of the Pentecostal Church of Grantville, I do hereby confirm and ordain you as a full-fledged minister of the Pentecostal Church, entitled to all the privileges and responsibilities of our Faith."

A breeze rustled the surrounding trees and a cloud of golden sycamore leaves in their full fall glory swirled through the air around the little gathering. Even the glassy, smooth-cut wall of the Ring of Fire seemed to shimmer.

With this blessing of the Holy Spirit coming from the mouth of their new minister and sensing the presence of something greater than themselves, Roy and Ingrid joined the circle around the two ministers as the Elders began to hum "Rock of Ages." The three Elders transferred one hand from Fischer to their respective spouses who were now part of the circle.

Tears streamed down the old preacher's face as his voice rose with all the power still available to him. "Furthermore, by the power granted me by these Elders, I hereby name you Minister of Down-timer Outreach. May God grant you vision so that the souls that you shall save will outnumber all the stars in the sky. Welcome, Reverend Fischer, to your Call!"

After several emotion-packed minutes of each member calling out individual prayers of thanks for the new preacher, Chalker continued, "In the Book of Acts, after the first Pentecostal baptism was finished, there were God-fearing Jews from all over staying around the place the apostles gathered. When they heard the commotion, they gathered around the apostles and some of them made fun of them and said,

"These men are full of new wine!"

Chalker grinned and started to laugh, "See, because the apostles were so filled with joy, others thought they were drunk! Today, my friends, we are drunk with the blessings of the Spirit!"

Jennifer Copenhaver broke out in uncontrollable laughter, followed by the rest, including Fischer. Pete called out, "We are born twice!" To which the rest responded through their laughter, "To die once!"

Openly weeping tears of joy, they hugged each other in the realization that the gift of tongues had finally marked this ordination of the first new Pentecostal minister in this new world.

October 1632, Grantville, New United States, Confederated Principalities of Europe

"But, no one has ever found a technical reason why we can't be on the air longer hours than we are. I asked them to research it at the national library or the state library or whatever they're calling it today." Marc Kronzburg, advertising sales manager of the Voice of America, didn't like leaving any spare money in the pockets of potential advertisers, and this had become his pet peeve.

Deanna Demetria Matowski, known to her friends as Deanna Dee, interrupted. "Marc, they can't find any proof that running the transmitter six hours in the morning and another six in the afternoon with a low current in between isn't extending them either. Until we get proof that we're not harming the tubes or we get some breakthroughs on the vacuum research, we're not going to deviate one bit from Gayle's instructions."

Now it was Marc's turn to pout. "Yes, yes, I know. It's Gayle's station, they're Gayle's tubes and she drove all over West Virginia . . ."

John Grover interjected with a smile, ". . . and Maryland and Pennsylvania!"

"And Pennsylvania and Maryland to get them, I know, I know." Marc continued the argument, which he had made dozens of times since coming onboard as the General Sales Manager for VOA. "But at least give me longer hours for the Christmas shopping season. This up-timer custom of yours is rapidly catching on with all the newly prosperous down-timers in the country.

"On top of that, I've got all these newspapers to compete with now, along with the ads the cable TV station has started selling. It's not like it was a year ago when we could get whatever price we asked for ad time. And the new government isn't going to fully fund all of our research projects forever. We've got to start bringing in more advertising revenue."

John leaned back in his chair and cupped the back of his head with both hands as he studied the ceiling momentarily. "Jennifer, do you think that extending the broadcast day from one hour after dawn to let's say, ten o'clock and then starting back up at four in the afternoon would have any noticeable effects on the tubes?"

Marc held his breath. He couldn't believe that he'd finally found an argument that got John thinking about

more time to sell advertising in.

"Well, no, I guess not, John," Jennifer Hanson, the acting station engineer replied.

"Now that Gayle is going to be off to Paris and London if this embassy that Mike Stearns is planning comes off, we really aren't going to be able to get to her with every little question the way we have so far. We're going to have to depend on ourselves." John continued, "She's never really said we have to limit it to six hours a day—just to make sure we broadcast during the critical period so that the sky wave has the maximum chance to bounce our signal as far as possible."

Taking another moment for thought, he added, "It looks like the Great Stone Radio Tower should be finished by the end of the month at the latest. That should also extend our range by about fifty percent."

He rocked slowly back and forth while he continued to study the ceiling. "Okay, here's the deal. Starting Monday, we're going to go full power till ten every morning and start back up at four every afternoon through Christmas. We'll revisit the issue between Christmas and New Years Eve. However, if one tube burns out during that time, we're cutting back immediately. Understand me, Marc?"

Marc nodded in agreement, all the time thinking of whom he should call on first to offer the new time slots.

"That will mean a five hour morning shift for *Franz in the Morning*," Deanna Dee piped in. As Program Director, she would have to fill the added hours with new programming somehow. "Janet Rogers should be able to get her news reporters to take on some of the added hours on the weekends. I can fill in the extra afternoon hours, no sweat, but I'd still like to come up with some more programming ideas. *Robin of the Committees of Correspondence* has all they can handle with their twenty minutes on Sunday night."

"That's a shame," Marc added regretfully. "I could sell that kind of programming every night of the week. What we need is more German language programs. That's where the money is."

"Oh no!" Marc jumped to his feet and started running for the door. "I've got to notify the printer to change the hours on the flyers he's printing for us today! Maybe I should double the order."

* * *

The steady snowfall and whipping winds, early for the season, kept most of the funeral service attendees from the final graveside services for Paul Nemeth. The newly-finished church sanctuary had been packed with all the new members attracted by Fischer's efforts. Paul had the unfortunate honor of being the first buried in the new churchyard behind the little Church in the Hollow.

Between the stress of comforting Ingrid the last few nights and supervising the finishing touches to his church, Brother Chalker really should have let Brother Fischer perform the graveside service afterward. But, he felt that the burial of an Elder, and such a devoted Elder at that, required the presence of the principal minister.

The Elders were gathered together at the Nemeth home. It had been a long and trying day. "A good send off for a good man," Jennifer said sipping her hot apple cider. She glanced across the room at Pete's housekeeper Susannah and the rest of the ladies still gathered around Ingrid. Jennifer's husband Roy was giving a lift to several of the families that had walked to the house for the gathering after the funeral.

"We'll have a hard time replacing him," Pete said. "Do you think Ingrid will have time to continue as an Elder? She's going to have a full time job with all those kids, and Terrell will be back off to the army soon enough. It might be time to bring in new blood at the treasurer position, too. Roy Copenhaver is getting more and more tied up with dealing with the government and the new territory that's being added to our jurisdiction."

"I was thinking about the Kurger family," Jennifer said. "Hans has really taken to the faith since they joined the church last spring."

Pete smiled. "Maybe it's time to get Phyllis Dobbs to become a deacon. Now that Slater's found the way."

"That's a miracle if I ever saw one." Jennifer laughed. Slater Dobbs had been written off as no-account since before the Ring of Fire and afterwards had been right in the middle of the 250 Club crowd. While his wife Phyllis had been a bastion of the startup congregation, it had taken the Fischer miracle to bring Slater around. "I still find it hard to believe that Slater had the idea to donate the land for the new sanctuary. I figured it was Phyllis' idea all along. For some reason lately he's taken a shine to Hans Kurger and his kids as well."

"Brothers Chalker and Fischer even think that Hans may be preacher material sooner or later," Jennifer continued. "Maria does a great job handling the money at their emporium. I've never heard a word spoken against them."

Nodding, Pete added, "It's time we started adding some down-timers to the leadership of the church. I sure could use some more help with running the Sunday School program and I know it's past time to take the burden of the Wednesday night Bible study off of Brother Chalker's shoulders. We might start looking to increase the Council of Elders up from three to five."

A small flurry of snow and wind swirled through the doorway, interrupting the conversation and in walked Georg Fleitner, the deacon and caretaker of the new church grounds. Georg had appeared at the new church while it was being built and he'd rapidly grown attached to Brother Chalker. "Mr. Enriquez, Mrs. Copenhaver, it is Brother Chalker. He sick."

Pete jumped to his feet. "What's wrong, Georg?"

"He hot. I put him in bed. Cover. He sick."

"Lord, what now?" Pete turned to Jennifer, "Call the doctor. You can handle the rest of the gathering here and make sure Susannah gets home safely, can't you, Jen?"

Jen nodded and looked at Georg, "Georg, does Brother Fischer know?"

"Don't know. Have not seen since Mr. Nemeth funeral."

"Fischer came here afterward with Ingrid and the kids. He left a while ago. Maybe he's over at the house by now," Pete said. "Georg, go to my house. Find Fischer. If he's not there, just go find him. Okay?"

"Yah, okay. I go find Brother Fischer." Pete relaxed a bit. Georg wasn't a bright person, but he could be depended on to stay at it until the job was finished. He'd find Fischer.

* * *

"It seems to be just a fever, but you people are going to have to make sure he slows down some. He's seventy-eight years old, for God's sake." Doctor Nichols looked right into Pete's eyes and said, "I don't want him getting out of that bed except to go to the bathroom until I come back Monday. Understand me?"

The authoritative voice of the doctor communicated just as clearly in the seventeenth century as it had in the twentieth, and both Enriquez and Fischer quickly shook their heads in agreement.

Brother Chalker's apartment was in the back of the new church building right behind the altar and choir loft. It was composed of a large study with a separate bedroom and bath.

Fischer looked very distressed. "I should have done the graveside service. I should have been able to convince him to let me do it."

"There's nothing you could have done, Dieter," Pete said. "I'm just glad you're here to take over the preaching duties tomorrow morning. I think it'll do the old man good to hear you preach while resting in his bed back here.

"Doc Nichols is right. We've got to start taking a lot of the tasks away from him. Jennifer and I were talking. We're thinking it's time to expand the Council of Elders to five. What do you think?"

Fischer sat in Chalker's chair behind the desk. "Yes, we're big enough to need more guidance now. It would also take some of the burden off of Brother Chalker."

"That's our thought exactly." Pete paused. His eyes seemed to focus on something out the window. "Wait a minute. It's Brother Chalker's turn Monday morning!"

"What?" Fischer looked confused.

"The morning radio devotional. It's every second Monday. That's this week!"

The five-minute devotional at the start of the broadcast day were the most important example of cooperation among the churches. The timetable was worked out by the Grantville Ecumenical Emergency Refugee Relief Committee. Many felt that this cooperation had shown the frightened down-timers an important aspect of the new American culture, different faiths cooperating in a common venture. It was also widely believed that this helped ease their transition to the up-timer culture as much as anything else that had been done.

The Lutheran and Catholic ministers preached on every Saturday and Sunday morning. After all, they had the most followers in the VOA coverage area. The rest of the ministers drew straws for alternate weekdays, since it would take ten days to cover all the denominations involved.

"Dieter, it isn't as easy getting behind that microphone as it seems," Pete said. "Remember last Labor Day? I was interviewed about how the new building codes were working out. I knew what I wanted to say, and what they were going to ask, but just sitting there, looking at one person and that microphone looking like a stick jabbing you in the face is very intimidating.

"I kept thinking, 'they're going to laugh at your Cuban accent' and wishing I had said something a different way. I haven't been that nervous since I left Cuba on the boat to Florida. We'll have to think about some way to get you prepared for being on the air."

"Whatever you say, Pete." Fischer leaned back in his chair. "I've listened to a lot of those devotionals since I've come here. Other than the Catholic and the Lutheran on the weekend, everyone else seems to stay with English. Do you think that it would be okay to speak in German?"

Chapter Five

"Your local weather forecast after this."

"Regelmaessig, zuverlaessig, zu angemessenem Preis! That's right, your CPE Postal Service gets the mail through. Here in Grantville, just take your folded and sealed letters to the mailbox and a CPEPS official will come by to speed your correspondence or package wherever your associates or loved ones dwell.

"Miss your aunt in Austria or your brother in Bavaria? How's your sister in Silesia or your mother in Magdeburg? The CPE Postal Service is here to serve you. Remember, neither rain, sleet, snow, nor war will stop the dependable couriers of your CPE Postal Service. Now more than ever, they're Regular, Reliable and Reasonable!

"And don't forget, no postage necessary for any letters to your Voice of America."

"The CPE Postal Service! Write someone today!"

October 1633, Grantville, New United States, Confederated Principalities of Europe

Central heating is a miracle. Franz Peck stamped the snow off his feet. Here it is five o'clock in the morning, I'm the first person in the studio, and the place has been kept warm all night long with no logs or coal fires to deal with.

Franz hung up his overcoat and hat, and began his morning ritual. First, he walked into the back room and turned on the transmitter, next he powered up the broadcast equipment in the control room. While they warmed up, he flipped on the rest of the studio lights and trotted up the stairs to the main floor where he turned on the lights in the reception area and the break room before making the first pot of coffee of the day.

Then he retrieved the morning log and other messages from his mailbox behind Helga Armbruster's desk. Taking it all back into the break room, he poured himself a cup and started to review the log entries. His boss, Deanna Dee, was meticulous with her logs and demanded that the air staff be just as

precise. She carefully noted any new commercial copy to be announced live on that day's shift, or any other changes from routine, in a different color ink than what was normally used.

Franz noted that the devotional this morning had a different name entered than those he was familiar with. No problem there, the morning preachers just came in, preached or prayed and left. Glancing again at the new commercial, he grinned, "Looks like 'Der Kronz' has had a busy sales week. Five new advertisers this morning."

Marc Kronzburg had recently seen his first episode of *Happy Days* and decided that everyone should now refer to him as 'Der Kronz.' It was most entertaining to see the expression on his face when no one would go along with it.

A note from Jennifer informed him that the new transmitter improvements had been tested, and this morning's broadcast would be at double its previous power. After reading through the new copy, Franz briefly went back downstairs to start the interval signal recording. This was a five-minute recording that Gayle made to be played before sign on each morning. It gave the listening audience a chance to get their receivers adjusted to the correct frequency before the first commercial. It was a recording of the West Virginia University Marching Band playing "Almost Heaven, West Virginia" followed by an announcer proclaiming, "This is the Voice of America, Grantville," followed by a pause, repeated over and over.

