Getting Run Over by a Ford Model T

Somewhere around 1950, I was run over by a Model T. Don't worry. I survived it, but a few lessons were accumulated along the way. First of all, a little background:

The Ford Model T was the most popular car during the first twenty-five years of the twentieth century. Ford produced fifteen million Model Ts from 1908 through 1927. The peak years were 1923, 1924, and 1925 when roughly two million were produced each of those three years. The car that ran over me was a 1924 Model T Tudor (two doors) like the one at right.

In 1924, 62.33% of the cars produced in the United States were Fords.

The Model T was a very simple car that remained quite unchanged during its twenty-year production run. Henry Ford, pictured at right, believed in simplicity. The car was simple enough that almost anyone could fix it -- even some Congressmen.

The car that ran over me belonged to our neighbor, Wayne Clark, who was a few years older than I was. There were five children in the Clark family; Lorna, Wayne, Don, Bob, and Marion. The parents, Roy and Olive were good friends of my parents and we were all good friends. Bob Clark was in my high school graduating class.

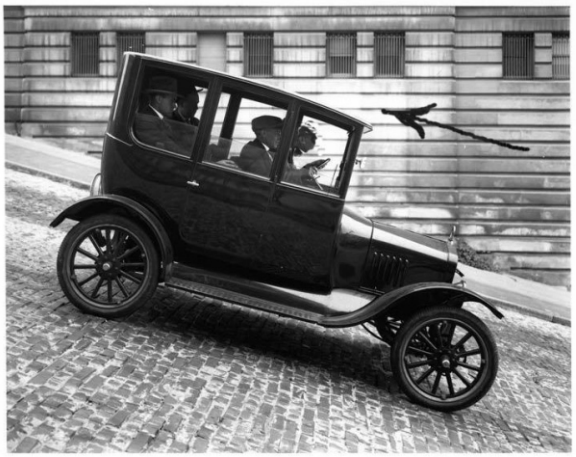
Wayne Clark went into the Marine Corps when he graduated from high school. When he came out a few years later, he first bought a 1949 Mercury.

About a year later, he purchased the 1924 Ford Model T.

Even though the Model T Ford was the best selling car of its time, the car did have some peculiarities. Instead of brakes on the wheels, the major brake was on the transmission. It worked, but not very quickly, so there were a few accidents when the car could not stop soon enough.

There was also a little problem with the steering. If the steering wheel was turned too quickly, the wells might "jackknife" and fold up underneath the car.

Another peculiar attribute of the Model T was the fact that the car had no fuel pump. The gas was delivered to the engine only by gravity. The gas tank was under the driver's seat, which was only a little higher than the engine. So, the engine was often starved for gasoline and would stop running when going up a hill. Some drivers worked around this problem by backing up hills so that the gas tank would be higher than the engine. The lack of a fuel pump was a contributing factor in why I was run over.



Regarding gasoline, the Model T did not have a gas gage. The car came with a ruler that the driver would stick down into the tank and measure how much gas was left.

The Model T had only two forward speed, slow and slower. It had no water pump. As the water would heat up from cooling the engine, the hot water would rise to the top of the radiator. As the water was cooled in the radiator, it would sink back down and thus circulate naturally. This was called the thermo-siphon cooling system. A picture of the engine is shown below.

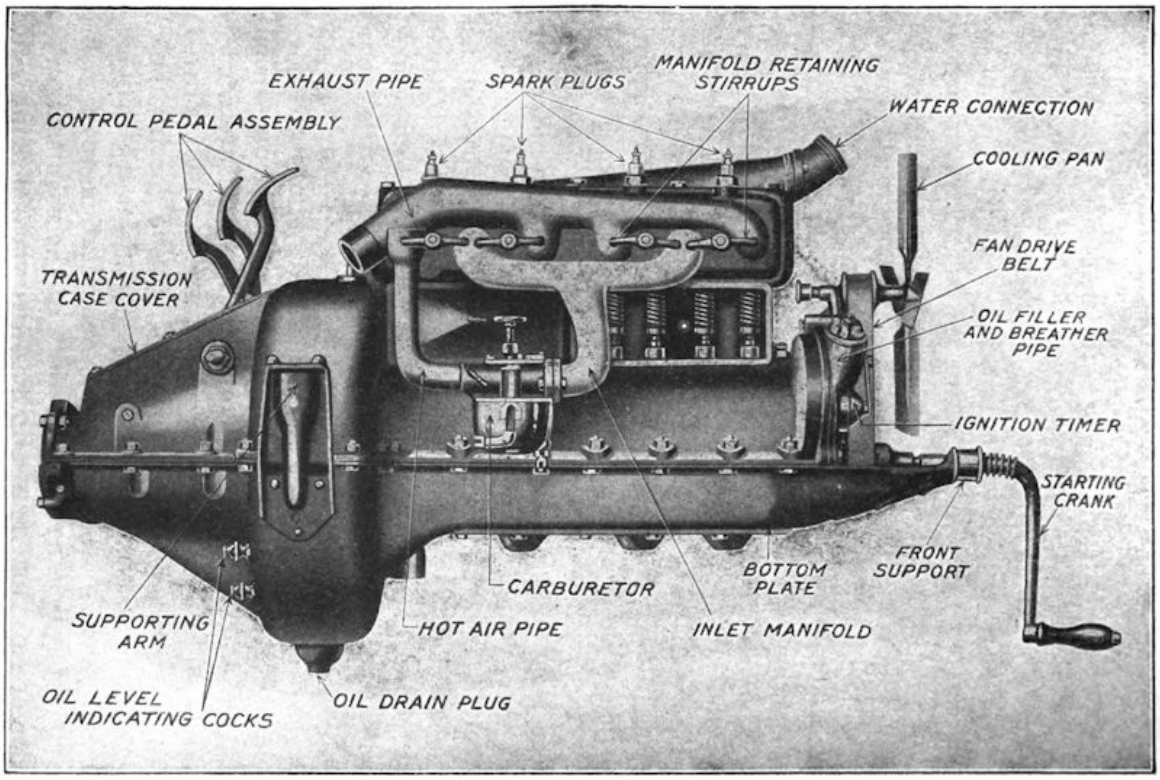


Fig. 8.—Valve Side of the Ford Model T Unit Power Plant Showing Manifolds, Carburetor and Interior of One of the Valve Spring Chambers.

