

## Chapter 1 - BluestoneCutter

Professor BluestoneCutter sat leisurely sipping his mid-day tea from his second story deck while looking out over the SouthCentral City harbor and the South Ocean beyond. He adjusted his light sweater, a little more snugly than regular. Although it was mid-day and clear, it was a nippy 18 fB<sup>1</sup> with the typical slight breeze from the northwest.

Normally at this time of day he would be working at his office in SouthCentral University. But today was LowSun day, and like every year, he took it off to relax at home and take in his view. As he looked South, his view was slightly obstructed by the Sun hanging just a few Sun widths above the horizon. As indicated by the day, the sun was at the lowest high-point of the year, just a few degrees above the horizon. But as it hung low in the sky, he felt fortunate being on the South shore. Many of the northern cities would see no sun today, and in fact had already entered the long night; some of them more than a dY<sup>2</sup> ago. But being on the south coast the sun never entirely vanished, but would at least peek out just above the horizon for a little bit each day.

Moreover the northern shore was about 15 degrees colder, getting down to -10 fB<sup>3</sup> in the middle of the night now, versus always staying well above freezing on the South coast. He knew here it could get balmy in the warm session, getting as high as about 30 fB<sup>4</sup> in the day, but also staying around a mild 20 fB at night. The North coast, about 50,000 kL<sup>5</sup> to the north, would never get much higher than a brisk 15 fB in the warm season.

On the other hand, going south was definitely not better. The 3-day rains abruptly stopped within about 1500 kL<sup>6</sup> south of SouthCentral City, and this seemed to happen at the same latitude around the entire northern region. So the land masses extending out to the southwest and southeast of habitable Necedah were vast deserts. Moreover, besides being parched, they became hot very quickly. Prior to last cool season, research ships had only made it as far south as about 20,000 kL<sup>7</sup>, both along the eastern and western southern coasts. At 20,000 kL down, it was about 15 degrees warmer there. So instead of a chilly 18 fB, it would now be around a warm 31 fB. In the warm season, it would be a

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<sup>1</sup> 18 fB (Freezing to Boiling scale) = 64.4 degrees Fahrenheit = 18 Celsius

<sup>2</sup> dY (1/10<sup>th</sup> of a Necedah year) = 1.02 months

<sup>3</sup> -10 fB = 14 Fahrenheit = -10 Celsius

<sup>4</sup> 30 fB = 86 Fahrenheit = 30 Celsius

<sup>5</sup> 50,000 kL (thousand standard Lengths) = 51,420 Miles [1 kL = 1.028 miles]

<sup>6</sup> 1,500 kL = 1,542 Miles

<sup>7</sup> 25,000 kL = 25,710 Miles

nearly unbearable 45 fB midday. Models for 40,000 kL south indicated it was another 15 fB warmer there, getting up to 60 fB midday in the warm season, and never getting much below 35 fB in the middle of the night in the cold season.

He and his collages debated what it was like near the equator of the Necedah. Although they had clearly never taken any measurements from there, the learned consensus was that it was almost certainly near 100 fB all the time, with the water so superheated the thought was it would be more plasma than ocean, but keeping the temperature just below boiling. Between the distance – almost 540,000 kL south - and the extreme temperatures, he couldn't imagine how anyone would ever be able to see that area, much less ever survive there.

“Yes,” Professor BluestoneCutter thought to himself, “this is just where I want to be. My little piece of Paradise.”

Turning his attention back to the serene view, as long as Professor BluestoneCutter diverted his view a little east or west to avoid looking directly into the Sun on the horizon he could take in all the vantage point from his deck had to offer. In the harbor, he was taken in by the majesty and beauty of the Clipper ships coming in and going out of the harbor. For hundreds of years, they had been the backbone of cargo commerce between the other coastal cities of Necedah. The beauty and elegance of the design showed the maturity of both the art and science of Clipper ship building.