Gayle had also taken a series of notes from some up-time record to use as the station identifier theme song, which was played at the top of each hour. Although what exactly "Ina-gada-da-vida" meant, no one seemed to know. He then ran back upstairs to fill his cup again.

Franz was half way up when he heard the knock at the station front door. He hurried up the stairs to the station door and encountered his first surprise of the morning.

Standing outside the station was not just the new minister that he was expecting. Instead, there stood three men, three women, and a large number of half-awake children.

"Franz in the Morning?" one of the adults finally said, seeing the confusion in the face of the sandy haired young man who was making no movement to get out of the open doorway. Franz nodded.

"*Guten Tag!* I am Brother Dieter Fischer; I'll be substituting for Brother Chalker this morning. These—" Fischer waved at the entourage behind him, "—are members of our congregation who came to help me feel comfortable in front of your microphone."

Finally understanding the purpose of the unexpected audience, Franz welcomed the church group inside. After offering the adults coffee and the children water, he grabbed his morning paperwork and escorted them all downstairs to the studio. The interval recording still had plenty of time left before he had to go on the air himself, so he gave Brother Fischer his first lesson in how to perform on the radio.

"I'll wave to signal you to start . . . That red light over there will come on when you are on the air . . . Make sure you stand directly in front of the mike, and keep it no more than six inches from your mouth . . . Speak slowly and clearly . . . Speak as though you're only talking to one person . . . For some reason, a smile on your face comes over the airwaves to the listener . . . When you have one minute left, I'll give you a hand signal to wrap up and another at thirty seconds . . . Relax and have fun!"

Finishing now with his orientation, and having helped arrange the children and their parents in a semicircle on the floor around the seated Fischer in the main studio, Franz went into his broadcast booth, and waited for the tape to end.

* * *

"And now with our morning devotional, the Reverend Dieter Fischer of the Grantville Pentecostal Church." Franz flipped on the microphone and pointed at Fischer.

"Good morning, Franz, and good morning to you listening in! I'm Brother Fischer of the Grantville Pentecostal Church and I'll be chatting with you in German this morning." Switching languages, he continued, "I have some of my favorite people with me this morning. Say hello, children."

The children were well coached and shouted out in almost harmony, "Good morning, Europe!"

"Very good! These are some of the children from our church. I thought I'd get them up this morning to tell them a story. Now children, have you ever listened to the radio?"

Some of the younger children nodded their heads rapidly as the rest called out their positive response.

"Do you like listening to the radio?"

One child blurted out, "I like Robin of the Committees of Correspondence!" as the rest called out their yeses and other noises of affirmation.

"I like *Robin of the Committees of Correspondence* too, Georg!" Fischer beamed at the child; he was in his element now. "You know that some people listen to the radio on big up-time radio sets, and some listen on small radio sets, and some people use crystal radios and put little bitty speakers right up close to their ears to listen to the radio.

"Do you think those people who listen on the homemade crystal sets hear a different message on their radios than those who have the big expensive up-time radios?"

The children all yelled out "No!" with great enthusiasm.

"That's right. Everyone hears the same message on the radio. Did you ever think that God was like the message we all hear on the radio? I mean, the Bible tells us that God is the same yesterday as he is today, and as he will be tomorrow. So, he's telling us the same message that he's told our ancestors since the beginning of time and the same message that he's going to tell our children when we're gone." Fischer paused for effect, then continued.

"You see children, the Bible says that God sent down His Son to live with us and to die for us, and after he died and went to heaven to live with His Father, God didn't want us to think that He'd forgotten about us. So He sent down the Holy Spirit to live with us every day of our lives. Through His Holy Ghost, He talks directly to us in that little voice that tells us what to do good and what things we shouldn't do that are bad."

Slightly adjusting the pitch of his voice, Fischer now made his point. "The Holy Ghost is like a radio. It's a tiny, tiny little voice that whispers to us every minute of every day. Isn't that a wonderful thing that God has given us to let us all hear Him?"

Again the children called out their happy little voices of approval as the parents behind them signaled them to begin singing the song that they had practiced.

"Jesus loves the little children, all the children of the world! Red or yellow, black or white, they are precious in His sight. Jesus loves the little children of the world."

Fischer looked to Franz who was staring back captivated by what was happening in his studio. Breaking out of his trance he looked to the clock to find that he had allowed the devotional to run seventy seconds too long. Not knowing what else to do, he signaled Fischer with the thirty seconds signal.

Fischer turned back to the mike, and over the children still singing in the background, closed saying, "Thank you for having listened in this morning. This has been Brother Fischer of the Grantville Pentecostal Church. Have a blessed day out there. Remember to listen to the Holy Spirit speaking to you right now."

As an afterthought, he added, "And remember to turn *your* radio on!"

Somewhere in the Voice of America Coverage Area

"Papa, Papa! Come, listen, I can hear something!"

Hermann got up from his breakfast table and went over by the window where his daughter sat on the floor playing with that stupid little rat's nest of wire and rocks. He should have never brought that broadside home from the CoC meeting. Taking the offered earpiece from his little girl's hands, he heard a very tinny sound distinguishable from behind the static. It sounded like singing.

Then, some real words, ". . . Brother Fischer . . . Grantville . . . Church . . . Listen to the Holy Spirit . . . Turn *your* radio on!"

"It's actually working!" he exclaimed. "God in heaven, this latest bit of American propaganda is actually working."

* * *

"Hans, I told you that we'd be able to pick up the American radio station sooner or later! When our first customers come in this morning, they will stay longer and order more food for their breakfast! We're going to get rich!"

Hanna had nagged her husband to buy the up-timer radio set shortly after their town bought a generator.

"What's the name of that pastor?"

* * *

" . . . Brother Fischer . . . Grantville Pentecostal Church . . . Holy Spirit speaking to you right now. Let me remind you to turn your radio on! . . . 'You're listening to Voice of America.' "

"Not one, but many voices! What will these Americans think of next?"

Johann decided that he really did need to take a pilgrimage into this Grantville place. His crop yield had

more than doubled this harvest after an American master gardener had helped his village to improve their planting plans. The co-op that the CoC had helped him and his neighbors start up had resulted in the highest price that anyone in town could remember for their produce. And now this!

Johann smiled. *I really need to give back to these wonderful people somehow .*

* * *

"Did you hear the power in that voice, Catharina?" Constanzia Garb waved at the up-time radio that was one of the main attractions in the kitchen of their boarding house. "He was so good with the children too."

"He sounds like he's from Saxony, but there's something about the pacing of his words that's very . . . intriguing." Catharina Sulzer thought for a moment. "Constanzia, we might need to visit that church. It would be good research for your 'secret mission.'"

Both girls laughed. Constanzia replied, "Indeed. If it will keep you out of trouble with my stick-in-the-mud Uncle Emanuel, research is what it will be. But now we need to finish getting ready or we'll miss the trolley. And you know how the principal hates teachers who are late to their first class of the morning."

Chapter Six

November 1633, Grantville, State of Thuringia, United States of Europe

Joellen Schwartz dabbed at the corners of her eyes, and amid scattered applause, sat back down at her table with her plaque in hand.

Turning to her neighbor, she said, "We really did do a lot of good in the last two and a half years. Look at you! You came in through the Grantville Ecumenical Emergency Relief Committee's refugee program. You've been a big help on the steering committee this last year, and now you're a minister and on the radio and everything. I'm so proud of you!"

Patting the last of his pie crumbs off his lips, Fischer replied, "Not on the radio permanently. I'm just filling in for Brother Chalker until he gets better."

"Well, I didn't hear it myself, but I don't know how many people have told me what a good job they think you did." Joellen squeezed Fischer's hand, "I think you have a talent for that kind of thing."

"Thank you, but it was just a little children's story told early in the morning."

* * *

Frowning, Helga sorted through the problem mail one more time. As if she didn't have enough problems with having to learn how to operate this new typewriting machine Mr. Grover had bought her and keeping up with all these dizzying projects that the company was working on. Now she was having to process mail for people she hadn't been notified of.

"Good morning, Helga!" Franz said as he came upstairs after finishing his morning shift.

"Good morning! Franz, you got a couple of letters from Bavaria today."

"Really? Let me see." Franz walked over and opened up the offered mail. "Someone must have mailed it from north of the Danube or west of the Lech." Tearing one open and reading it, he exclaimed, "They can hear me! All the way back home in Garching bei München, they can hear our broadcasts! This is amazing."

He ripped open the next one. "This is from one of my professors at the University of Ingolstadt! He said he couldn't believe it when he heard my voice on his new radio last Monday. We've got to tell Mr. Grover. Where is he?"

"Herr Grover is out of town this week. He's trying to get a new source of supply for something or the other." Helga pulled out her notepad. "I'll make sure he gets the message as soon as he gets back."

Thinking of her other problem, Helga asked, "Franz, by any chance do you know who this 'Der Fischer' person is? We've started receiving mail for him." She waved a small handful of letters to emphasize her point.

Franz looked puzzled, and then replied, "Yeah, that's the guy that did the morning devotional last Monday. Just put it in my box and when he comes back in, I'll give it to him."

With that, Franz walked out of the station lost in reading his unexpected fan mail. With nothing else to do with them, Helga dropped her handful of letters back into the half-filled mailbag of correspondence that this 'Der Fischer' had received in the morning's mail. Next to it sat another mailbag. It was full.

* * *

"You were right, Catharina. He is even more dynamic behind the pulpit than he is on the radio! I think it's the way he paces himself to that wonderful up-time cadence. It is quite mesmerizing."

"Yes, and what's more, he's single!" The girls laughed at the thought of competing for the hand of this very eligible young pastor. Catharina giggled. "But you know my father. He would have a fit if I told him I was seeing someone other than a Lutheran."

"But he *was* a Lutheran pastor," Constanzia objected. "Who knows if it might be that this Pentecostal thing is just a future version of our Lutheran church, or even Calvinist like my father. It certainly isn't Catholic, is it?"

"Up-time or not, I don't think my father would approve. He doesn't even like me to listen in on the morning radio devotionals except for the one on Saturday morning." Catharina furrowed her brow

momentarily and then added, "But your father . . . He's much more modern. Look at how quickly he's adapted to the up-timers way of doing business."

Constanzia shrugged, "I don't know. Papa may not have objected to raising his children as Lutherans, but he's a real Calvinist at heart. Besides, unless we start coming regularly to this service, I'm not sure of how I could even meet this minister in person."

"Oh! That's the best part. Let me tell you about how they do Bible study!"

* * *



"Oh my!" Chalker repeated, as he laid aside the handful of opened letters he was holding to look up at the bundles of money neatly stacked on the table in his bedroom. He then marveled at the last remaining half-full sack sitting at its side. "Guilders and florins, dollars and ducats, scudos and pesos, marks and thalers, oh my."

When Fischer and the others had started opening and sorting the sacks of mail in the church office, they realized that it was too exciting an occurrence for Reverend Chalker to be able to just remain in his bed in the other room. He kept getting up and walking to the door, or just sitting up on the edge of his bed and craning his neck so he could see into the office a little bit better. Finally, giving in to the inevitable, they moved the money-counting operation into his bedroom so at least he could stay propped up in bed.

While Maria and Roy broke open the sealing wax to sort out whatever donations lay inside, Chalker, Fischer and Enriquez read the letters that had accompanied the monies.

Fischer had been told of the unexpected mail that day after his second morning radio devotional. He opened a few of the letters just outside the station as he sat in the church wagon. He was stunned to discover that most of them seemed to hold small sums of money.

From there, he had stopped by the house of church treasurer Roy Copenhaver to show him. Roy determined the best course was to open the remainder of the mail at the church. Before leaving however, he called Maria Kurger to join them. With all the transactions at Maria and Hans' consignment emporium, Roy felt Maria would be good at figuring out how to value the different types of currency that were coming out of all the folded and wax sealed paper envelopes. Finally before continuing on, he sent his nephew Houston to Pete Enriquez's job sites to look for him as well.

"I guess we should have suspected something like this was going to happen after our church attendance the last two Sundays," Pete said. The first Sunday following Fischer's radio appearance had brought the

largest number of new visitors to the service they had seen since the Ring of Fire. From the comments, it was clear that the brand new church building had played less a part in their decision to visit than the buzz over Fischer's radio devotional. Then the service yesterday had been standing room only, prompting the Elders to toss around the idea of moving to two services on Sunday mornings. If the attendance kept up, of course.

Occasionally, someone reading a letter would call out that this one must be heard, "Thank you, Father Fischer. I thank God so much for bringing you on this radio. My precious twins recently died in childbirth. The priest here in town told me that my babies would not go to heaven since the Mother Church had not baptized them. When I heard your wonderful children singing how Jesus loved the little children, I knew that my babies would be safe."

Then Fischer read another. "Pastor Fischer, this one thaler note is all I can afford to give. I just had to thank you for the strength you brought me. I work in a shop cutting fabric so the new sewing machine can stay busy. They pay us by the piece, which should make us more, but the owners keep lowering what we are paid per piece as we do more. Please pray for me."

Chalker spoke up, "'This poor widow hath cast more in, than all they which have cast into the treasury: For all they did cast in of their abundance; but she of her want did cast in all that she had, even all her living.' Mark 12:43-44.

"It's herself and her everlasting soul she's giving to, not us."

Fischer nodded in agreement. Then with a frown, he added, "Peter, isn't Heinrich Mann involved with the Committees of Correspondence? Maybe we should ask him to see what they can do in this situation. This sounds like a union problem to me."

After Maria finished recounting the last of the gifts and double-checking her figures on the back of an opened envelope, she announced her totals. "Of course, we'll have to pay five percent to the bank to have all these other currencies converted into dollars."

"That's more than we receive in a whole month!" Chalker said in amazement.

Roy added, "The five percent alone is more than we collected the whole month following the Ring of Fire. Maybe there's a way I can convince the bank to give us a better rate. This new government job in Franconia ought to get me some pull over there."

Fischer just sat there, never taking his eyes off the letters. He became aware that the others kept glancing over at him with widened eyes. Finally he said, "We must all give our thanks to the Lord for this bounty He has blessed us with."