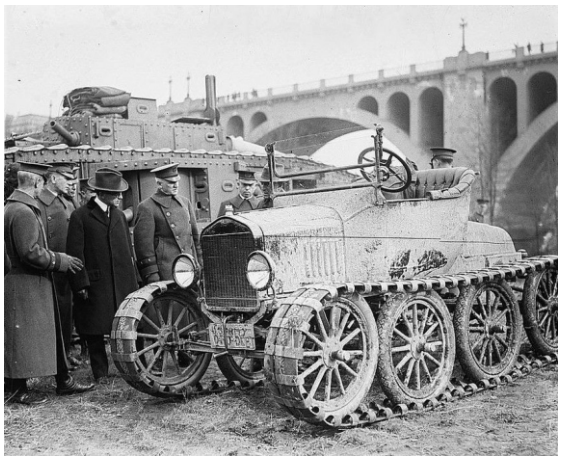
Many kinds of Model Ts were built. The first 1908 models looked like this. The cars worked all right, but sometimes they were a little chilly in Minnesota.

Note that the early cars had many brass parts. Later, less costly materials were used.

Most Model Ts were either open cars, like the 1908 model, but a few were equipped with special purpose bodies. Model T station wagons were often used to transport passengers to and from railroad stations -- hence the name, "station wagons."

Some were made into racing cars. Many were made into trucks.

Once in a while, other functional vehicles were built out of the Model T.



And, believe it or not, there was even a few Model T motor homes.

han the engine. The lack of a fuel pump was a contributing factor in why I was run over.

Now there were two specific reasons why I was run over; dirt in the gas tank and washboard roads. First, lets describe the roads.

Washboard roads occur when unpaved roads develop regular bumps in the road surface. We call them "washboard roads," because they look like the surface of an old-style washboard. If many vehicles are driven fast on gravel roads, ripples will slowly grow and get larger because of the wheels bouncing in resonance with the bumps. Since there were no paved roads in our neighborhood, there were lots of washboard roads where I grew up.

You have to realize that not everyone had modern cars during these years. Some people had oxen.

And, some people had horses. (There are three people you might know in this picture. Do you know who they are?)

they were a little chilly in Minnesota.

Note that the early cars h many brass parts. Later, less costly materials were used.

Well, getting back to being run over, the problem was that some dirt had somehow gotten into the gas tank of Wayne Clark's Model T. The car would start and maybe run slowly for about 50 feet. Then the dirt would clog up the gas line and the engine would stop. If we let it sit for a few minutes, the gasoline would slowly seep through to the engine and the car would then start, again.

The problem was that we were quite a way from home when the problem developed. Since we could only go about 50 feet before the car stopped, we had to wait a few minutes and start the car many times in the process of trying to get home. Along the way, the car battery became discharged and would no longer turn over the engine to start the car.

That was not an insurmountable problem because every Model T had a crank in the from to the car that could be used to start the engine.

I was only a passenger, and perhaps too young to drive the Model T, though I sometimes did drive it. My job, at the time, was to ride on the front fender of the Model T as the boy on the right is doing.

When the engine stopped, I would wait a few minutes and then jump off the fender crank the Model T to get it going. I would crank the engine. The lack o pump was a contributing fa why I was run over.

Under usual conditions for that afternoon, this was not a dangerous assignment because, when it ran, the car would only sputter along slowly -- not much faster than a person could walk. So, without much trouble, I felt I was being useful.

However, we were on washboard roads, which were very bumpy. The bumps didn't matter when we were going walking speed. But, all of a sudden, the bumps in the road apparently jarred loose the dirt in the gas line and the car began to run fine -- at a much faster speed. I was still on the fender.

Pretty soon, the bumps in the gravel road were making the car, and particularly the front fender, bounce around quite a bit. The bounces became so severe, that I was bounced off of the fender right in front of the right front wheel of the Model T.

But, alas, I was not hurt too badly. The car ran up my back and killed the engine. The model T did not have enough power to run over me. I did have quite a few abrasions from the gravel, however.

But, we lived to tell it. At right is a picture taken only a few hundred feet from where th e Model T tried to run over me. I was so glad I survived because I got to meet the other person in the picture.

By the way, Wayne Clark and several other members of the Clark family came to Hans' funeral events. His daughter works at Starkey Laboratories where I get my hearing aids.

Note that the early cars had many brass parts. Later, less costly materials were used.

they were a little chilly in Minnesota.

And that is the end of the story.

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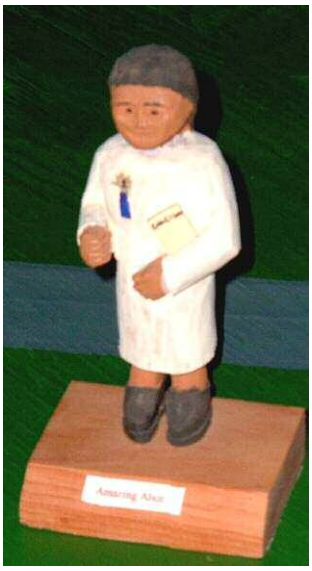
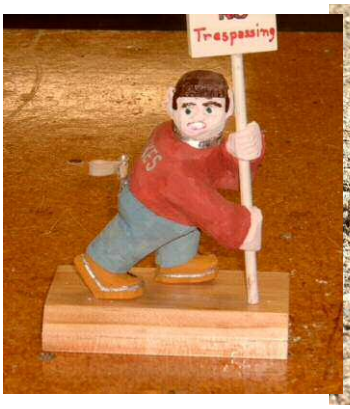
Two Approaches to Homework



Amazing Alice a mountain of homework.

Rudolf Fussbudget had an ant hill of homework.



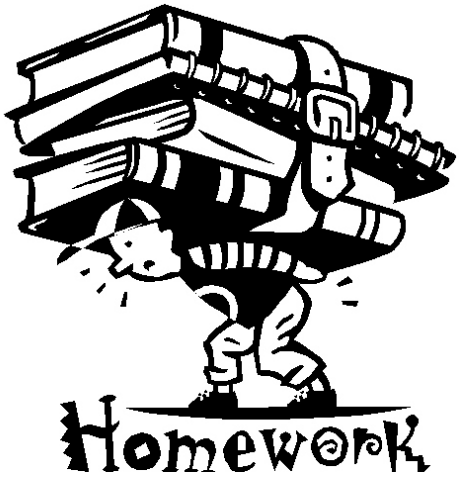
Actually, Rudolf had a lot of homework, too, but he just did not do it. He would rather shoot birds with his sling shot.

Amazing Alice was worried about Rudolf. She was afraid that he would never amount to anything. So, one day she noticed her friend, Doctor Always B. Thoughtful, as she was crossing the street. Amazing Alice explained the situation of Rudolf Fussbudget not doing his homework. Then she asked Dr. Thoughtful if he had any suggestions as to what to do about it.

So, Dr. Thoughtful sat down on a nearby park bench and began to tell the following story.

I encountered the same situation at the school I attended out in the country. You have to realize that we had a wider variety of homework in those days. First of all, we had to keep the school going by cutting firewood, loading the stove, cleaning the school, and helping the teacher prepare her lessons and class materials.