But as his focus changed, he was just as impressed by the wonder of the new class of steamers also making their way in and out of the harbor. They were just one of the marvels coming out of the current and accelerating Age of Discovery. He had read that almost all the new ships being built were steamers. He pondered that while they were faster and could keep a schedule more dependably than the Clipper ships, the steamers also had the flaw that they had to be fueled. While new fueling depots were being built along the coastal cities radiating out from the main hub cities, there weren't enough of them to make the 50,000 kL journey to either SouthWest City or SouthEast City. So, at least for the time being, the steamers were restricted to regional transports, leaving the Clippers for the long journeys between the hub ports.

As he took another sip of tea, his gaze wandered from the harbor to the city around him. There were very few other two-story houses in SouthCentral City, giving him a very commanding view of the harbor and surrounding city. Most of the buildings were still made of wood, but more and more were made out of brick, or, for the more grand structures, stone. Looking upon the city around him, he reflected how

lucky he was to be in this house. His position as Professor Emeritus of Meteorology at SouthCentral University afforded him both the prestige to have it and the time to enjoy it.

Professor BluestoneCutter reflected how he had come to live here. There was almost unlimited amounts of land available in Necedah. With about 5 billion square kL of land, the population of 500 million citizens hardly made a noticeable dent in it. There was so much land that it was free for anyone take as long as there no one else had built there. Moreover, with so much free land, it was culturally taboo to sell it, although once you built there you could ask a fair value for the building on it. However, the value was usually calculated on the labor it would take to build a similar house, without consideration of the land beneath it. Still, even though there was ample land to just take, and it had no inherent value, some land was more valueless than others. So any existing land that had a building in a good location, tended to be passed down or given away rather than selling for building value. This particular spot of land of his was about a half mile from the University and two blocks from the harbor, and had been given to the University about 200 years ago by another professor who had first built here. As the ranking Professor Emeritus, he was able to choose this place when the last Professor who lived here retired and moved to the retired Professors homes that were built by the university about 50 kL inland. Professor BluestoneCutter loved this location and was going to keep working as long as he could just so he could keep enjoying it.

In large part he had earned the title of Professor Emeritus by winning the Central Science Academy's Renowned Discovery award. This was the most prestigious Sciences award in all of Necedah and was only awarded a to a maximum of one research professor each year at the annual Science Academy conferences, and only then if the discovery was deemed worthy of "A discovery that shapes the way people live and allows the citizens of Necedah to achieve a better standard of living". In fact, historically, it was only awarded 38% of the time. The other 62%, no one was given the award that year. So in a 10 year period, it was typically given out only about 4 times.

Professor BluestoneCutter had won the award for his discovery of why the 3-day rains could vary their stop and end time. The environment in Necedah was very predictable and very regular. Every 3 days it would rain for about 5 cD<sup>8</sup>, for a total of about 1.5 cL<sup>9</sup> of precipitation. However the rain's start and stop time could vary by almost 9 cD<sup>10</sup>. Professor BluestoneCutter had shown that by tracking the speed

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<sup>8</sup> 5 cD (1 cD = 1/100<sup>th</sup> of a Necedah day) = 3.6 hours.

<sup>9</sup> 1.5 cL (1 cL = 1/100<sup>th</sup> of a standard Length) = .977 inches

<sup>10</sup> 7 cD = 5.1 hours

of clouds in the sky above for the days preceding the rain, you could predict if the rains would start sooner or later. If the clouds moved slower than average, the rains would arrive later, if they were moving faster, it would arrive faster. He developed a formula that allowed people all over Necedah to predict the rainfall arrival within 4 mD<sup>11</sup>, which led to his award by the Academy. Because of that award, he was only one of 2 Renowned Discovery award winners in all of Southcentral University's staff and was one of only 4 Professors given the rank of Emeritus.

Being an Emeritus definitely came with its privileges. He was allowed to either lecture or do research, or a combination of both, as he preferred. Moreover he was given priority scheduling to all the research facilities, had unlimited access to all the labs, and could teach any classes he decided to teach. He was commander of his own destiny. Professor BluestoneCutter had decided to lecture one class each year on advanced Meteorology studies, that was only open to students he invited, and conduct research about 100 cD<sup>12</sup> hours each dY<sup>13</sup>. Of course, he could choose what to do in his research hours, so he could finagle them to however he wanted to spend his time.