Nodding, Chalker began, waved the letters he held in his hand for emphasis, "These people, they are hungry for the same thing all mankind is hungry for, the love of the Almighty. They've been displaced by this war. They've lost loved ones, sometimes to both sides, been kicked out of their homes, had their crops burned or taken, and no politician allies with *them*."



Chalker sat up and brushed some of the broken sealing wax off his bedspread, then raised his voice. "It was the same back in the Depression. People kicked out of their homes and off their farms. Their jobs being taken away and their banks closed. That was the time that the Pentecostal movement made its greatest strides! Hundreds came to the revival tents! Thousands were healed! Millions were saved! The harsher the economy and the oppression, the greater was the need for a higher power to intervene."

After a few moments, he added, "I think we need to get ourselves a radio show."

All conversation stopped as they turned to listen to the suggestion of their senior minister.

"Remember back up-time, all the television evangelists? There used to be whole cable channels full of them. Pat Robertson, Jim and Tammy Bakker, Jimmy Swaggert, bunches of them. Back when I was growing up, the same thing happened with radio. I remember there were churches that even owned their own radio stations." Pausing to think over where this thought was leading him, he then continued, "Listen to me. Do you all understand, I mean really understand how we've managed to survive and grow since the Ring of Fire?"

"Of course through the Lord's will, but God helps those who help themselves. What I did was gather together the faithful and combine the Good News with good music and camaraderie and the kind of family fun that makes the experience of coming to church something most people look forward to. That's what we've got to hold out to all the folks who can listen into the radio. Something that will make them tap their toes and shake their heads and laugh." Chalker grinned. "You catch more flies with honey than with vinegar!"

"Brother Fischer, get with Elder Copenhaver and Sister Kurger. See what you can come up with to fill up a radio program of our own." Chalker turned to Roy. "Deacon Copenhaver, can you put together a proposal to take to the radio station to buy some time for the show? We'll all get back together Friday and go over what we've got done then."

* * *

To be continued in *Grantville Gazette* Volume 22 . . .

Revival tent photo courtesy of Wood Hughes

NONFICTION:

An Analysis of the Effect of Evangelical Missions on the 1632verse

Written by John Davis



An Analysis of the Effect of Evangelical Missions on the 1632verse

By John Davis

Technology is usually thought of in terms of understanding of the physical world and the ability to manipulate it. However, ideas and methodology can also be thought of as a form of technology in which society is understood and manipulated. For example, the introduction of Grantville to the Germanies brought American ideas about the equality of people and representative government. American methodology has already shaped the process used in elections and legislation. Clearly this has changed the existing society dramatically in just a few years. In the same way modern evangelical approach to missions is likely to result in profound changes to the religious landscape of Europe. Pentecostalism in particular could over the next generation grow dramatically to perhaps one quarter of the population or more.

The growth of Pentecostalism would probably follow a pattern that begins with an initial burst followed by twenty-five years or so of steady growth and consolidation erupting at some point in an explosion of growth that touches one quarter of the continent. The initial burst could be expected to reach wherever there is sufficient freedom of religion for either public or private meetings. Additional bursts of growth are likely to happen as the message enters new areas where the necessary freedom is present. These bursts of growth are likely to last from three to five years from the time it begins in any given area. The bursts of growth will then likely slow to a steady pace for about a generation. During this time of steady growth, congregations will become established with members growing in doctrine and purified lifestyles. The purified lifestyles should produce stable families and an economic lift. Typically many of the members will sense a call to preach and some sort of educational program will be created for their training. The economic lift ordinarily provides financing for the training of new ministers and future outreaches. At some point after about a generation of steady growth a critical mass should be reached and exponential growth might follow which could encompass up to one quarter of the continent.

To understand why this scenario is likely it is necessary to understand the difference in how missions were conducted in the seventeenth century and today by Pentecostals. The approach to Christian missions in the Reformation era divided largely along denominational lines. The Catholic church continued to depend upon various religious orders for missionary personnel. This continued a system reaching back to the late Roman period that was, at least in theory, centralized and had a source of funding. Personnel from the various orders could be sent essentially at will by the organization. By contrast the Reformed and Lutheran Churches depended mostly upon the state for impetus and funding. Those sent usually represented the political entity that had sent them. In addition since these churches lacked religious orders there was not a ready source of personnel. This resulted in very limited efforts at missionary work. [1]



The modern approach introduced by the appearance of Grantville is the result of a series of changes that are first seen in the 1650's in the New England colonies with Puritan missions to the Native Americans. These changes are echoed and expanded in the early 1700's by the Moravian efforts. The three key changes in thought are that missionaries are God sent rather than by any human entity, that common people are sent, and that missionary needs are the responsibility of everyone in the church.[2] These changes were followed over the next two centuries by consideration of what should constitute the missionary objective. The formal answer to this comes in the mid-nineteenth century from missionary executives Henry Venn of England and Rufus Anderson in America.[3] This approach is usually summarized as the 3-Self approach to missions. It states that the object of the missionary endeavor should be the planting of churches that are self-supporting, self-governing and self-propagating. A self-supporting church is not financially dependent on money coming from another place for its continued existence. A self-governing church is able to manage its own affairs without outside intervention^{3/4}that is without the need for continuing missionary involvement. A self-propagating church conducts evangelism with sufficient success that it grows locally and is involved in producing additional churches.

The next piece of the modern approach to evangelical missions is that churches should be contextualized to the culture where they are located. Roland Allen, a missionary to China at the end of the nineteenth century, is usually given credit for formally publishing this in 1927.[4] The modern understanding of a contextualized approach means first and foremost that the methods of evangelism, organization, and liturgy, should be understandable to a culture. In addition, the new believers in the culture being evangelized must ultimately wrestle with Scripture to organize and apply its truth in a way that speaks to and ultimately transforms their culture.[5] The result is not a rewriting of orthodoxy but a presentation of orthodoxy that is comprehensible to the culture. This is a time consuming process but results in the new believers "owning" their beliefs and practices rather than receiving the possibly ill fitting dictations of the missionary.

A final twentieth century addition to the modern approach is the "power encounter." This is essentially an expectation of miracles, healings and exorcisms as demonstration of God's power and the reality of the message being proclaimed. While most often identified with Pentecostals most missionaries of Evangelical persuasion utilize this method at least to some degree. A popular description of both the method and its results in South America has been written by Peter Wagner, a non-Pentecostal.[6] An example he uses is Tommy Hicks seeking an interview with Chile's Perón. A meeting was arranged with the secretary of religion who came in limping with an injured leg. Hicks offered to pray for the leg but the secretary scoffed at both the request and the power of prayer. Hicks prayed anyway and the pain instantly vanished. The result was an audience with Perón and the use of a huge stadium for evangelism.[7]

These ideas would be carried through the Ring of Fire by most church members of Evangelical persuasion and any Pentecostals in particular. The majority of Pentecostal and Evangelical churches in America have written into their DNA the Moravian idea that missionaries are God sent rather than by any human entity, that common people are sent, and that missionary needs are the responsibility of everyone in the church. This is readily seen in the very wide participation in these churches of the support of missions by prayer and financing. In addition, many will take part in at least one short term missions trip where they can see the work firsthand and participate at least a little. Every report they receive from missionaries emphasizes some part of the 3-Self plan of church planting. In addition, many of the books and articles in promotional materials from the denominations also emphasize this point.



Missionaries home on furlough visit supporting churches and delight in reporting on power encounters in large part because people love to hear about them. As a result the people and leaders are aware of its power to persuade and open doors. Perhaps more important for the 1632verse Pentecostal people who believe that God is sending them are willing to take real risks trusting that God will do miracles. It takes very few successes to strongly impact both those who feel sent and those who are listening. The results often cement both of them to the church forever.

Leaders, whether clergy or not, in these churches are generally aware of the contextualization portion of the approach. Though they probably would never say contextualization, they understand that we must do what works there and not just what works here. This is effectively contextualization. Missionaries on furlough also bring up differences in practices in positive terms, which reinforces this understanding.

When these churches are transferred to Thuringia, this thinking will go with them.

What will happen when people who think like this travel through the Ring of Fire? At first the general switch may overwhelm them. However, they will soon begin looking around them at the continent full of "lost" Catholics and Lutherans and set about the task of reaching them with the Gospel. The way they go about this will be drawn from the example familiar to them using the methods of modern evangelical approach to missions.

To estimate the effect of this missionary effort a modern analogy might be seen in the Pentecostal inroads into the formerly solid Catholic area of South America. "In Latin America, Catholicism had been imposed by more or less open force." [8] This parallels many areas of the Germanies during the Thirty Years War. The same could be said for many Lutheran and Calvinist areas. The majority of the population gave no more than nominal allegiance to the church according to many 1632 stories. Similarly in Brazil today "barely a tenth of those registered Catholics are regular churchgoers." [9]

Another possible point of comparison is the social disruption occurring in both South America and Europe in the 1630's. Willems attributes much of the growth of Protestantism in Brazil and Chile in the 1940's and 1950's to social disruption leading to moral emptiness (*anomie*) and the desire for stability, which is satisfied by the cohesion of the new church affiliation. [10] It should be understood that in this context Protestant effectively means Pentecostal. Harvey Cox expands this analysis suggesting that Pentecostalism's insistence on a lifestyle that, "strictly forbids drunkenness, carousing, and infidelity" has raised the status of its followers, "producing something the continent has always lacked, a middle class." [11] This makes affiliation attractive both to those at the bottom of society and acceptable to those at somewhat higher levels. Given the number of people at or near the bottom of the social scale in late medieval Europe this has to help the missions outreach.

The initial Pentecostal missionaries in South America met with serious semi-official resistance and frequent general opposition. This resulted in confrontations that ranged from name-calling and a refusal to do business to martyrdom. This is paralleled by the treatment given the Grantville Evangelicals who engaged in evangelism beyond the immediate borders of Grantville as mentioned in various 1632 stories. Indeed the appearance of Grantville has changed what would likely have been the burning at the stake of missionaries to a mild to midlevel opposition. Historically this mild to midlevel level of opposition with occasional bursts of violence has provided the most fruitful times of Pentecostal growth.

Since about the 1940's Pentecostal missionaries in South America have used a 3-Self approach and power-encounter with startling results. Remember the 3-Self approach states that the object of missionary endeavor should be the planting of churches that are self-supporting, self-governing and self-propagating. This means the forming of new congregations will be the paramount objective of their missionary endeavors. Outsiders often fail to realize the importance of the self-governing portion of the formula. This translates into personal responsibility for "my church" not the missionary's church. This is in sharp contrast to churches sponsored by the state. With self-government also comes the training of local

believers as clergy. The result is characteristically more clergy than churches, which motivates these new clergy to plant new churches multiplying the effort. Together these approaches have allowed the new churches to run their own affairs and adjust practices to local conditions. This is effectively contextualization. Trained modern missionaries contextualize intentionally as part of evangelism but the 3-Self approach will encourage this spontaneously as local churches flourish and manage their own affairs. In addition, the "saved and lift" phenomenon that Cox observes contributes mightily to the effectiveness of secondary church growth by allowing churches to be self-supporting and become senders themselves.[12]

The efforts of these missionaries beginning in the 1940's and using the 3-Self approach all came together in South America and reached a critical mass around 1970. At this point growth increased explosively. A full picture shows that in 1900 the dominant and official religion was Catholicism and Protestants were almost non-existent. In 1970 the number of Pentecostals totaled about 1 in 25 people. In 1990 Pentecostals alone now made up about 1 in 4 people.[13] This growth is somewhat uneven but exists across the continent. This general pattern in growth is not unique to South America but can also be found in other locations.[14]

The Grantville Pentecostals in particular are very likely to begin missionary activity soon. They will almost certainly follow the approach described above. This suggests that if the analogy is even approximate, Europe in the 1632verse should begin to experience major growth of Pentecostal groups. The working out of this will depend on Eric and the various stories in the Gazette. This analogy to South America suggests that the pattern of growth should be an initial burst of growth followed by a time of consolidation. New local groups will be formed and local leadership trained. From these groups new missionaries will be sent out to new areas. Steady growth is likely to occur. Somewhere around the twenty-five year mark there would likely be an explosion of growth.

Every South American country has at least one strong national Pentecostal denomination; most have several. How analogous to South America the organizational instincts of the Europeans will be is an unknown, but similar organizations are likely to form. In South America these organizations formed fairly early in the process and have significantly contributed to growth in their several countries. If the Europeans follow this pattern the lack of strong national boundaries may allow the formation of even larger organizations crossing lesser political entities. With denominational organizations will come doctrinal statements. This could be a point of explosive conflict with the existing religious organizations. What someone is preaching "on the wrong side of the tracks" may be ignored. However, when it is written down in an organized form the people who are threatened by the growth will be able to focus on written documents. Since these are often poorly written in the original editions due to the lower educational level of the authors there would be plenty of places to attack the details. Crises that initiate either denominational formation or doctrinal statements provide excellent starting points for stories.

Once Pentecostal growth starts it could eclipse the Committees of Correspondences as a transformational force in society within twenty years. This statement assumes that many of the CoC's objectives will be reached and the upward mobility of especially the second generation of Pentecostals will occur in earnest. The outcome could easily change the character of the European middle class. In

South America where abortion and other moral issues are less prominent than in the USA many Pentecostals have gravitated politically toward issues that help the working class. This might benefit the Fourth of July party or its successors.

A fascinating situation could result from Jan Billek's and the Brethren's reaction to hearing about the Moravians and Count Zinzendorf. However, the Moravian approach did not typically emphasize church planting or result in new churches.[15] This limited the effect of their efforts. How or if Billek would accept the additional information along the line the 3-Self approach is a wildcard. However, given the supply of already strongly committed personnel Billek could draw upon this could provide an explosion of growth for the Brethren churches.

At this point most authors of the 1632verse have not widely explored the effect of the introduction of the modern missionary approach to evangelism on the new timeline. While the effect in the first years may be small the effect is likely to increase with the passage of time becoming very significant. Within a generation it is likely that up to a quarter of the European population may become Pentecostal. To this point few stories in the 1632verse have dealt with this area of religious change. The stories being developed by Wood Hughes are an exception to this statement but one of the few. It would seem desirable that able authors take up the challenge to produce stories concerning these changes within the boundaries of canon and the projected 1632 story arc.