We had to read the books, of course, but that was not so straightforward because there was not one of the same book for everyone one in the class. Our school had a few books in history, some on geography, five or six on mathematics, and a small complement of science book. We were each expected to take home a few books every night and reand something from them that would help everyone in the school to learn.

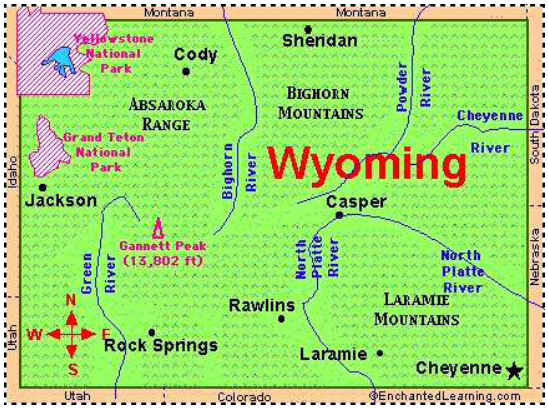


"I don't like to give a lot of homework over the weekend, so just read every other word."

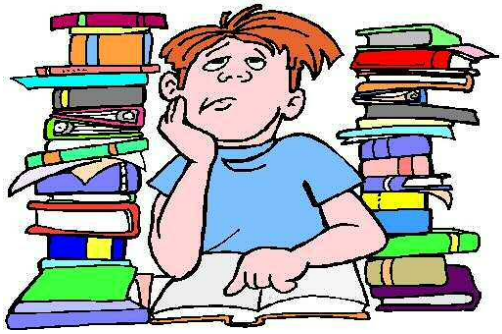
We did have maps, that hung on widow shades in the front of the room by the blackboards. And, we did have a small microscope.

The result of this situation was that we all had to do reading and homework every night, but not always on the same subject because of the shortage of books. So, in class the next day, the teacher might be covering mathematics and the teacher, Mr. Thaasen, might say, "Who can tell me how to compute square roots?" Then, someone

might say, "I read in my biology book that potatoes and sugar beets are <u>root</u> crops."



Someone else might mention, "Wyoming is very close to a <u>square</u> state."



A third person would say something like "I was reading in the First Epistle to Timothy that money was the <u>root</u> of all evil."

I am sure you can imagine that it was hard for the teacher to keep everyone on track when we were all reading different books. But, it turned out that it was not such a bad system, after all. Because of the competition for books, and the need to gather information from a variety of sources, we all became quite good at taking responsibility for our homework, ourselves. We all had to do what ever we could do to learn something.

Some of the parents and other members of the community helped out by coming in to teach certain subjects they knew something about. Mrs. McGillicuddy's grandmother taught the children about gardening. The children never misbehaved when Mrs. McGillicuddy's grandmother was teaching.

destions as

One of the parents had his daughter learn Spanish in order for her to get her allowance out of the cash machine.

In general, the students in our little one-room school house did pretty well. Horace became an engineer and worked to develop on of the first space rockets.

Susan became a famous author who gave lectures in far away places like London and Paris.

Charles became a famous banker.

Henrietta became a biological scientist.

Heinrich built up a large manufacturing company, and I went to medical school.

All of us did pretty well because we had to take it upon ourselves to be conscientious about our own homework..... Everybody, that is except Douglas. Mr. Thaasen, might say, "Who can tell me how to compute square roots?" Then, someone

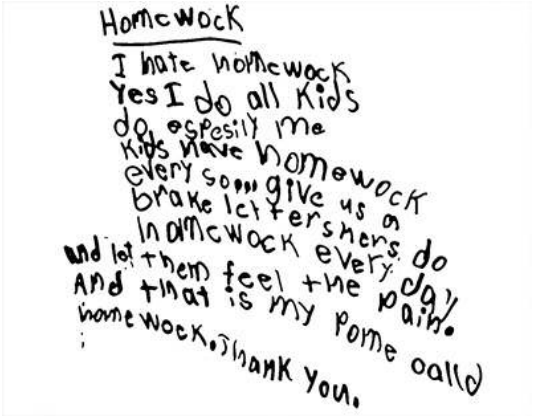
"What about Douglas," Amazing Alice asked.

"I couldn't do my homework because my computer has a virus and so do all my pencils and pens."

Douglas didn't want to do homework, Dr. Thoughtful explained. Too bad! He could have done all right, instead of how he approached homework.

"How did he approach homework?" asked Amazing Alice.

First of all, he was always making excuses for not getting his homework done. He would make up stories telling why he was unable to do it.


Homework
I hate homework
Yes I do all kids
do espesily me
kids have homework
every soon give us a
brake lettershens do
homework every
and let them feel the pain.
And that is my pome oallo
homework. Thank you.

Douglas simply would not do the homework that needed to be done.

Oh, once in a while, he would make a feeble attempt at doing his homework, like the time he was required to write a poem. I saved a copy so I could talk to him about it later. Here it is.

That is about as much as I know him. He was the only person in our school who really did not do his homework. So, that is the end of my little story about the fellow who didn't do his homework.

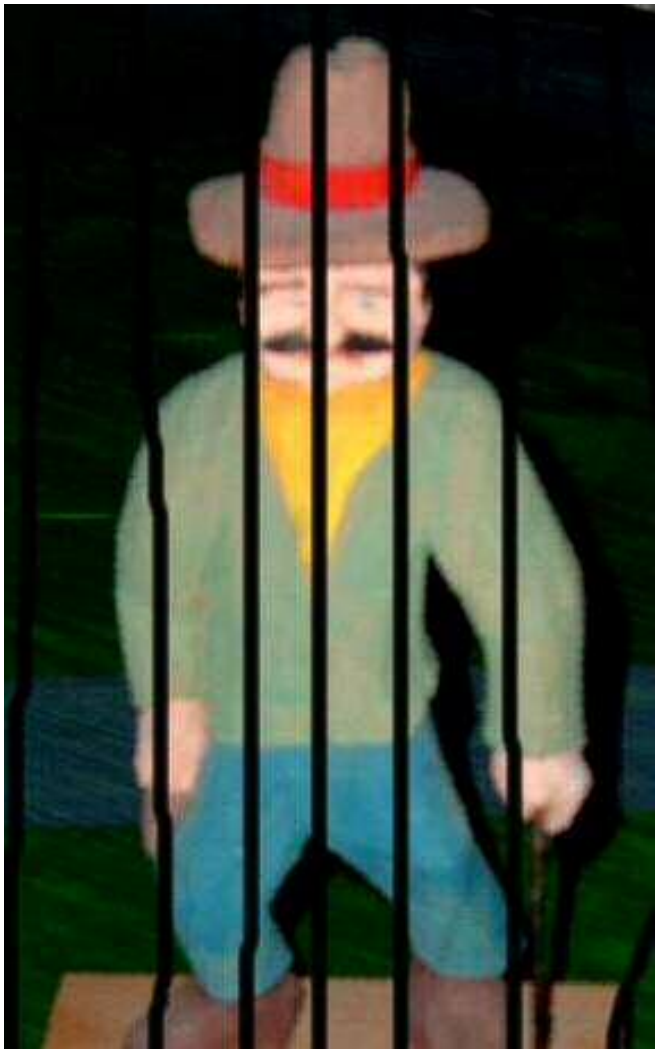
"What finally happened to him?" Amazing Alice inquired.