But despite all the flexibility he had with his time, he still chose to officially take this day off each year as one of his 7 vacation days, just to enjoy what he had achieved.

Professor BluestoneCutter, taking another sip of his tea, looked down at the postal mail he had brought up with him. He sorted through the typical stack, seeing the normal letters from other professors and colleges, as well as official documents.

While going through them, he silently chuckled to himself as he noted the addressee: *Professor Emeritus Nord BluestoneCutter*. It had been over 250 Ys<sup>14</sup> since a cast system of hereditary labor skills had been abandoned. True, for as long as history recorded before then, a culture had developed where a father would pass down his trade to his son, who would pass it down to his son and so on. Changing your trade was never a consideration, much less an option; that's just how things were done. Women had a little more flexibility in that they could marry into any cast; but once married into it, that was their position for the rest of their lives, just like their husbands. And this system worked with great efficiency. Since Necedah's weather and crops were so dependable and consistent, although the population changed, the proportions between the various trades didn't. Whether you were a carpenter, a farmer,

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<sup>11</sup> 4 mD (1 mD = 1/1000<sup>th</sup> of a Necedah day) = 17.4 minutes.

<sup>12</sup> 100 cD = 72 hours

<sup>13</sup> dY (1 dY = 1/10<sup>th</sup> of a Necedah year) = 1.02 months.

<sup>14</sup> 250 Y (Necedah year) = 208.7 years

an ironsmith, or a teacher, there was a set, consistent need for your services, for life. Everyone could contribute and have a life with abundant food and ready shelter – as long as every man did what his father did.

But the beginning of the Age of Discovery a couple hundred years ago changed that. Suddenly the demand for certain skill sets changed. There was an increased demand for iron smiths, and educators, and a whole new class of trades needed in the arts and sciences as discoveries started to make things both more beautiful and more efficient. At the same time, certain trades were being replaced with contraptions and devices, decreasing the need for them. Hence society had to change and abandon the cast system and permit men, and increasingly women, to move to the trades and professions where they were most needed and removed from those that were being reduced.

It had been 3 generations since Professor BluestoneCutter's great-grandfather had made a living from precisely cutting the valuable Bluestone. Yet, there was no move to eliminate the deep tradition of taking your fathers "tradenname" as your tradename, even though it was now probably not their trade for nearly half the population, and decreasing more so with each generation.

Returning from his internal chuckle which had descended into an intellectual self-lecture, the Professor continued reviewing his post stack, this time with a little more deliberant effort. He always paid a little more attention to those from further away. Letters coming from CentralCentral University, just 25,000 kL away, would normally take 1½ dY to get to Southcentral City by Yatz express. NorthCentral City, SouthWest City, or SouthEast City, all about 50,000 kL away would take 3 dY. Those from NorthWest City or NorthEast City, about 70,000 kL away, would take a little less than 5 dY to reach him. He knew those letters were important enough to wait a long time for a response. Alternatively, local letters were typically of a more mundane nature.

However, that wasn't always the case today. In flipping through the letters, he saw a package from CentralCentral Science institute, an arm of the Science Academy. And a package was definitely more attention grabbing than a letter. The weight and size of a package via Yatz express from one of the other hub cities cost much more than a typical letter, and hence had relatively more importance.

His first thought was that this was the formal package discussing his lecture at the SouthCentral Science Academy meeting in about 2½ dY, where he was to give a lecture on "Challenges in Predicting Daily Temperatures to 3 Significant Figures". The distance between the hub Cities was too great for people to travel between for casual reasons such as a conference – it could take from 3 dY to over a year to get

between the hub cities, and traveling by Yatz was never described as comfortable, even on the more elegant services. So every year each of the 9 hub universities would hold a regional Scientific Conference, where a number of talks on various scientific topics would be given. Each regional conference would then send the papers for the talks back to CentralCentral University, who would collect all of them, and disseminate them to the 9 University Libraries. One of those papers, if it was uniquely insightful enough, might be nominated for the Renowned Discovery award. If it was truly life changing, it might even win.