APPENDIX ONE

This analysis has deliberately ignored "On Ye Saints" by Eva Musch in *1634: The Ram Rebellion* because the Church of Jesus Christ of Latter Day Saints [hereafter LDS] have a different philosophy and approach to missions than Evangelicals and Pentecostals. In particular they do not utilize power encounters or understand contextualization in the same way. Also their centralized structure has not permitted true 3-Self church planting. As a result the analysis in this article does not apply to the LDS.

Another reason that the LDS is not included is that while they have a history of growth, there is nothing in their history analogous to the Pentecostal growth. The actual results of LDS activity as reported by LDS sources do not reflect the growth results of Pentecostals in most regions.[16] Specifically, in South America where they compete head to head with Catholics and Pentecostals there is no country where active LDS membership exceeds 1% of the population.[17] Rodger Loomis, a LDS member with experience in their missionary program, observes:

"If we look at the size of these various religions and the rates at which they are growing, it is hard to construe the LDS Church as the one that has the competitive advantage. Without a significant competitive advantage over other religions, Mormonism cannot grow to become a major world religion, but rather will be constrained to filling a relatively small niche in the religious ecosystem." [18]

This suggests that while the LDS may continue to exist in the 1632verse it likely be a fringe movement rather than a dominant one.

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[1] John York, *Missions in the Age of the Spirit* , second ed. (Springfield, Mo.: Gospel Publishing House, 2001)., 139-140.

[2] Ibid.

[3] Henry Venn, *Minute on the Organization of Native Churches* (London: Church Missionary Society, 1861). and Rufus Anderson, *Foreign Missions: Their Relations and Claims* , 3d rev. ed. (New York: Scribner, 1870).

[4] Rolland Allen, *Missionary Methods: St. Paul's or Ours* , 1962 ed. (Grand Rapids, Mich.: Wm. B. Eerdmans Publishing Company, 1927).

[5] Many elaborate definitions of contextualization exist in Missiology. The following is representative of many formal definitions.

"Contextualization can be thought of as the attempt to communicate the message of the person, works, work, and will of God in a way that is faithful to God's revelation, especially as it is put forth in the teachings of Holy Scripture, and that is meaningful to respondents in their respective cultural and existential contexts. Contextualization is both verbal and nonverbal and has to do with theologizing; Bible translation, interpretation and application; incarnational lifestyle; evangelism; Christian instruction; church planting and growth; church organization; worship style—indeed with all of those activities involved in carrying out of the Great Commission."

David J. Hesselgrave and Edward Rommen, *Contextualization: Meanings, Methods, and Models* (Grand Rapids, Mich.: Baker Book House, 1989), 200.

[6] Peter Wagner, *Look Out! The Pentecostals Are Coming* (Carol Stream, Ill: Creation House,

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[7] Ibid. p. 21.

[8] Gary MacEoin, "Religion in the Megacity: Catholic and Protestant Portraits from Latin America," *National Catholic Reporter*, (March 14, 1997).

[9] Richard Ostling, "The Battle for Latin America's Soul," *Time*, June 24, 2001.

[10] Emilio Willems, *Followers of the New Faith: Culture, Change, and the Rise of Protestantism in Brazil and Chile* (Nashville, TN: Vanderbilt, 1967).

[11] Harvey Cox, *Fire from Heaven* (Reading, Mass: Perseus Books, 1995). 171-172.

[12] Something similar seems to happen with the CoC's in the 1632verse.

11. Pew Trust, "Overview: Pentecostalism in Latin America: Surveys," in: Pew Forum on Religion and Public Life, 2006. Viewed At: [Http://Pewforum.Org/Surveys/Pentecostal/Latinamerica/](http://Pewforum.Org/Surveys/Pentecostal/Latinamerica/).

Pentecostals & Charismatics in Latin America

1900 1970 1990 2005

Pentecostals and Charismatics (in millions) 0.01 12.6 118.6 156.9

Pentecostals and Charismatics as % of Total Population 0.0 4.4 26.9 28.1

[14] While South America is the focus in this comparison the growth curve is not unique. Pentecostalism in America is usually measured from 1901. In this comparison the initial burst of growth would be represented by the Azusa revival of 1906-1908. Using 1901 as a starting point for an introductory growth burst and steady growth to a 25 year mark says that explosive growth should begin in approximately 1925. Using the Assemblies of God as a numerical sampling shows that between 1925 and 1950 the Assemblies of God in America sustained an explosion of growth from 50,386 to 318,478 adult full members. When it is remembered that this period brackets the great depression and WW2 as disruptive forces in society, the comparison is even better. The numbers are taken from: William Menzies, *Anointed to Serve* (Springfield, Mo.: Gospel Publishing House, 1971). p 401.

[15] John York, *Missions in the Age of the Spirit*, second ed. (Springfield, Mo.: Gospel Publishing House, 2001)., 140.

[16] David Stewart Jr., *The Cumorah Project International Resources for Latter-Day Saints* (accessed 2008); available from <http://www.cumorah.com/>.

[17] Ibid.

[18] Roger Loomis, *Growth of the Mormon Church* (2002, accessed 2008); available from <http://www.lds4u.com/growth/growth.PDF>.

Better Foundations, Part 2: Putting Concrete to Work

Written by Iver P. Cooper



In the world the up-timers left behind, the most widely consumed substance on Earth was water. What came second? Concrete. Indeed, concrete can be said to be, quite literally, the foundation of modern society. We depend upon it for shelter (concrete buildings), transportation (concrete highways), and energy (concrete dams providing hydroelectric power).

In Part I, we found out why the down-timers are going to rediscover the advantages of concrete as a structural material, and, by reinforcing it, take it—literally—to new heights.

In this part, we will first consider the nitty-gritty of proportioning, mixing, laying, curing and testing concrete, and then move on to the fun stuff—talking about what we can build with it.

Proportioning Concrete

Designing (proportioning) the concrete mix is an essay in the art of compromise. For plain concrete, we need to worry about the ratios of four ingredients: water, cement, coarse aggregate and fine aggregate. (For the moment, we will assume a Portland cement and no admixtures.)

An architect (or perhaps a building code) will have specified the minimum 28-day compressive strength of the concrete ("design strength"). The most important consideration is the ratio of water to cement (w/c). In 1919, Duff Abrams discovered that the strength (at a fixed age) increases as the w/c ratio decreases, provided the concrete can still be fully compacted (Camp; Cowan 128; Bauer 98). ACI figures that for plain concrete (non-air entrained), a 0.68 ratio yields a standard strength of 3000 psi, and 0.41, 6000 psi. (For air-entrained concrete, reduce the ratios by about 0.08-0.09.)

A lower w/c ratio also results in lower porosity of the cement paste. (Camp, Chap. 8). That correlates with lower permeability and hence higher durability (stops water from entering, bringing nasty chemicals in with it, or just freezing inside the concrete and stressing it).

Unfortunately, low w/c ratios ("stiff mixes") are also less "workable," because there is less water to act as lubricant between the particles. (It follows that high aggregate-to-water ratios also result in less workability.)

"Workability" refers to the ability to mix, place, compact and finish the concrete. Workability is usually measured by the "slump" test (see below). Slump is usually specified by the contract with the concrete supplier. The desired slump will depend on the type of construction, but it will usually be in the 1-4 inch range.

Typical w/c ratios are 0.4-0.7:1, and it is customary to prepare trial mixes and test whether, with the available cement and aggregates, they provide the desired strength and workability.

Another consideration is shrinkage. Shrinkage causes cracking. To reduce shrinkage, we need to reduce the amount of cement in the mix (sand and gravel doesn't shrink). But you need enough cement to mostly fill up the voids between particles. So that means that you have to find the right "grading," so the fine aggregate fills up the voids between the larger pieces.

Reducing the amount of cement is also economical; cement is typically the most expensive concrete ingredient.

* * *

Several engineering handbooks contain extensive tables of trial mixes. Grantville's encyclopedias contain a number of recommendations on mix design and even some specific "starter" mixes. 1911EB "Concrete" says that the ratio of sand to cement can vary from 1:1 to 4:1, and that of gravel to cement is in the range of 3:1 (for very strong work) to 2:1 (for "unimportant" work). It says that the combined volume of the sand and cement should be sufficient to fill the void volume of the gravel. (The void volume can be crudely determined by filling a can of known volume with the gravel, and then seeing what volume of water the can will hold.)



A sample proportion mentioned in the article is one part cement, two parts sand, and five parts gravel. (Note that this gives a gravel/cement ratio of 5:1 which is higher than the 3:1 stated previously. I suspect that the intent of the writer was to refer to the ratio of gravel/sand, or gravel/sand+cement, and not to gravel/cement.) Insofar as water is concerned, it says that the amount required for the chemical reaction is 16% by weight, but that in practice more is needed to compensate for evaporation and other losses.

The *Columbia Encyclopedia* gives a "typical proportion" of "one part of cement, two parts of sand, and five parts of broken stone or gravel, with the proper amount of water for a pouring consistency." The

Encyclopedia Americana "Concrete" article suggests, as a hand mix, one pound water, two pounds cement, four pounds sand, and five pounds coarse aggregate. And Time-Life's *Masonry* (26) suggests one part cement, two parts sand, and four parts gravel, with a half part water.

* * *

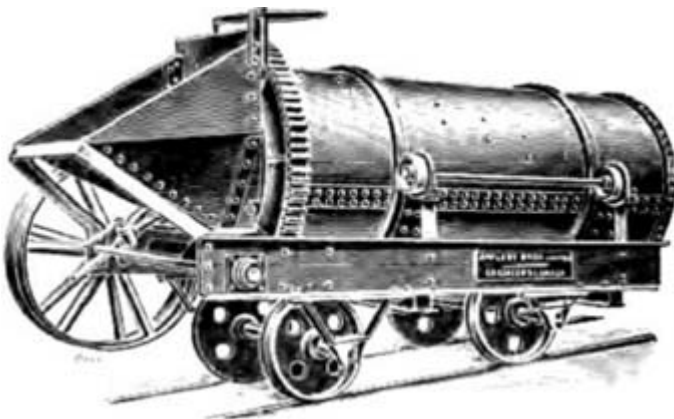
Because fly ash improves workability, blending it with Portland cement allows use of a lower water/cement issue and hence the concrete can be of higher strength. It is no accident that Chicago, which is well supplied with fly ash, has a large number of concrete skyscrapers (Camp).

Estimating

A 94 pound (one cubic foot) bag of Portland cement might be combined with 188 pounds sand and 376 pounds gravel (ratio 1:2:4) . If the w/c ratio is 0.5:1, that calls for 47 pounds (5.64 gallons) of water. Air-free concrete with standard aggregate would weigh about 150 pounds per cubic foot. If the air content of the concrete is 4%, the density is 144 pounds/cubic foot, and you have about 715 pounds, or 4.95 cubic feet, of concrete per bag cement. If you know the volume of the slab, wall, column or beam you wish to pour, you can calculate how many bags of cement (and everything else) you need. One percent reinforcing steel would add about 4 pounds/cubic foot to the plain concrete.

Mixing Concrete

In 2000, there were several choices for mixing concrete. The simplest from the contractor's point of view was "ready-mix." The concrete batch is placed in a mobile mixer, and mixed while en route to the job site. Or the concrete is mixed in a stationary mixer at the ready-mix plant, and then transferred to a truck, which merely keeps it sufficiently agitated so it doesn't set.



While concrete was used in construction in the early nineteenth century (in a concrete bridge in Souillac, France in 1816), it was not until 1913 that ready-mixed concrete became available; it was hauled in a dump truck. That meant that the concrete had to be remixed upon arrival (Ali). Dedicated truck mixers

were introduced in the 1920s. The earliest ones carried only one cubic yard of concrete; a modern truck mixer carries 10-12. The horizontal-axis revolving-drum mixer truck was introduced in 1930. (Kuhlman Corp.).

It remains to be seen how quickly ready-mix will be introduced in the new time line. The alternative in 2000 was to mix the ingredients at the job site. A contractor might have a portable mixer, mounted on skids, wheels or a tractor hitch. The ingredients (including as much as two bags of cement) are dumped into a hopper, and mixed in a revolving drum, which is powered by an electric motor, a small gasoline engine, or a tractor. In post-RoF Germany, one can imagine the drum being turned as a result of animals trudging in a turnstile, or even hand-cranking.

An even more primitive method of hand-mixing is to lay the sand, cement and gravel in a "mud box," or a wheelbarrow, mix them up with a hoe-like instrument, and then slowly add water. (Ahrens 55).

In 2000, hand-mixing of concrete was facilitated by buying dry mix concrete, that is, a mix containing all of the ingredients except water. This isn't available in the seventeenth century, of course, but it isn't much of a step to go from bagging cement to bagging dry mix. The real problem with dry mix after RoF will be transportation costs; it will be cheaper to just have cement delivered to you, and mix it with local sand and gravel, then to pay for delivery of a much greater weight of dry mix.

For a big job, a mixing plant can be built on site. It may be possible to come up with a "set up, use, and knock down" plant design, primarily of lightweight (wood) construction, so that the plant can "hop" from one major construction site to another.

Placing Concrete

Formwork. The plasticity of newly formed concrete is both blessing and curse. Blessing, because that is what gives it its characteristic versatility of form. Curse, because it must be poured into a "form" (a kind of mold) to hold it until it has hardened enough to support its own weight. That typically takes 1-2 days in summer and 4-7 days in winter (Ahrens 62).

That means, in turn, that the preparation of the site includes building, erecting and bracing the forms, which can be made of wood, metal, or, when they become available, plastic or fiberglass. Handling formwork is probably the most time-consuming aspect of concrete construction in the modern age. (Of course, in the modern age, contractors don't have to worry about making their own cement.)

* * *

Placing. Once the forms are ready, the freshly mixed concrete is placed where it needs to go. Time is of the essence, since the initial set takes place in 30-60 minutes, and moving the concrete after it occurs will reduce strength. That means that the labor on hand for placing the concrete has to be adequate for the amount being handled.