"I'm not sure, exactly, what happened to Douglas." Dr. Thoughtful Replied. "He apparently got into some trouble or something. The last we heard is that he changed his name and moved to Arkansas. Then, many years later, I saw a picture in the post office that looked a little like him. The person looked so familiar that I took a photograph of the picture to see if I

questions as to what to do about it.

could ask others if this was the same person who never did his home work when we were in school. A few people saw it and said that there were "profound similarities." I saved a copy of that picture, also. Here it is."

"But the reason why we should all do homework is not so that we do not end up like the fellow on th left," Dr. Thoughtful explained. "We should be glad to do our homework so we can help other people. We need to do our part by making use of teh talents God has given us.



Imagine what it would be like if people like Abraham Lincoln, Thomas Jefferson, Albert Einstein, Mahatma Ghandi, Nicola Tesla, Guglielmo Marconi, Archimedes, Galileo Galilei, Mother Theresa, and Madame Curie, never did their homework.

If you and your friend do your homework, you can accomplish as much as any of the people listed above.

And, if you don't, just look to the left."

And that is the end of the story.

Mr. Thaasen,
might say, "Who can tell me how to
compute square roots?" Then, someone

Counting with Computers

Mr. Schmidt teaches children to count

One day, when Mr. Schmidt was sitting in the beak room of his factory having his afternoon axlegrease tea, one of his grandchildren and other children approached him and wondered if he would show them the machinery he had in his manufacturing plant.

"Oh," he said. "I would be delighted to show you the fine machinery we have. But first, let's get you all set up with safety glasses. We would not want to have anything get in your eye as you walked through our fine factory."

The, Mr. Schmidt opened the door to the splendid factory.

Mr. Schmidt's Recipe for Axle Grease Tea

Start with 1 gallon of water.

Add 2 cups of cheap tea.

Add 1 cup of corn silage animal feed.

Add three tablespoons of grease from the rear axle of an old Ford truck with at least 100,000 miles.

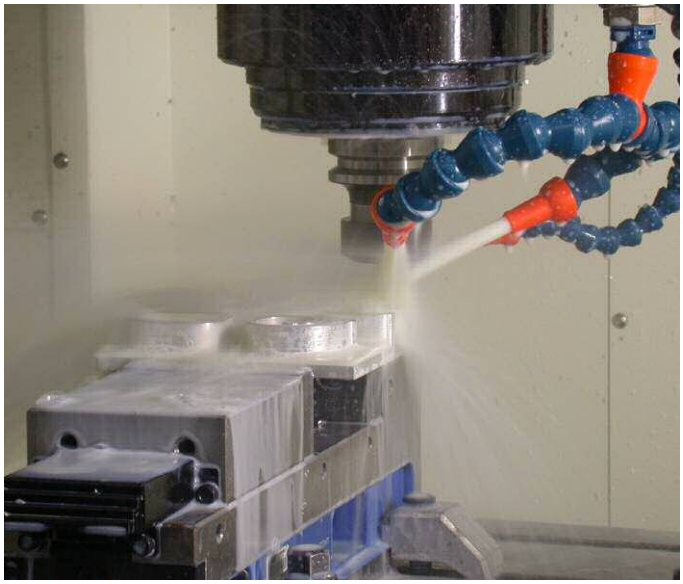
Note: Boil extensively because there may be a few germs in the axle grease.

Mr. Schmidt was very proud of his factory, including the Haas VF-4 vertical machining center which he had just purchased. He explained that it is called a "vertical" because the spindle that holds the milling cutters is vertical, rather than horizontal. It is called a "machining center" because it can automatically change and utilize many tools -- all under the control of the computer control that is part of the machine.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

"Vell, it's a humdinger. That's all I can say" said Olaf Erickson, the operator."Dis ting can do more vork in ten minutes than eighty congressmen could do in a year."

Then, Olaf showed the children how it looked inside the machine when it was cutting the metal. "Notice how ve spray fluid onto the part to keep the temperature down and to make the cutting go better."



Next, Olaf showed them the inside of another machine that can machine a part from many directions. It was called a "turning center" because the part could be turned as it was cut.

Mr. Schmidt explained that careful attention is essential in manufacturing and everything has to be done in the proper way.

Then, one of the children asked, "How do you make sure everything is done properly?"

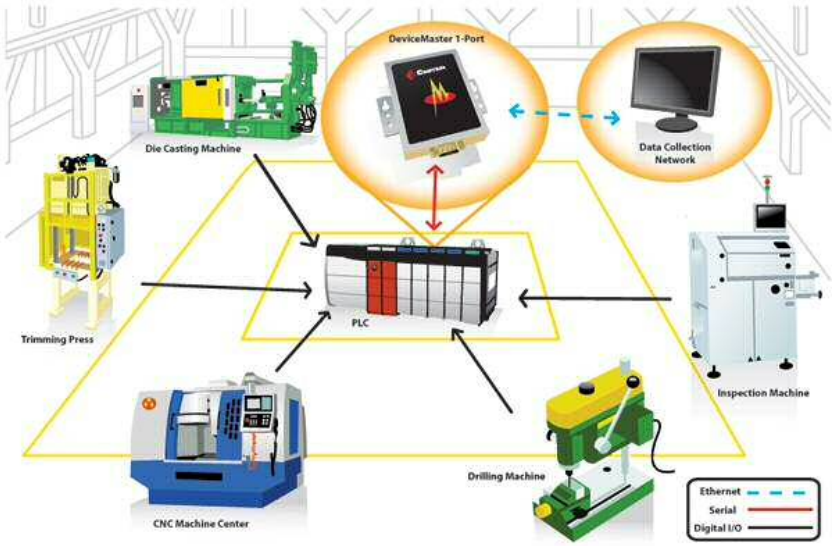
"We have a very effective shop supervisor who makes sure everyone is doing what they are supposed to do.

One of the children asked the plant superintendent what she did to make sure everyone did what they were supposed to do in the factory.