He had heard of papers in other regions that might be so incredible as to overshadow the winner from two years ago who had produced a paper on *“Commercially viable Electricity Generation and its Uses”*. That paper had launched initiatives in all the Hub Cities that had already surpassed the use ideas presented in the paper. But now he was told there were papers on two other revolutionary concepts.

The first, titled *“Instant communications between Cities using Electrical Signals”*, was a presentation on how using simple variations in open/closed circuits between the cities utilizing a coding system could allow for transcribing information instead of having to wait for it to be delivered by Yatz. The concept was not entirely new, but there were substantial hurdles to be overcome. For one thing the degradation of the voltage over long distances precluded a direct connection. Additionally, speed of light considerations would cause about a  $4 \mu\text{D}^{15}$  delay between the most distant hub Cities; the actual delay would be much greater. But the author had come up with an innovative way to re-amplify the signal along the way. Therefore, the signal could, in theory, go as far as possible. Additionally, they had developed a coding language that would allow for acknowledgements and transmitter reversal for bi-directional communications.

The second paper, *“Using Steam Generation to produce Inter-City Land Transportation Devices”*, was a joint concept by Citizen Nash ShipBuilder and a young CentralWest research professor to put a smaller version of a steam ship engine in a rail based land vehicle larger than an ore hauler that would allow for large scale cargo hauling as well as travel between the cities as fast as, and maybe faster than, Yatz transport. The concept, if practical, would not only change the fabric of long distance travel, but also allow for relatively comfortable travel between the cities.

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<sup>15</sup>  $4 \mu\text{D}$  (1  $\mu\text{D}$  = millionth of a Necedah day) = ~1 second

It was truly a fascinating time to be alive, and he was anxious to see and read those papers, one of whom could very well will the Renowned Discovery award.

As a former winner, Professor BluestoneCutter was not eligible to win again. However, he was automatically one of the judges for all future awards as long as he was alive, and as such he had a good idea who the next year's winner might be from this year's papers. But the other, more important perk, at least in his mind, was that he was guaranteed a talk session if he wanted one; and his research had gone far enough that he had asked for a spot at this year's SouthCentral regional conference.

But as soon as he opened the package he noticed it wasn't for his lecture session, but instead was the monthly weather data he received as part of his research. As he started sorting through the data he grimaced to himself, half out of concern, and half out of annoyance.

Due to the time it took to transport the package, the data was mostly too old for his needs. For CentralCentral that data was 2 dY old, and for NorthCentral, SouthWest and SouthEast Universities the data was 4 dY old. For the other Universities it was even older. For his immediate concern, only the 2 dY, 3 dY and 4 dY old data had any relevance.

As the title of his talk this year - "Challenges in Predicting Daily Temperatures to 3 Significant Figures" - suggested, the temperature on Necedah was incredibly predictable and consistent. But 4 dYs ago, Professor BluestoneCutter had noticed that average temperatures over the dY was down by .05 fB over expected. Still well within the monthly statistical uncertainty of .07 fB. But the next month was down by .10, then .18, and last month it was down by .32 fB beyond expected. While all were not individually that far off, being down in the same direction, and also increasing each month, definitely got his attention. Not wanting to cause any undo concern, he had not gone over to Profession Rewt YatzshoeMaker's office yet to have him run the statistical numbers; but Professor BluestoneCutter suspected that three small variations measurements that were steadily and increasingly moving in the same direction each dY for 4 dY in a row, would, in fact, be very statistically relevant.

Professor BluestoneCutter had also convinced himself that a much more rational reason was that there was a systematic problem with the temperature equipment here in the SouthCentral facilities, and it was producing increasingly faulty and skewed measurements. However, the data from the other Universities was consistent with his data. All the cities showed a .06 to .08 fB decrease 4 dY ago, and CentralCentral University showed a decrease of .11 and .17, 3 dY and 2 dY ago, respectively.

He wasn't sure what the implications of this was yet, but he felt in his gut it wasn't good. But more to the immediate concern, it was going to really throw a wrench into his talk about "*Challenges in Predicting Daily Temperatures to 3 Significant Figures*" when the temperatures were shifting below the expected averages, and in an apparent non-linear fashion, making prediction even harder.