Concrete is compacted to reduce air voids. If the mix is high in water, this should be done with a hand tool. But vibrators allow the use of "stiff" (relatively low water content) mixes that can't be placed properly by hand. They can reduce the air content from, say, 1.5% to less than 0.5% in perhaps two

minutes. (Used on a water-rich mix, they have the undesirable effect of segregating the water from the aggregate.)

Vibrators are gas- or electric-powered, and can be internal (placed inside the concrete), attached to the form, or placed on the surface. It is reasonable to expect the general contractors in Grantville to have a few concrete vibrators. (Ahrens 67-9).

An alternative is to formulate self-consolidating (self-compacting) concrete, which can be placed by its own weight, without vibration. This was introduced in the 1980s, and uses water-reducing and superplasticizing agents. We will have to rediscover the additives before we can make the concrete behave this way.

* * *

Pumping was developed in the 1930s, if not earlier. Pumping comes in handy for reaching the upper floors of a building. There are piston, pneumatic and squeeze pump designs. Concrete can be pumped 500 feet vertically and more than 1500 feet horizontally. The concrete mix may need to be adjusted (e.g., restrict maximum aggregate size) to render it suitable for pumping. (Camp). A special concrete mix, "shotcrete," may be sprayed onto the interior of a fabric balloon to make a thin shell monolithic dome.

* * *

The old Roman concrete (really, a mortar) was not plastic; it had a very low ("zero slump") water content. The Romans laid the coarse aggregate by hand and pounded the mortar into the gaps. The modern equivalent is roller-compacted concrete. It is placed with an asphalt paver and then compacted with a vibratory roller. (Moore). RCC is used mostly for low traffic pavement, and for dams (less heat generation).

Setting and Curing of Concrete

It is important to recognize that the setting (loss of plasticity) and curing (hardening and strengthening) of concrete is not the result of drying out by evaporation. Alite and belite react chemically with water (so-called "hydraulic reaction") to form calcium silicate hydrates (C-S-H), which are the effective cementing agents. The more reactive alite contributes to early strength and belite to late strength. (If pozzolans are present, there is also the reaction of silica and lime to form C-S-H.)

Once concrete has dried out, it stops getting harder and stronger. Fresh concrete has, initially, enough water for the concrete to reach full strength, but unfortunately it will lose water as a result of evaporation. Hence it is customary to moist-cure it for a period of time, either by sealing the surface (e.g., covering it with plastic or waterproof paper sheets, or spraying it with a sealant), or by supplying additional water during the curing period. Water can be supplied by covering the surface with wet material (wet burlap, canvas, sand, shaving, straw) or by spraying, flooding or ponding. (Ahrens 83).

Ideally, the concrete is moist-cured for 28 days (the standard); the usual recommendation is at least five days if the temperature is at least 70 deg. F, and at least seven days if it is 50-70. Fully moist-cured Type I concrete will reach 50% of its 28-day strength about 5 days after it is laid, and 75% after perhaps 12

days. Between three and six months after it's laid, its strength will be 125% of standard. In contrast, if the concrete is in air the entire time, its strength will plateau at a little over 50% of standard. If the concrete is moist-cured for 3 days and then air-cured, it will level off at about 80% of standard. And if it is moist-cured for 7 days before air-curing, it will reach the standard strength but not exceed it. (Ahrens 82).

Moist-curing not only improves strength, but also wearability and water-tightness. A 7-day moist-cure is sufficient for complete watertightness.

The curing reaction is slower if the temperature is lowered; it takes three times as long to reach a given strength at 33 deg. F. as at 70 deg. F. There is permanent damage if the concrete is frozen during the first 24 hours after it is laid. Hence, in modern practice, if the temperatures are near freezing; it is customary to heat the sand, gravel and water before they are mixed with the cement. Care must be taken not to heat the materials so much as to cause "flash" (rapid premature) setting of the concrete. The concrete, once placed, can be covered with insulating material such as canvas, straw or hay. The forms may need to be warmed up; it is probably better to use wood rather than steel. Another possible cold weather expedient is to build a temporary enclosure for the concreting area and heat it while the concrete is being laid and cured.

The danger in hot weather is that the heat causes greater evaporation of the water in the concrete. Evaporation at 90 deg. F. is quadruple that at 50 deg. F. and double that at 70 deg. F. There is also a further loss of strength at high temperatures, beyond that attributable to water loss. Often, the concrete will have a higher early strength but a lower ultimate strength.

The usual hot weather concreting expedient is to keep the aggregate cool by shading and sprinkling, and to cool the water by adding ice or refrigerating it. It is also possible to dampen the forms.

The rate of evaporation is also dependent on humidity; it increases five times when relative humidity decreases from 90% (Washington DC in the summer) to 50%. And on wind; the rate is four times higher in a 10 mph breeze than in a calm.

Concrete Testing

Because the raw materials used to make concrete are heavy, they usually are obtained locally. Consequently, concrete made in one area will not be quite the same as concrete made somewhere else even if they use the same nominal mix of cement, aggregate and water.

So, to be sure the concrete will perform as expected, you need to test it. Even a "how-to" manual will explain how to carry out a "slump" test, which measures the stiffness of the mix. Mixes with small slumps are difficult to work and those with big slumps won't be particularly strong or durable.

Those manuals also talk about compression tests. Unfortunately, they just tell how to make the sample cylinder; it is then sent off-site to a testing lab. It is possible that the Tech Center has a test machine which can be used post-RoF. If not, then we will have to wait until the machine shops can create one. In essence, it hydraulically applies increasing pressure to the sample cylinder until it fails.

Compression tests are typically carried out 1, 3, 7 and 28 days after the concrete is laid. Unfortunately, the one and three day strengths are not necessarily well correlated with the 28 day strength, because they are sensitive to certain factors which are operative in the short term. To get a better idea of what the 28-day strength is going to be, we need to accelerate the curing time. In general, this is done by using warm or even boiling water to moist-cure the concrete. (Camp).

* * *

Don't expect that early post-RoF concrete will be the equal of modern concrete. For example, in spring 2000, students from Villanova University designed and constructed a reinforced concrete cross for a Catholic orphanage in Honduras. the Honduran-made concrete only had a compressive strength of 1800 psi, rather than the U.S. norm of 4,000 psi. (Dinehart). This was almost certainly attributable to want of quality control in a Third World country. We are likely to experience even more acute quality control problems in the seventeenth century.

Precast Concrete

The concrete doesn't have to be cast and cured in place. Instead, concrete elements can be precast, and then assembled. While precasting can be done at a building site, it is more common for it to be done at a precasting plant. Such a plant will often use steel forms because they can be reused many times. At the building site, the precast elements are erected and joined.

A special case of a precast element is a concrete block. This is intended to be used like masonry; that is, the blocks are mortared together at the building site. Block mixes usually contain less cement and less water than the mixes used to make structural concrete, and often contain lightweight aggregate. The blocks are usually steam-cured, at normal or even high pressure, at the plant.

Precasting plants won't be practical until the transportation network is capable of accommodating heavy traffic.

CONCRETE STRUCTURES *Roads*

In Flint, 1633 , Chapter 27, Jesse tells Jim, "Next time you're in Magdeburg, go talk to Mr. Simpson. I understand he's got plans for producing some sort of paving material. Find out what it is, concrete, macadam, whatever, and what it will take to get it down here to the field."

Jesse, of course, is thinking about aircraft runways, but concrete provides an excellent road surface for land vehicles, too. Details are given in Cooper, "All Roads Lead . . ." (*Grantville Gazette*, Volume 10). Concrete is durable; the first concrete street in the United States was laid by George Bartholomew in Bellefontaine, Ohio in 1891, and is still in use (Snell).

It is worth noting that roads can be made either of reinforced or unreinforced concrete. Given the shortage of steel in the early post-RoF period, I expect that unreinforced concrete will be preferred.

Apartment and office buildings

The Romans built insulae (tenements), usually not higher than six stories, using masonry or unreinforced concrete. (Idorn 38).

The first reinforced concrete building (a two story servant's cottage) was built by plasterer William Wilkinson in 1854. More upscale homes were built using reinforced concrete in the 1870s, but they were "made to resemble masonry to be socially acceptable." The single most important reason for concrete construction was fear of fire. (Camp).

It is worth noting that while concrete itself is fire resistant, the furnishings of a building are likely to be flammable. Hence, as concrete buildings became taller, it became important to assure that one could easily escape the upper floors in case of a fire, and also that firefighters could direct water against an upper-story fire.

Edison wanted to mass-produce concrete houses for the betterment of the poor. The whole project proved to be a marketing disaster. While the first two-story homes were put on the market in 1917 for a mere \$1,200 apiece, none sold in the first month. "No one wanted to live in a house that had been described as 'the salvation of the slum dweller.'" (Peterson) So the fledgling concrete industry in Grantville should be careful how it markets its product.

The first concrete skyscraper (16 stories, 210 feet high, 50 x 100 feet base) was built in Cincinnati in 1904 (the Ingalls building). The columns were built first, then the walls, girders, joists and floor slabs.

Concrete ingredients were brought to the site and stored in the basement until needed. Mixing was done on-site, using a powered mixer (invented in the 1880s). One hundred cubic yards of concrete were produced on each 10-hour shift. The concrete was one part Portland cement, two parts sand, and four parts pebbles or crushed limestone. The compressive strength of the concrete isn't stated, but I would expect it to have been at least 2,200 p.s.i. in that period (and the steel to have a tensile strength of 80,000 p.s.i.). The total consumption of concrete was about 4000 cubic yards (Newby 274).

The total staff of workmen dealing with the concrete were 28 men, of whom nine wheeled cement, sand and stone, one attended to the mixer and ground hoist, two more to the hoist on the upper floor, four wheeled concrete on the upper floor, and twelve placed the concrete.

Three sets of forms (molds) were used; that is, while concrete was poured into one set, previously poured concrete was curing in the other two. The "floor cycle" was nearly three stories a month, with ten days to erect the molds for each story and two days to place the concrete. Molds were kept in position for about fourteen days after the concrete set, and, after they were removed, temporary struts were used to provide partial support for another thirty days while the concrete increased further in strength. The Ingalls Building was completed in eight months.

The principal floor panels were five inches thick. Supporting columns were 30x34 inches for the first ten floors and 10x10 for the remaining ones. The principal girders were 32 feet long, column to column, 27 inches deep, and 16-20 inches wide. The cross girders were 16 feet long, 18 inches deep, 9-12 inches

wide. The exterior walls were eight inches thick. After the second floor, the floor height was 12'6", which was a foot less than what would have been required by steel girder construction and hence effectuated a saving in construction costs. (Ali, "Ingalls"; Twelvetrees Bldgs., 101, 312-37; Taylor 611-12) .



The height achievable with reinforced concrete is largely a function of the strength of the concrete. The stronger the concrete, the slenderer the supporting columns on the lowest floors can be. In the 1950s, 5000 psi was considered high strength. (Prairie Material) . With 6000 psi concrete, Place Victoria in Montreal reached a high of 624 feet, and in 1970, One Shell Plaza in Houston ascended to 714 feet. (Camp). By the 1960s, 7,500 psi was feasible; such concrete was used in 1968 to raise Lake Point Towers, in Chicago, to 645 feet (seventy stories).

In the early 1970s, builders had access to 9000 psi concrete. The 859 foot Water Tower Place, the tallest concrete building in the world from 1975-1990, used 3000 psi concrete for the slabs and 9000 psi for the columns (with some assist from superplasticizers) (ConcreteContractor.com).

The taller the building, the greater the lateral wind force which it must resist. The "structural system" must be suitable. The classic frame (column-beam) construction is good only to about twenty office stories. A shear wall construction (1940) is appropriate up to perhaps forty stories. And so on (Ali).

For early high-rises, the concrete was hoisted to the working floor in buckets. In the 1960s, it became possible to pump the concrete to some floors. However, the higher the floor, the greater the pumping pressure required, and so, once the building reaches a certain height, it's back to buckets.

Bridges and Dams

In the United States, the first concrete bridge was built in New York in 1871, and the first reinforced concrete bridge was the Alvord Lake Bridge in California (1889). It survived the San Francisco Earthquake. The first concrete dam was built in 1887 in California, and the first reinforced concrete one in 1899 (Prentice 18).

Special Structures

The tallest unreinforced concrete structure in the world is an obelisk, the 351-foot Jefferson Davis Monument in Kentucky. It is 8.5 feet thick at the base and tapers to 2.5 feet at the apex. The Pantheon is still the largest unreinforced solid concrete dome in the world (43.4 meter diameter). It was constructed in seven years; the similar sized dome of St. Peter's in Rome took fifty years to build with stone (Davidovits).

Reinforced concrete can be used in the construction of monumental public structures characterized by long, open spans suitable for large public gatherings. These are often based on thin shells with load resistant shapes, singly curved (cylinders, cones) or doubly curved (spheres, hyperbolic paraboloids). Special structures have been used as stadiums, performance and exhibition halls, churches and factories. (Bradshaw).

Fortifications

The first concrete fortification was probably the Aurelian Wall, 12.5 miles long, and built in 271-275 A.D. using brick-faced plain concrete. The walls were initially 11.5 feet thick and 26.2 feet high. ("Aurelian Walls," Wikipedia). When concrete was rediscovered, and more particularly when reinforced concrete was invented, the world military powers took note.

Initially, any concrete fortifications we build will face just solid shot. However, the USE navy used explosive shells in the Baltic War, and this will inevitably be copied by other governments.

Gillette (185) reports that the amount of concrete required for two 12 inch gun emplacements at Staten Island, NY was 5609 cubic yards, and cost \$5.50/cubic yard.

I have a bit of data on the ability of unreinforced concrete to resist artillery fire:

—In an 1881 experiment, a Woolworth rifled cannon, of ten inch caliber, fired a 408 pound projectile at a range of 145 yards. It struck unreinforced concrete at a velocity of 1424 feet/second, and penetrated 13-17 feet. Under essentially the same conditions, the penetration into earth was 34.5 feet. (Mahan's Permanent Fortifications 163).