"Oh, its not a problem. If anybody gets out of line or doesn't do what they are supposed to do, I just whack them with my umbrella and they go right back to work."

"Order is important in a factory," said Mr. Schmidt. "Everything is hooked together and everything has to be done exactly as it should be. That is the best thing we can do to make sure that the company remains in business and that everybody has a place to work. In our community, almost one out of every five employed persons work in a manufacturing plant. If we don't do it right, the company will close and we will all be out of a job."

Then, Mr., Schmidt described how the whole factory was connected to computers that transferred around all of the information about jobs to be run along with the instructions so the work could be done exactly as the customers specified.



"Those computers must be very smart," remarked on of the children.

"Actually, computers are not very smart at all that is part of the machine."

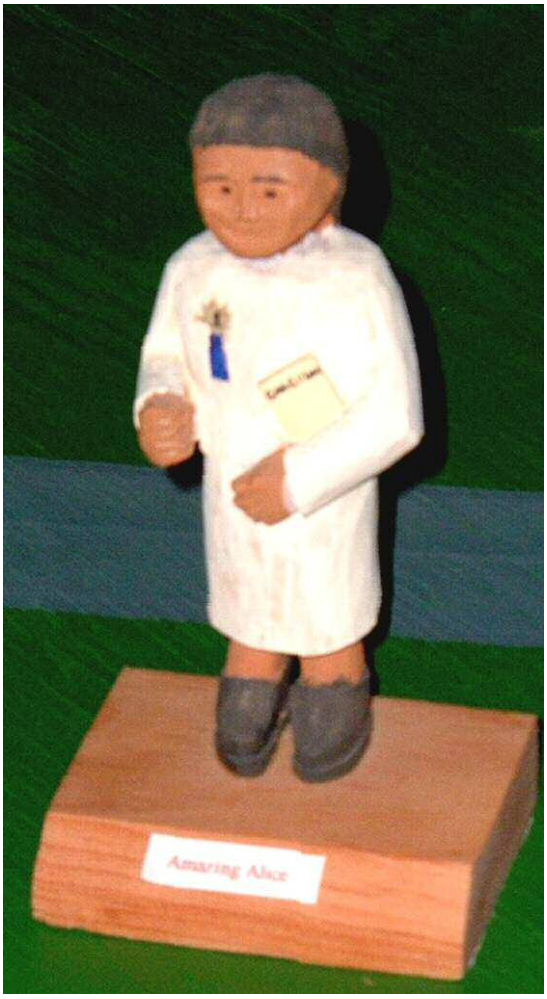
Then, Mr. Schmidt asked the operator to tell the children more about the machine.

all," replied Mr. Schmidt. " All they can do is add one to one, but they can do it fast and in many different formats."

"Well," the child said, computers certainly do handle some big numbers."

"Yes, that is true, said Mr. Schmidt. "But, lets see how they do it. To explain this better, I am going to ask the head of our computer operations to explain how computers handle numbers. Amazing Alice, can you teach the children to count like computers?"

"Of course," said Amazing Alice. That will not take any time at all. Just say, 'zero."



"Zero," all of the children replied.

"Now say 'one'."

"One." they all said.

Amazing Alice then explained, "Well, now you can count like computers, because that is all they can do is to say zero or one."

Mr. Schmidt then elaborated. "You see, the inner workings of a computer is something like a lot os switches wired together. Each switch can be off or on. When the switch is off, it is a zero. When the switch is on, it is a one. That is all computers can do. Of course, they do it very fast and they do it millions of times every second.. So, computers get al lot done -- even though they are really not very smart."

Then, one of the children asked how computers could get big numbers if they can only count to one.

isor who makes sure everyone is doing what they are supposed to do.

"That's an excellent question," answered Amazing Alice. hey can only do it by changing the base of their numbering system away from the base of 10 (our current system) to a much smaller base. Computers use a numbering system with a base of 2 -- which is called the binary system. So, for instance, the number one is written as a 1, just as it is with the decimal system. But the number two is written as 10. A three becomes 11 and a four is written as 100.

Computers also use other numbering systems. Some use the hexadecimal system based on the base of 16. Some older computers used the octal system with 8 as the base. However, non-binary systems are only used for external communications to printers and other devices. The only number system used internally in computers is the binary systems. One and zero are the only numbers the computers can handle.

The tables below show the value of decimal numbers under the binary, hexadecimal, and octal systems. So, how old is Grandpa Fred. Well he is either 78, 4E, 96, or 1001110 depending upon which numbering systems you use. To the computer, however, Grandpa Fred is only 1001110 years old.

Take a minute and see how old you are and how old your father is. Then remind him of it.

Decimal and Other Number Systems

Decimal	Binary	Hexadecimal	Octal
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7
8	1000	8	10
9	1001	9	11
10	1010	A	12
11	1011	B	13
12	1100	C	14

rol that is part of the machine.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

13	1101	D	15
14	1110	E	16
15	1111	F	17
16	10000	10	20
17	10001	11	21
18	10010	12	22
19	10011	13	23
20	10100	14	24
21	10101	15	25
22	10110	16	26
23	10111	17	27
24	11000	18	30
25	11001	19	31
26	11010	1A	32
27	11011	1B	33
28	11100	1C	34
29	11101	1D	35
30	11110	1E	36
31	11111	1F	37
32	100000	20	40
33	100001	21	41
34	100010	22	42
35	100011	23	43
36	100100	24	44
37	100101	25	45
38	100110	26	46
39	100111	27	47
40	101000	28	50
41	101001	29	51
42	101010	2A	52
43	101011	2B	53
44	101100	2C	54
45	101101	2D	55
46	101110	2E	56
47	101111	2F	57
48	110000	30	60
49	110001	31	61

isor who makes sure everyone is doing what they are supposed to do.

50	110010	32	62
51	110011	33	63
52	110100	34	64
53	110101	35	65
54	110110	36	66
55	110111	37	67
56	111000	38	70
57	111001	39	71
58	111010	3A	72
59	111011	3B	73
60	111100	3C	74
61	111101	3D	75
62	111110	3E	76
63	111111	3F	77
64	1000000	40	80
65	1000001	41	81
66	1000010	42	82
67	1000011	43	83
68	1000100	44	84
69	1000101	45	85
70	1000110	46	86
71	1000111	47	87
72	1001000	48	90
73	1001001	49	91
74	1001010	4A	92
75	1001011	4B	93
76	1001100	4C	94
77	1001101	4D	95
78	1001110	4E	96
79	1001111	4F	97
80	1010000	50	100
81	1010001	51	101