—One meter of concrete masonry is the equivalent of two meters of brick, or three of earth, when it comes to resisting a direct (flat) shot from a 1912 vintage field howitzer. (Fiebeger, *A Textbook on Field Fortification*).

—Heavy guns (e.g., an 80-ton gun firing a 1700 pound cast iron projectile with a striking velocity of

1580 feet per second) could expect to penetrate 32 feet of Portland cement concrete or twelve inches of steel-faced wrought iron. (Abbot, *Course of Lectures Upon the Defence of the Sea-coast of the U.S.*, 147)

—In 1897, six feet of hard concrete resisted shells of the eight inch B.L. howitzer, and at Port Arthur, 4.5 feet concrete proved sufficient to resist single shells. (Sydenham, *Fortification* 128).

Reinforced concrete is of course capable of offering greater resistance. The German World War II "Verstärkt Feltmessig" (Vf) were bunkers with three foot thick walls and ceiling, intended to protect the troops from a 50 kg bomb or a 105 mm artillery shell. The next level up were the Ständige Anlage (St), and in the Baustärke B (build strength B), they used 6.5 feet of concrete to hold of a half-ton bomb or a 220 mm artillery shell. (Regelbau).

A USMC Staff Officer's Manual (Hyperwar) compares the resistance of plain concrete, reinforced concrete and other materials to attacks by modern weapons ranging from small arms fire to 88-mm artillery. In general, you need 20-30% less thickness of plain concrete, or 20-50% less reinforced concrete, than brick masonry, to resist the fire. The difference is most pronounced for the less powerful attacks.

A material known as "very high strength concrete" (high silica content; low water/cement ratio, steel fiber reinforcement; steam cured), with compressive strength four times that of conventional plain concrete, and tensile strength almost three times, reduces penetration about 50% (Cargile).

Concrete fortifications can be used, not only to protect troops or guns, but also to channel the enemy. For example, there were the "dragon's teeth" of World War II, three or four feet tall pyramids of reinforced concrete, spaced so that tanks couldn't drive through.

Concrete Ships and Other Floating Structures

Yes, you can sail a concrete ship. This shouldn't come as a surprise, since all metal ships ply the seas, and steel is more than three times denser than concrete. One secret is displacement; the ship displaces a volume of water whose weight is greater than the weight of the ship, creating buoyancy, and that is possible because the hull encloses a lot of empty space.

Displacement is not the only secret. Since the 1960s, engineering schools have raced concrete canoes in competition (NCCC). Formal regional competitions began in the 1970s, and the first national competition was held in 1988.

At the competition, the teams must swamp the canoe (fully submerge it) and then release it. To qualify, the canoe must float up and break the water surface. That means that the concrete itself must be able to float. The modern concrete canoes use concrete mixes which weigh 35-50 pounds/cubic foot, whereas the density of water is about 62 pounds/cubic foot(Bie).

The cement is usually a blend of Portland cement and a pozzolan (fly ash, metakaolin, slag, rice hull ash, silica fume). Latex polymers may be added. The concrete is usually reinforced with metal, carbon, fiberglass or plastic fiber. The lightweight coarse aggregates used in these concrete canoes include glass and ceramic beads, epoxy coated styrofoam beads, perlite, and vermiculite, The concrete must be air-entrained (at least 6%). The mix is usually low in water (maximum water cement ratio is 0.5:1), to

keep strength high, and so superplasticizers are likely to be used to improve workability. (OSU, NCCC 2007 Rules).

Both West Virginia University and Fairmont State have participated in concrete canoe competitions since at least 1998 (their participation is mentioned in a 1998 issue of *Mountaineer Spirit* .) The American Society of Civil Engineers (ASCE) Virginias Conference (Virginia and West Virginia) was held at WVU on April 3-4, 1998, and WVU competed against teams from Old Dominion University, Virginia Polytechnic Institute, University of Virginia, Virginia Military Academy, and Fairmont State College. Virginia Tech won the regionals, but came in tied for last in the nationals, which were won by University of Alabama in Huntsville. Fairmont State has made it to the nationals four times, but all after RoF. So far as I know, WVU has never made it that far. The "winningest" team in the Virginias Regional Conference is certainly Virginia Tech, which made it to the nationals fourteen times (including 1988-95 and 1998-2000).

Which leads to the logical question: Are there any "Hokies" among Grantville's civil engineers?

* * *

The first known concrete ship was a small ferrocement boat built by Joseph Louis Lambot (1848) and exhibited at the 1855 World's Fair. The first ocean-going concrete steamer, N.K. Fougner's 84-foot, 600 ton *Namsenfjord* , was launched in August, 1917. Fougner went on to build two more, the *Patent* and the *Concrete* . There was also W. Leslie Comyn's 5,000 ton *Faith* , launched in May 1918. Her first cargo was 4300 tons of salt and copper ore, which she carried from San Francisco to Vancouver. (Thomas; Bender)

During the First World War, steel scarcities prompted the construction of twelve other concrete ships under government auspices, at a total cost of \$50 million. However, they didn't see any wartime use. One of these ships, the 420 foot oil tanker *S.S. Peralta* (launched 1921), is still afloat (as part of a breakwater for a paper mill in British Columbia).

Steel was again hard to come by during the Second World War, and at least twenty more concrete ships were built. All weighed 4690 tons and were 102.5 meters long; they were typically used as storeships. Some still survive as wharves and breakwaters. The closest ones to Grantville are the nine used to form a breakwater for a ferry landing at Kiptopeke Beach, Virginia.

So far as I know, since World War II, there have been no large merchant ships constructed using concrete. However, there have been quite a few amateur built "ferro-cement" sailboats. In 1984, Peter Freeman circumnavigated the world in a 32 footer, in the process setting the then record for fastest singlehanded nonstop circumnavigation in a sailing craft (236 days, 10 hours, 45 minutes).

I find mixed reports as to the durability of concrete ships. Clearly, they were capable of handling ordinary seas and winds. *S.S. Aspdin* (1944) was "caught in a hurricane with 60 to 80 foot high waves, but survived with minimal damage." Likewise, "in the course of a trip to Vancouver [the *Faith*] encountered an 80-mile gale and 35-foot waves. During this storm she made a speed of between 4 and 5 knots, considered an excellent performance under the circumstances." On the other hand, the *S.S. Cape Fear* "shattered like a teacup" after colliding with the City of Atlanta in 1920. (Thomas)

Thomas contends that concrete merchant ships were unable to compete economically with steel ships because they couldn't carry as much cargo relative to their own weight. Steel, of course, is more than three times as dense as concrete, but for a concrete hull to be as strong as a steel hull, it would have to be considerably more than three times as thick.

In the early post-RoF period, of course, concrete ships don't have to compete with steel ships, but rather with wooden ones. The navy and the railroads will gobble up most of the available steel. So there may be a window of opportunity for civilian concrete ship construction.

Concrete ships have some other advantages worth mentioning. As compared with wooden ships, they aren't vulnerable to marine borers, like the teredo worm. And they can be repaired easily (in fact, even steel ships sometimes carry ready-mix concrete for emergency repairs).

Kim Mackey has suggested to me, "for the Maghreb Regencies which consisted of a narrow green belt between the Mediterranean and the Sahara, making ships with a minimum of wood might be attractive." To this, I will add that there are quite a few other powers which are suffering acute wood shortages, including the Ottoman Empire proper, Spain, the Netherlands, and the various Italian states.

I can also imagine using concrete "floating batteries" to protect harbors.

Concrete Cannonballs

There is a "weird tech" proposal I floated on the Bar in 2006: might the Ottomans, or the Mughals, who at this time still use stone cannonballs, think it worthwhile to replace them with concrete cannonballs (or some other concrete projectile)?

A naval historian, Guilmartin (286), says that while cast iron cannonballs had a greater maximum range than stone cannonballs (presumably with the same cannon and equal weight balls), the stone cannonball, because of its lesser sectional density (about one-third that of cast iron), created less internal pressure within the gun for a given muzzle velocity . . . so the cannon could be lighter and thinner for a given projectile weight. Guilmartin also says that a stone cannonball left a larger hole than an iron one of the same weight.

Guilmartin attributes the demise of the stone cannonball to the problem of finding cannon ball cutters who could cut a smooth, perfectly spherical ball. In other words, labor costs were the problem. Much the same thing is said by another military historian, Cowley (49). A concrete cannonball would not have to be cut, since the concrete is cast in a mold. The mold has to have a hole for pouring in the concrete, so the resulting sphere may need a little bit of work—but much less than for stone. A visitor to Grantville (like the pirate's son in my story, "A Pirate's Ken") might even find some inspiration in one of those hollow or solid concrete garden spheres (Artistic Garden).

It is important to recognize that in the 1630s, the Ottomans and the Mughals, rightly or wrongly, thought that stone cannonballs better suited their tactical needs than cast iron ones. So, from their point of view, the issue is whether to replace stone with concrete, not whether iron is better than either.

It is difficult to say whether the concrete cannonball would be cheaper to make or not. On the one hand, you don't need to quarry and ship the right kind of stone, and you don't need skilled workers to carve it into spheres. On the other hand, if you use carved stone, you don't have to learn to make cement and how to mix concrete.

If the only reason for developing a cement/concrete industry was to make concrete cannonballs, that probably would not be reason enough. But there are plenty of uses for concrete, and if concrete is of

general interest, there isn't much incremental effort necessary to develop concrete cannonballs.

There was some debate on the Bar as to whether my proposed concrete cannonballs would fragment inside the barrel (bad) or on impact (good or bad, depending on whether you want to kill personnel with shrapnel or do serious structural damage to a hull or wall).

Since stone cannonballs were still in use, at least by the Ottomans in the Mediterranean, the real issue is whether concrete would be more vulnerable to premature shattering than carved stone. And, if so, could you work around this in some way.

One solution is to use a fiber-reinforced concrete. Scrap cloth or rope would probably work well enough. Another possibility is a bit of a cheat; take a large rough stone which is a little smaller than the desired cannonball size, put it inside the mold, and then pour in enough concrete mix to fill the mold. (To get the stone in, you will probably need to use a two part mold; plop the stone into one hemisphere and then put the other hemisphere over it.) The concrete is then more of a surface treatment, so you don't have to carve the stone to a sphere.

Another issue is whether the concrete balls would damage the gun barrel. Since the Ottoman pedreros (stone-throwers) work fine, I don't see why concrete would be any worse. If it is, then it can be given a smooth finish in a number of ways.

Concrete Pointed Shot

There is a reason that modern rifles shoot bullets (which have an "ogive" shape, that is, a cylindrical shank with a streamlined tip) rather than balls: you can increase the mass (and therefore the damage potential) without increasing air resistance.

Which leads, logically, to an inquiry into whether the Ottomans might make ogive cannon projectiles out of concrete. Concrete, of course, can be cast into any desired shape. But there are a few practical problems to be solved. First, when the projectile isn't spherical, if it is fired from a smoothbore barrel, it is going to tumble erratically, changing its aerodynamic profile as it does so. So, with an ogive projectile, you need a rifled barrel, and the projectile needs to be able to engage the rifling so it is spun (which gyroscopically stabilizes its flight).

A projectile with a cylindrical shape is going to have a greater surface area in contact with the barrel. While that means that the seal is better (less loss of gas generated by the combustion of the charge), it also means that there is more friction. So either the concrete must be finished so it is quite smooth (perhaps it could be glazed?), or it must be jacketed. There are modern concrete projectiles used in mining (see below) which are plastic-jacketed, but the Ottomans aren't going to have access to plastic so their jackets are likely to be metal (perhaps copper or tin).

U.S. Patent 3963275 (1976) is directed to the use of concrete projectiles in mining. The idea is that the effect is more controlled than with explosives, and boulders can be fragmented from a distance of perhaps 150 feet. According to the patentee, if a one-caliber granite cylinder (~ten pounds, five inch diameter and length), fired from a cannon, strikes a free-standing boulder with an impact velocity of 4,000 feet/second, the impact stress is about 1,750,000 psi. The patentee found that a ten pound concrete projectile could fragment 10-30 ton boulders with one shot and a forty ton boulder with two shots. Against a solid cliff face, the projectile broke out a mass of 1000-1100 pounds, leaving a crater

twelve inches deep and fifty inches diameter.

An earlier patent, 3695715 (1972), suggests firing (from a rapid fire breechloader) one kilogram, ten centimeter diameter concrete slugs, cast in a plastic casing, for rapid vertical excavation. Indeed, it even gives us a formula; crater volume (cubic inches) = $0.0005 * E^{1.25}$ (E, kinetic energy in foot pounds). So a one kilogram slug impacting at 1.5 kilometers/second would excavate 7.2 cubic feet (about 500 kilograms). The '715 patent says that stiff, dense projectiles, like concrete, are those most effective in breaking rock.

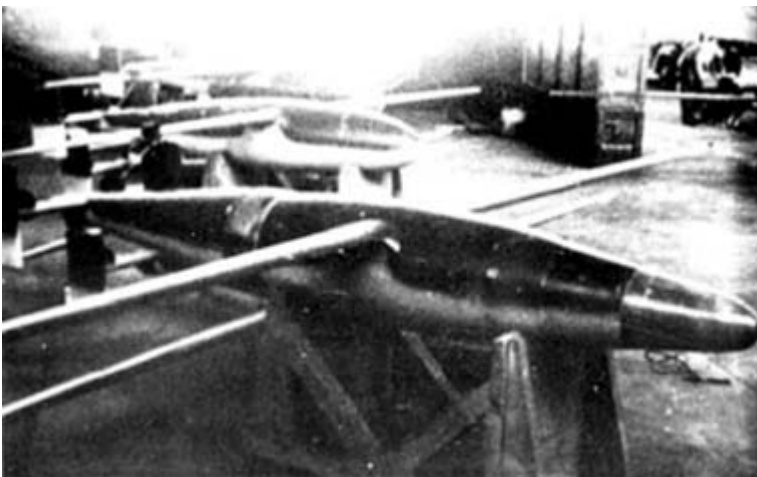
It is possible that the miners in Grantville have heard of this technique. But even if they haven't, the important point is that it is clear that a concrete projectile *can* be fired from a cannon and *can* damage a target.