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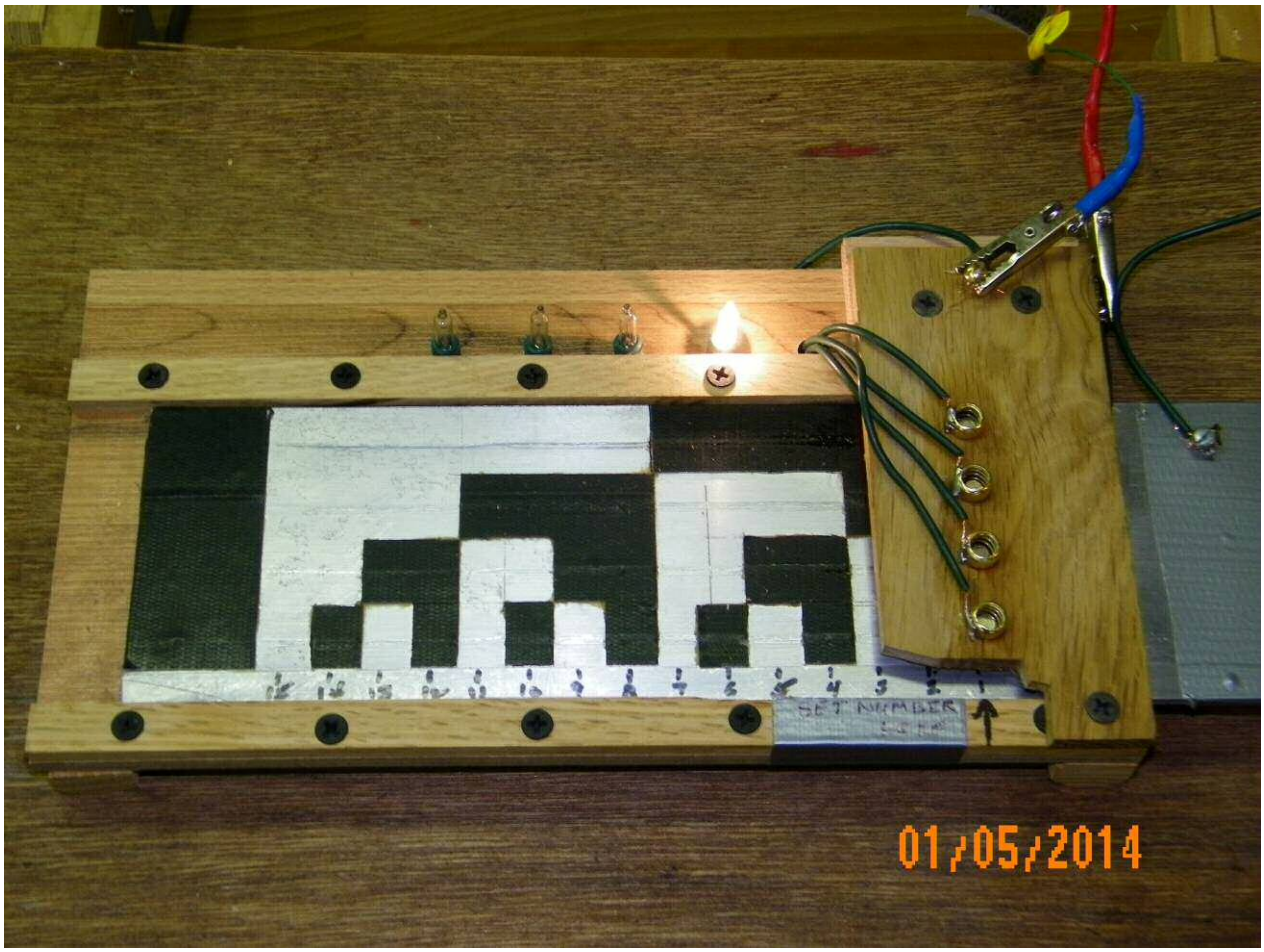
Then, Mr. Schmidt asked the operator to tell the children more about the machine.

It turned out that Mr. Schmidt designed a machine that would help his employees understand the binary numbering system

used in computers. It involved a pattered way of illuminating four electric light bulbs in ways that would represent the way numbers would be stored in the computer. If the light bulb was on, it would be a one. If the bulb is off, it would be a zero. The machine below shows the number 1 displayed as 0001.

The machine works by sliding an aluminum coated connector bar (the one with black and aluminum spots) under four



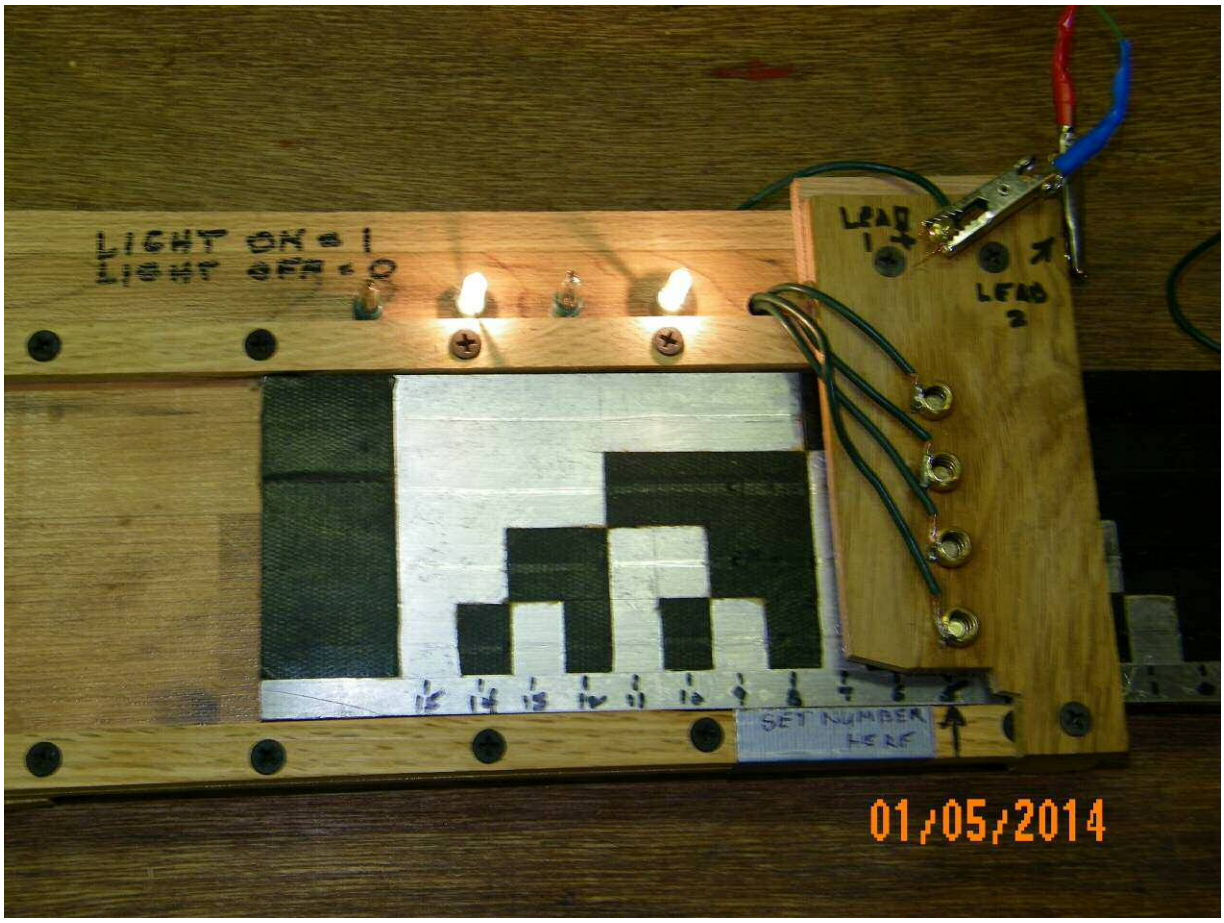
connectors points, each of which is connected to one of the four light bulbs. The black spots on the connector bar is gorilla tape stuck onto the aluminum so the connection will NOT be made and the current will not flow. When the connector is over a black spot, the appropriate light will not light up. When the connector touches the aluminum, a connection is made and the light will light up.