Concrete Bombs

Concrete (non-explosive) bombs have been dropped upon military targets which are uncomfortably close to civilian ones. They have also been directed against military targets which you want to damage but not destroy; say, a bridge you might like to use yourself in a week or two.

These bombs might weigh 900 kilograms and strike the target at a speed of 200 m/s, which is faster than a rifle bullet. The energy release is proportional to the mass and to the square of the speed.

Concrete in Flight



Series production of the Blohm & Voss BV 246 glide bomb, featuring "die-cast" reinforced concrete wings, was authorized on Dev. 12, 1943. The bomb was suspended under the carrier aircraft, and the wings were bent so as to "spring" the bomb away when it was released.. The Germans used a "light" concrete obtained by a chemical additive which generated gas bubbles during the curing process, thereby increasing porosity. (BV 246; Bruner).

In 1949, Eugene Freysinnet, the inventor of prestressed concrete, helped Breguet Aircraft Company build wings, intended for a 4.8m long gliding bomb (Breguet-910), out of that material. The concrete was specially formulated, to a compressive strength of 14,000 psi, and had a density of 2.5. The prestressing, with aviation quality piano wires of tensile strength 280,000 psi, was intended to avoid surface cracking.

Each wing was made of two half wings, upper and lower, each with two matching spars, so the wing when assembled has three cavities. The thickness of concrete in the wing, which had a span of 4m, was 18mm at the root and 13 at the tip.

The normal load on the wings was 143 psf, and the breaking load was five times that. Presumably because of the relatively thick stressed walls, the prestressed concrete wings were 50% stiffer than comparable metal wings. Because the prestressed concrete wings didn't require much in the way of stiffeners, they weighed only 10-15% more than a conventional metal wing.

(Bruner noted the possibility of using a "mixed structure" wing, with concrete where stresses are high, and a stiffened light-alloy sheet used elsewhere.)

The concrete wings were well suited to mass production. Bruner says it took only 0.5 hr/kg to cast and finish a concrete wing, as opposed to 10 hours for a metal one (a ratio of 20). APMRTEF says production times were reduced by a ratio of 3.4 for batches of fifty wings, and 5 for batches of 500. The discrepancy could be attributable to smoothing and painting operations, which Bruner stated could take longer than the building of the wing itself.

Four hundred bombs were produced. Launched from an altitude of 5000m, they had a range of 50 km. The bomb was capable of both normal and inverted flight. (Bruner; ICJ; APMRTEF 98).

A French patent (958272) on constructing aircraft (!) structural elements out of prestressed concrete was filed by Louis Breguet in 1949. In his US Patent 2787042 (1957), he argued that concrete wings were much cheaper than metal wings, they could be fabricated with a very high degree of accuracy, they had superior torsional rigidity (leading to reduced elastic interference and thus, hopefully, improved acrobatic flight under heavy loads), and greater temperature resistance (temperature elevation limited the maximum velocities attainable by metallic aircraft).

Breguet, in US Patent 2776100 (1957), says that he actually constructed a fighter craft wing from concrete, and that there was only a negligible difference in weight between it and an identically shaped wing of light metal construction. He explains that the relatively thick wall sections of the concrete ring prevented local buckling and sagging, and thus reduced the number of local reinforcing ribs needed.

Breguet '100 describes an improved wing in which the cross-sectional area of the concrete is reduced as you move out along the wing; so as to correspond to the outward diminution in the bending moments resulting from the aerodynamic load. The desired airfoil shape is maintained by filling it in with a lightweight material.

Concrete Submersibles

The problem isn't with submerging concrete vessels, it's getting them back to the surface! Just joking. In

actually, a reinforced concrete personal submarine was built and used (in a lake) by Willfried Ellmer in 1996. It weighed 14 tons before ballasting, and had a seven inch thick hull, made of Portland "cement" reinforced with 4mm and 6mm steel in a 10cm mesh. Its design operational depth was 300 meters, and crush depth 900 meters. (diseno-art.com; sub-log.com; concretesubmarine.com).

Kathleen Ann Goonan, speaking about her novel *In War Times*, says the Weber plant produced some concrete submarines in 1945. (Goonan).

By 1998, there were rumors that the Russians were designing six-man concrete submarines equipped with rocket-powered torpedoes. Concrete is not only cheap, it is strong in compression. Which means that a concrete submarine might be able to descend below the 1800 foot crush depth for steel. And a concrete submarine will be more difficult to detect by sonar. (Wilson)

The Concrete U-Plane

Ah, Karl Heinz Lipschutz's U-Plane design of the late 1920s. No, it doesn't actually fly. It is a submarine with wings to provide additional lift, somewhat like a modern hydrofoil. Well, if we can put prestressed concrete wings on a plane, and give a submarine a concrete hull, I suppose we could make a concrete U-Plane.

Concrete Economics

According to Lipowitz (32), the 1868 cost of erecting a large (30 ton/batch) dome kiln was 120-150 pounds sterling, and the annual maintenance cost 30. In 1632-34 pounds sterling, the cost would be about one-third that (adjusting for inflation based on London building laborer's wages.)

The 1900 cost of construction for a rotary plant was \$50,000 (1250 pounds in 1632) for a 125 barrel/day kiln, and \$400/barrel capacity (with the possibility of reducing costs to \$300/barrel capacity with certain economies). The cost of a Dietsch or Schofer kiln was only \$200/barrel capacity but labor costs were much higher. (Ries/Clays 194-196). A 1903 USGS estimate (Davis) for a 300 barrel/day plant, with two rotary kilns, was \$91,000 (2000 pounds in 1632).

The first consideration in siting a cement plant is to locate it where it can economically obtain limestone, clay and coal. Ideally it is right next to suitable quarries. If not, the source should be within a few miles of the plant, or at least the materials are transportable almost entirely by water or rail.

Concrete can be made from rock which isn't directly useable as a building material because of cosmetic or structural flaws. Limestone with clayey intrusions is ideal "cement rock." Other "inferior" rock can be crushed into aggregate. Clay can be leftover material from the brick and ceramics industries.

Limestone, sand, etc. are readily available worldwide, so if the price of concrete gets too high, more kilns are built. (theoildrum.com). In part because it can be made anywhere, it is not cost-effective to transport concrete over long distances. The density of normal concrete is about 2.4 times that of water (Elert). So it is heavy. But imported concrete needs to be priced to compete with imported natural rock, and locally made concrete, so the price per unit weight is low. Even with a twentieth century transportation infrastructure, that limits the trade in concrete.

The situation is similar for cement, which has a density of about 2.1 times that of water (Logicsphere). The decision in the CEMEX anti-dumping case remarked, "The price of cement is largely determined by the transportation costs involved in delivering the cement. . . . The majority of cement produced in the U.S. is sold within 200 miles of the plant or terminal of origin."

This is not a new problem. Jamul Cement (California) found that it "cost about as much to haul cement by wagon the dozen or so miles to the railroad at Sweetwater Valley as it did to ship it [from Europe] around the Horn to the [San Diego] Bay." ((Burkenroad).

Likewise, the cost of transporting limestone, clay and coal affects where a cement plant can be sited.

The introduction of the rotary kiln reduced the price of concrete from \$2-2.50/barrel (380 pounds net) to around \$1/barrel (1895). (Eckel 501) In twentieth century America, cement prices, in constant 1998 dollars, were \$65-115/ton. The actual 1900 price was \$4/ton (1998\$78). (USGS).

Even in the early 1900s, concrete was cheaper than steel (Ali). In 1911 America, it was still more expensive to construct a house from concrete than with wood. But in 1902 Edison predicted to the press that concrete would become more economical as the forests shrunk (Peterson), and he was right. Western and Central Europe, in the seventeenth century, were already feeling the pinch when it came to lumber production, and in the new time line concrete may quite quickly acquire a cost advantage over wood.

Geography of Cement and Concrete Production

If one "data mines" the 1911EB, the following German towns can be identified as associated in some way with late nineteenth century cement production:

Central: Halle (has coal), Magdeburg, Eisenach (cement pipes).

Northeast: Chemnitz, Mittweida, Wittenberge, Bredow, Stettin, Dirschau, Oppeln, Hirschberg, Gleiwitz.

Northwest: Luneburg (near Hamburg—"owes its importance chiefly to the gypsum and lime quarries of the Kalkberg, which afford the materials for its cement works"), Wesel, Unna, Emden, Hoxter.

Southeast: Straubing, Heiligenstadt, Kitzingen, Weissenburg-am-Sand.

Southwest: Heidelberg, Karlsruhe, Heilbronn (also quarries for sandstone and gypsum), Biebrich, Ingelheim, Malstatt-Burbach (has coal), Kirchheim.

There is no guarantee that history will repeat itself, but whatever advantages these centers enjoyed in the old time line in terms of proximity to sources of raw materials, or to river transport, are likely to be reasserted in the new time line, too.

The first German cement works was in Stettin; other early ones were at Bonn and Mannheim. According to a 1900 cement industry survey, the largest operation in Germany was the Alsen Works, near Hamburg, which had plants at the clay deposit of Itzehoe and the chalk quarries of Laegerdorf. Marl, and clay below it, were exploited at Misburg, near Hanove, and at Luneburg. The Dyckerhoff plant on the

Rhine, at Amoeneburg near Mainz, was situated near a limestone-and-marl quarry, and coal was brought in (and cement shipped out) by water. Across the Rhine, there were similar plants at Mannheim and Weisenau. Finally, the survey mentioned that there had been works at Heidelberg. (ER, Chap. XXII).

Carsten Edelberger, in "Railroading in Germany" (*Grantville Gazette*, Volume7), notes that Bernburg (near Stassfurt, thirty miles south of Magdeburg) has big deposits of limestone and therefore could become a center of lime and cement production. I would add that the nearby Stassfurt lignite could, when burnt, be used as a source of fly ash. Stassfurt also has gypsum, which is used in Portland cement. There is sand available from the banks of the Elbe. The oldest and largest clay mining region in Germany is the Westerwald, but there are clay deposits in Thuringia and Saxony (Meissen), too. Also note that there is limestone at Kamsdorf, and clay at Kahla, both within a few miles of Grantville.

Plant Construction



I have tried to determine how quickly a Portland cement plant can be built, with only limited success. Bear in mind that a kiln by itself isn't going to make any cement. You need limestone and clay quarries, rock crushers and fuel, grinding machinery, and transport facilities. In Jamul, twenty miles from San Diego, construction of a cement plant, with two kilns, was begun April 1890; the kilns were only fired up in March, 1891. Part of the problem was that materials not available on site, such as fireclay and coke, had to be brought in by rail and then wagon-freighted over a dozen miles to the plant. With the plant infrastructure in place, it was possible to add five small pot kilns and bring them on-line in July, 1891. (Burkenroad).

Beginning in the latter part of 1881, the Walkill Portland Cement Company (NY) built sixteen dome kilns, with a total capacity of 200-300 barrels/day, and put them into operation in 1883. (Ries, 854). In 1893 the Glens Falls Portland Cement Company (NY) commenced construction of six Schofer kilns, with a total capacity of 500 barrels/day, and began production in 1894 (866). Under the right circumstances, it might be possible to build a single dome kiln in a month or two.

As for short rotary kilns, in 1899, the Catskill Cement Company (NY) built a plant, with two kilns, total capacity 300 barrels/day, and was shipping cement by July 1900 (862). In 1900, Helderberg Cement Company (NY) built a new plant, with twelve kilns, and a total capacity of 1500 barrels/day. (868).

OTL Chronology

Natural cements (that is, cements made from rocks which could be burnt without admixture and then ground to make a crude cement) were in use in the early nineteenth century in England (1796), France (1796/1802), the United States (1818/1824) and probably also Belgium.

John Smeaton improvised an artificial hydraulic cement in the late eighteenth century. There was experimental work in France and England during the early nineteenth century, and Joseph Aspdin received a patent for "Portland Cement" in 1824. This was improved by Joseph Aspdin and Isaac Johnson in the 1830s and 1840s. Nonetheless, in 1850, there were only four Portland cement factories in England.

French Portland cement production began in 1846 or 1850. The first German plant opened in 1852, and Germany manufactured 30,000 barrels in 1855.

Even though the Europeans could witness firsthand the strength and durability of Roman concrete (and it was surely for marketing purposes that Parker called his natural cement, "Roman" cement), this didn't lead them to rapidly adopt Portland cement for structural purposes.

The first large scale use of Portland cement was in the Thames Tunnel (1828), but it continued to be considered inferior to other cements until its use in the London Drainage Canal (1859). Portland cement was then used primarily for underground and underwater work until a shortage of structural steel in 1897-98 forced architects to place greater reliance on reinforced concrete. (Haber 21; Howe 10).

American Portland cement production began in 1872 and Canadian in 1890. The growth of the North American industries was retarded by the high cost of labor. In 1895, Americans consumed eight million barrels of natural cement (50 cents/265-pound barrel), almost two million of imported Portland cement (which traveled cheaply on ships as ballast), and only 335,500 barrels of domestic Portland (both \$2-2.50/376-pound barrel). The labor-saving rotary kiln made it possible to sell domestic Portland cement at a price of 88 cents (1904). (Eckel 501)

Germany had relatively low labor costs in the nineteenth century, so it was well suited to become a leader in Portland cement production. Production rose as follows: 30,000 barrels (1855), 2,400,000 (1877), 5,700,000 (1886); 12,000,000 (1892), 13,000,000 (1895), 18,000,000 (1900). World (primarily US and Europe) Portland cement production was 1.7 million tons in 1880, 2.5 in 1886, 7.5 in 1904, 11 in 1906.

The following per capita consumption values may be useful for estimating the post-RoF demand for cement.