The user can slide the aluminum coated connector bar (the one with black and aluminum spots) back and forth to get different

is not who makes sure everyone is doing what they are supposed to do.

numbers in the binary system. Below shows the machine set to display the number 5 or 0101 in binary.

Well, the children were all fascinated with the explanations of computer numbering system provided by Mr. Schmidt and



Amazing Alice. The next week, they told all of their friends in school about it. They even asked Mr Schmidt if they could borrow the binary counting machine and bring it to school. The teacher was very pleased to see it.

Then, the next week, Mr Schmidt had to go to the doctor. The doctor he went to was Dr. Ambrose McAver, the brother of Judge Cadaver McAver.

When Mr. Schmidt walked in, Dr. McAver asked him a few questions about his health. At one point, Dr. McAver said, "How old are you?"

for that is part of the machine.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

Well, Mr. Schmidt thought he would show off a little bit and so he thought he would give the anser in binary.

"I am one zero zero zero one zero zero," answered Mr. Schmidt.

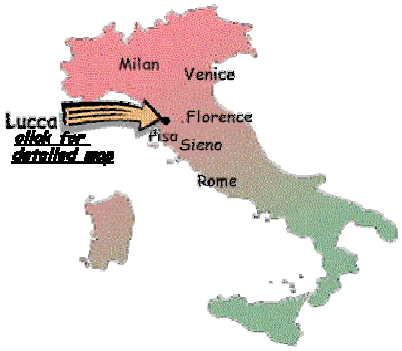
Dr. McAver looked a little puzzled ane then said, "Hero? You don't sound like much of a hero to me! You don't even know how old you are!

And that is the end of the story.

isor who makes sure everyone is doing what they are supposed to do.

The Zig-zag Adventures of Filo the Pickpocket

Once upon a time, Filo the pickpocket was having a bad day. Filo was an orphan boy who came from Lucca, a small city in Tuscano region of Italy. Since he was an orphan boy, the town orphanage gave him a last name of the region where he was born -- Toscano.

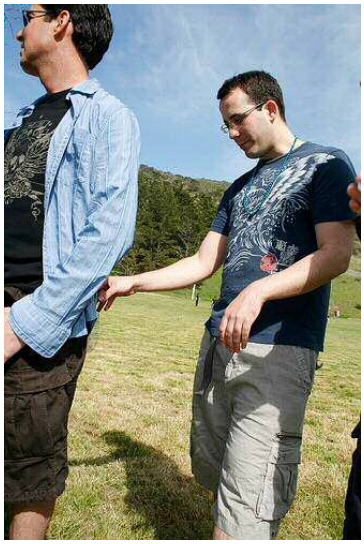


Life in the orphanage was not that bad for Filo. The nuns showed an interest in him and they taught him to read and write. However, the orphanage was not set up to keep people throughout their lives, so after a few years, Filo was turned out to the streets of Lucca.

Lucca had been, during Roman and Medieval times, a rather prosperous city because of its trade in silk. But those days were long gone at the time Filo left the orphanage. It was hard for him to find work or for something to do. He just wondered through the streets alone.

After a few years in Lucca, Filo made his way to the Italian city of Venice. Venice was a large city with many visitors, but it was not such a prosperous city when Filo was there. Filo had very little work experience and it was hard for him to find work.

Still, Filo had to eat. Unfortunately, because he could not find a job, Filo became a pickpocket.



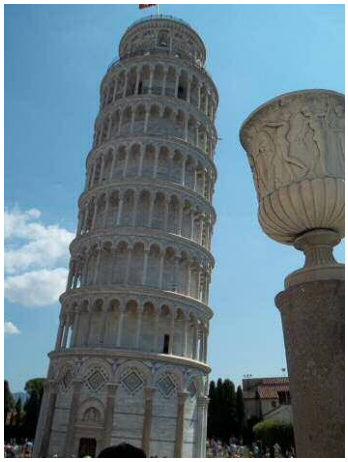
But, it turned out that Filo was not a good pickpocket, either. He got caught, and was taken to the Doge's palace where he was tried and convicted of pickpocketing before a committee of three elderly Venice judges.

The judges felt a little sorry for Filo, but they could not have pickpockets running loose in their city. So, they sentenced him to two months in jail, which was right across a small canal from the Doge palace.

To get to the jail, Filo walked across the "Bridge of Sighs," which connected the palace and the jail. It was called the Bridge of Sighs because the prisoners would sigh when they looked out of the windows of the bridge and realized they would not be free for a long time.

Filo was very sad in jail and he regretted that he had been a pickpocket and he was also afraid that he might never amount to anything. When he was released after the two months in jail, he was dejected. He sad on the curb in Venice and said, "IO sono così triste. NON sarò mai nulla," which means, "I am so sad. I will never amount to anything."

He looked at the beautiful piazza named after San Marco (Saint Mark). He remembered in his home town of Lucca, a piazza named after the famous composer, Giacomo Puccini. He had heard about the famous leaning tower of Pisa where the scientist Galileo did some of his experiments on gravity.



Filo was still very sad. He said, "Non potrò mai avere qualcosa chiamato dopo di me.," which means "I will never have anything named after me."