Place	Year	All cement pounds /person	% Portland cement	Source
USA	1818-1830*	0.6	0	(1)
	1830-1840*	1.8	"	"
	1840-1850*	5.7	"	"
	1850	6.5	"	(3)

	1860	7.3 "	"
	1870	15.8 "	"
	1880	11.3 ~5%	(2)
		13.9	(3)
	1885	23.8 ~20%	(2)
	1890	43.5 ~32%	(2)
		50.2	(3)
	1895	51.8 ~42%	(2)
	1900	83.5 ~65%	(2)
		80.8	(3)
Germany	1895	70.9 ~100%	USGS1896
	1900	100.0 ~100%	Blatchley 11
Canada	1900	43.8	Bushnell 304
	1905	132.0	"

*annual average

(1) Eckel 242 (2) Eno 22, Mills 88 (3) PanCanalHrg

Population of USE in 1633 is about ten million. That of all Christian Europe (excluding Russia), ~75 million. (http://www.1632.org/1632tech/faqs/eur_pop.html).

Because concrete is primarily a building material, the demand for cement should increase as the population increases. But that of course isn't the only factor. The private and public sector have to be able to afford new construction. Per capita GDP might be a good measure of economic prosperity .. but of course it isn't easy to find GDP figures for the "old" seventeenth century, let alone the new one!

Jackson (25) gives the following chronology for the increases in the standard strength of Portland cement concrete, which I have annotated:

Year	Strength (psi)	Related Tech
<i>1800</i>	400 (Parker's "Roman" cement)	natural cement
<i>1850</i>	800 (William Aspdin)	higher clinkering temp
<i>1875</i>	1600 ("German")	chemical analysis/QC
<i>1887</i>	2300	continuous vertical kilns
<i>1905</i>	2800	long rotary kilns, ball mills
<i>1918</i>	3600	Abrams analysis of water/cement ratios
<i>1930</i>	3900	fly ash
<i>1946</i>	4500	
<i>1966</i>	6000	superplasticizers

Proposed Chronology

It's head extrusion time. . . .

Please bear in mind that there are a variety of scenarios for the evolution of the cement and concrete industries after the Ring of Fire. There are several big questions:

- 1) will investors insist on seeing that buildings made with "post-RoF" cement-based concrete are standing up before investing in cement plants "back home"?
- 2) how quick will be the growth of the supply of skilled workers, especially chemical and engineering technicians who can do the periodic testing needed to assure a high-quality cement?
- 3) how quick will be the growth of the transportation infrastructure necessary to support the economical movement of raw materials and finished product?
- 4) when will there be an adequate supply of steel for use in reinforcing concrete?
- 5) how interested will builders be in using unreinforced concrete?
- 6) what will be the relative costs of labor and fuel?
- 7) What is the risk and profit potential of cement-making and concrete construction, compared to other industries?
- 8) What will be the rate of increase in new construction over the first decade after the RoF and what fraction of the new construction will be using concrete?

The scenario outlined below is based on one set of possible answers to those questions.

Late 1631-end 1632. A simple dome kiln is constructed at Kamsdorf for use by the Grantville Tech Center research lab. Adding clay from Kahla, a crude Portland cement is made. By year's end, production is running four to six tons a day.

Fly ash from the power plant is tested as a possible pozzolan for blending with the Portland cement. Various fine and coarse aggregates from nearby (e.g., sand from the banks of the Saale?) are also tested.

Some of the dwindling supply of up-time cement is used in comparison testing, and some is used in demonstrations for down-time dignitaries so they can see how concrete is mixed and poured. The compressive strength of concrete made with only down-time cement is probably in the 1000-2000 psi range.

1633. Trass is imported and tested in blended cements. (Once the steel mill is in operation, blast furnace slag will be used as a pozzolan and as an aggregate.) Quality control on the rawmix improves, and concrete made using down-time cement achieves compressive strengths in the 2000-3000 psi range.

Unfortunately, steel is hard to obtain (at least in the USE), thanks to the ironclads and the railroad, so there is experimentation with other forms of reinforcement. Cement demand, and therefore production, is primarily limited to the Grantville area, as a result of both skepticism as to the utility of unreinforced concrete, and the limited transportation infrastructure.

New dome kilns are built at Kamsdorf, and total cement production capacity is probably 10-50 tons a day. Higgins Hotel built in Grantville to showcase the "new" technology and ramp up cement demand. (Bear in mind that to build an Ingalls Building equivalent, you will need something like 1000 tons of cement.)

1634. The railroad connects Grantville to Halle in spring 1634, and dome kilns are built there. The railroad is also being built southward from Magdeburg, and once it gets there (July 1634?), more dome kilns are built and concrete construction begins in Magdeburg. The end of the Baltic War in mid-1634 allows much more steel production to be devoted to rebar. In late 1634, kilns are constructed in the areas of Hamburg and Stettin, and perhaps somewhere on the Rhine.

European daily cement production jumps to perhaps 50-200 tons, and includes small-scale production outside the USE. That assumes per capita demand of about US 1860-1870 levels in the USE, and early 19c levels elsewhere.

1635. The completion of the Grantville-Magdeburg railroad line in mid or late 1634 facilitates movement of coal, clay, limestone, and cement, increasing supply and demand. Dome kilns pop up in many parts of Europe, wherever there is a reasonable convergence of raw materials, demand, and transport. It is difficult to predict where, since warfare will interfere with construction, but England, France, and Germany were leaders in the early European Portland cement industry. Outside the USE, cement plants are likely to be located near navigable rivers, to reduce transport costs and to provide power for crushing and grinding mills.

A cement plant with **continuous** vertical kilns is constructed, possibly near Stassfurt, to reduce fuel consumption.

Cement production could easily be expanded to the 1000-2000 ton/day range. The catch is that I don't think the population and economic productivity levels will be high enough to support that level. Based on the relationship of cement production (see above) to historical American/European GDP and population (Maddison), I would guess that the economic and population level of Christian Europe and its colonies in 1600 would have supported production of something like 60,000-140,000 tons annually (had the technology existed back then!). Multiply that by however much you think makes sense as the economic impact of the RoF. Bear in mind that when China industrialized in 1990-2000, its annual growth rate in cement production was only about 12%.

1636-40. Hoffman ring kilns and continuous vertical kilns proliferate. By 1640, 3000 psi concrete is standard and specified for most building jobs.

Note the omission of any reference to rotary kilns. While the growth of the transportation infrastructure will facilitate shipment of raw materials and cement, and wages are going to be rising, fuel costs are likely to be high enough to discourage pre-1640 adoption of rotary kilns. At most, we might see some experimentation with prototypes.

Once the economic incentive is there, it will probably be possible to achieve the first workable rotary kiln in 1-3 years (significantly faster than in OTL).

Conclusion

The twentieth century has been called the Atomic Age, the Space Age and the Information Age, but with some justification it could be called the Concrete Age. Yes, concrete was used before the twentieth century, but more money is spent on concrete construction than on atomic reactors, space ships, or even computers. In 2005, six billion cubic meters of concrete were made. It remains to be seen whether, in the new time line, the seventeenth century will become the "New Age of Concrete."

Bibliography

The bibliography for this article is extensive. Hence, it has been posted to the FAQ section of www.1632.org.

* * *

Fire Breathing Hogs

Written by Kevin H. Evans



Prologue

Engineer Lothar Schneider walked into the crew office. Glancing up he checked out the assignment boards and spotted his name. Yeah, there it was. He had received the first run.

He turned and saw his fireman hang up his time card. "Otto, are you ready?"

Otto sauntered over, wiping beer from his mustache. He must have just come from breakfast at the inn. "Ja, I think so."

Lothar stuck his thumbs in his overalls. He was very proud of this opportunity. "Today we are assigned to the large new engine on its first run."

Otto pulled the job assignment board off the wall, and looked at all the pages. "Lothar, are you sure it will pull a train that big?"

The engineer nodded. "The *Locomotive Werk* says it will. They have not been wrong before."

Out in the yard the hostler, Carl, had placed the engine on the drill track. Lothar started at the nose, walked down the fireman side, and around the tender at the rear, then all the way back to the engineer window.

The hostler came out and followed Lothar on his inspection walk. "This locomotive's a real monster, with twice as many driving wheels as anything anybody has ever seen before. Do you think you can handle it, Lothar?"

Without answering the hostler, Lothar and Otto climbed into the cab. The hostler had done his work well. There was a full head of steam and the fire was burning nicely.

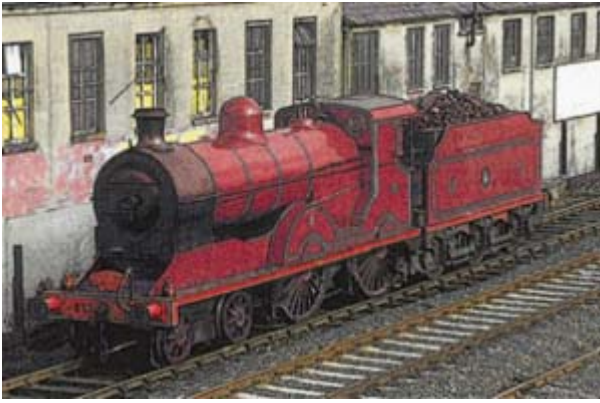
Lothar stuck his head out of his window. "Yes, Carl. I think we can handle it. You got everything just right."

Otto put the lunch buckets on the oil shelf attached to the backhead. Together they made the checks to see that all was ready. Lothar opened the starting cocks, grabbed the throttle, and notched the link up. Gently easing the throttle open, toggling the sanders and adding a little sand to the track, he began to move the giant machine.

* * *

Industrialization the way we have described it in the 1632 universe will demand enormous amounts of material to be moved from one location to another. Perhaps the largest material movement will be that of supplies and raw materials for the steel industry. In the quantities we need, steel cannot be made by hand. By 1635 steel manufacturing will need to be producing thousands of tons of steel a year. Each ton of steel requires the movement of three to five times as many tons of raw material that are required to produce one ton of steel. All of this material cannot be moved by hand with the available workforce. Also, all of this material does not exist on the production site and must be brought to the production area. This means that we have to move a lot of stuff to get to the industry level we want. Moving all that stuff will be mostly the job of the railroads and river barges. These are the only two forms of transportation that will have the capacity to move the quantities we need. This will require the railroads to grow in size and capacity, and it will require material-handling equipment for the barges.

In addition to material handling, transportation of people and transportation of finished goods will demand much higher capacity from the railroads. In fact, finished goods and agricultural production will consume much of the railroads' capacity. Large urban areas are supported by the countryside around them. Food, finished goods, and many essentials will need to be transported into the cities from that countryside. This transportation, especially over a long distance, will require the railroads.



To increase in size, a railroad will need to put more track on the ground. This will require the acquisition of the right of way (the land the railroad is built on), and large gangs of men to build the railway. To increase capacity, the railroad will need more cars. These cars will need to be capable of moving the cargo that will be given to the railroads care in a safe and swift manner.

The increased capacity and the longer distances serviced by the larger railroads will mean more cargo will move across the rails. This will require longer and heavier trains. To move these trains, the railroad will need either multiple locomotives or a much stronger locomotive.

In our timeline the railroads responded to this need by first adding a third set of drivers and then almost immediately a fourth set of drivers to the locomotives. The Whyte classification of this locomotive is 2-8-0; meaning that the locomotive will have two pilot wheels and eight driving wheels. The locomotives were commonly called "Consolidations" in our timeline.

This class of locomotive was built in greater numbers than any other. The driving wheels were smaller in diameter than the wheels of dedicated passenger or even dual-purpose locomotives. With 55 or 60 inch drivers, the locomotives had a limited top speed but were able to pull much larger loads. This is because the smaller drivers allowed the use of more torque, giving a higher adhesion, and a much greater draw bar pull. At a weight of 60 to 200 tons these locomotives were the beginning of what we now call superpower. With a draw bar pull of 20,000 to 40,000 pounds they are capable of pulling 30 to 60 fully loaded freight cars. These locomotives became the backbone of the freight moving capability of the railroads.

In the new timeline, there will be a need to move really large quantities of raw materials. This will demand large, powerful, machinery. The locomotives don't need to be very fast; top speeds of 45 to 60 miles an hour are more than sufficient, but they do need to be strong and reliable. The Consolidation class fulfills this need in every respect.

By the time the locomotives are needed, the Locomotive Works will need to have been moved outside of Grantville. A locomotive building shop is a large noisy industry. There will be a need for heavy tooling, large riveting equipment, and heavy fabrication machinery. The first of this class locomotives will probably be constructed by doubling the frame of a 4-4-0. This will also involve using larger cylinders and stronger driving rods. The suspension will probably be equalized by connecting the pilot truck and the first two drivers as one suspension point and coupling the rear three drivers on each side as the other two suspension points. This will allow a smooth operating, well suspended locomotive.

Build time for the prototype will probably be on the order of two to six months. The design will incorporate as much of modern technology as possible. This locomotive will be the core of the motive power pool available to the industry. With this locomotive the railroads in the new timeline will achieve a

plateau in development that will not need to be changed for a fairly long period of time. Not until roadbed quality and speeds increase greatly will larger power be needed. With the addition of this class, locomotives will begin to be numbered rather than named, as there will be many more locomotives in existence.

Because of the information available from Grantville, interesting developments could be added to these locomotives. Automatic lubricators, roller bearings, and powered stokers will be well within the capabilities of the builders.

Another interesting thing to add would be a condensing tender. This was developed in Germany in the 1940s, and reduced the amount of water needed per run. What they did was run the exhaust steam back into the water supply where it was condensed and re-used. Draft for the locomotive was accomplished by using large blowers mounted in the smokestack.



All of these improvements would significantly increase the capacity and efficiency of the locomotive. Further, because of information out of Grantville, the large locomotives would be able to leap over many of the dead ends and false starts experienced in our timeline. In my opinion, this, added to the pictures from the sources in Grantville, would combine to create locomotives that would look much more 1950s than 1850s. Also there is a large emotional component about what a locomotive should look like. This might add to the modern appearance of the locomotive.

With this locomotive we have a fully mature motive power industry. By their very nature these locomotives will inspire the people of the USE. Large numbers of mechanics, boilermakers, steamfitters, and other trades will be needed. This will move large numbers of people away from agriculture and into industry, creating a technically-minded culture. This will cause enormous changes in society. Labor and management, accountability and the division of profit will become a real concern. The people in this industry will be the very definition of workers. Therefore, this locomotive could become a symbol of how technology changes culture.

THE END

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