About that time, Filo was visited by his guardian angel. The angel said, "Non essere così triste, Filo. Dio vuole che tu faccia bene. MI è stato chiesto di trovare un supporto, che può iniziare il percorso giusto." (Don't be so sad. God wants you to do well. I have been asked to find you a helper who can get you started on the right path.). The helper turned out to be -----

e time Filo left the orphanage. It was hard for him to find work or for something to do. He just wondered through the streets alone.

Mrs. McGillicuddy's grandmother.

Now, she got right to work. She did not speak any Italian but, fortunately, Filo had picked up some English by listening to the tour guides at both Lucca and Venice. So, Mrs. McGillicuddy's grandmother started right in.

"There doesn't seem to be a problem here," Mrs. McGillicuddy's grandmother said. "You can amount to something. You just have to work at it. The first thing you need to do is get a job. I mean a real job. Any more pickpocketing and you will have my umbrella to deal with. So there."

Filo soon grew to like Mrs. McGillicuddy's grandmother because she was not confusing. She made it very clear what he was supposed to do and what he could not do. She was very much like a parent. She made him go back to school, do his homework and his chores, clean his plate, and do all the things he should have been doing. Sometimes he thought it was a little like slavery, but when he complained, she would say something like, "Look, Filo, what you are complaining about? You want to go again to the Bridge of Sighs?"

Then Filo would go back to work.

Now, it turned out that Venice was a large port city with many ships coming and going. There were many merchants in Venice who would buy imported goods from the ship owners and sell other goods that they needed. These merchants provided a lot of work for the people in Venice to do. One of these merchants was a close personal friend of Mrs. McGillicuddy's grandmother, so she approached him to see if he would be willing to hire Filo. The merchant's name was Signore Davide De Benedetti.

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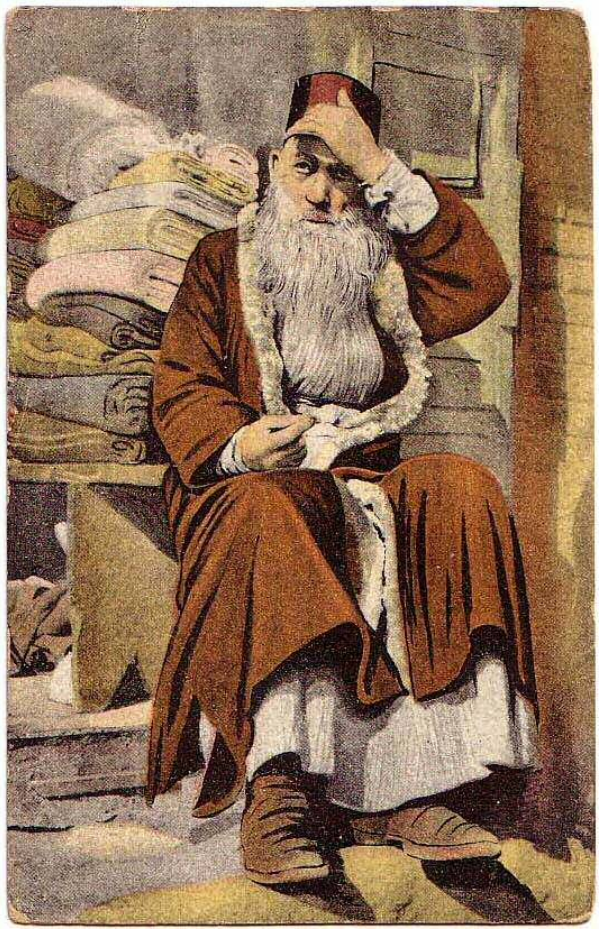

Signore Davide De Benedetti was a very successful merchant and also a very kind man who did a lot to help the people he knew. But, he was also sort of gruff and outspoken. When Mrs. McGillicuddy's grandmother asked him if he would hire Filo, he said, "You want I should hire a pickpocket for my business? People already accuse me of being a pickpocket. Hiring him will only add to the rumors."

"But, he is a nice boy. I have never had to use the umbrella on him -- not even once," Mrs. McGillicuddy's grandmother replied.

"That's fine, but the question is, will you use it on me if I don't hire him?" was his response.

"Not immediately," she responded.

"Hmmm," he said. "Can he carry packages? And, can he do math?"

"Of course," she replied. "Just last night, he was inverting a matrix by using the LaPlace expansion of minors."

"That's fine, but can he invert the trash can when it needs to be dumped out?"

"Yes, he can do that, too."

"OK," Signore Davide De Benedetti said. "He can start tomorrow. But no pickpocketing."

So, the next day Filo started his new job.

e time Filo left the orphanage. It was hard for him to find work or for something to do. He just wondered through the streets alone.

Filo worked conscientiously at his new job and Signore Davide De Benedetti appreciated his efforts. To make sure everything was going well, Mrs. McGillicuddy's grandmother would stop by every day and just casually swing her umbrella. So, Filo continued to work hard.

Part of Filo's job was to handle the large number of boxes of merchandise being received and shipped from Signore Davide De Benedetti's warehouse in Venice. Filo had to pack the merchandise and arrange the boxes into large bundles for each customer. Filo worked with boxes all day. Boxes, boxes, and boxes. He had never seen so many boxes.

To keep the bundles together, Filo would tie the boxes together with string. There was only on problem, the string was no good. It kept breaking. Then the boxes would get mixed up and not go to the right customer.

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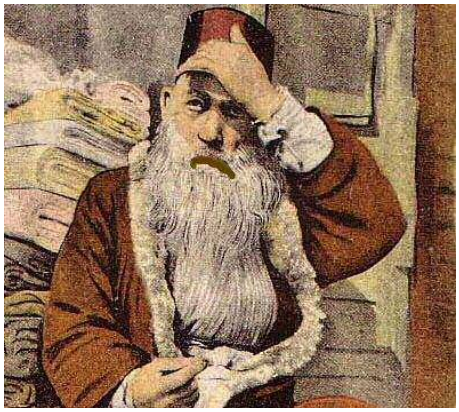
Filo talked to Signore Davide De Benedetti about the problem who said, "You want there to be a better string? Go invent one. I have been worrying about weak and inferior string since I was your age. I complained to my father about it. He told me just what I told you. If you want a better string, go invent one. But, I never did."



Signore Davide De Benedetti was sad.

The next day was Filo's day off. He went for a walk down by the ocean where there was a sort of park like area with lots of palm trees. He sat down under a large palm tree and begin to think about the problem of the weak string.

Then, all of a sudden, the wind blew and a large palm tree leaf fluttered down and landed on his head. Filo began to look an the leaf and he started to play with it. He noticed tat there were little strings attached to the leaves and that these strings were very strong. He wondered if these palm tree leaf strings could be combined with the hemp fibers in their regular string to produce a much stronger string.

The next day, Filo began to experiment by twisting together some of the old string along with the fibers from the palm tree. He kept changing the mixture and

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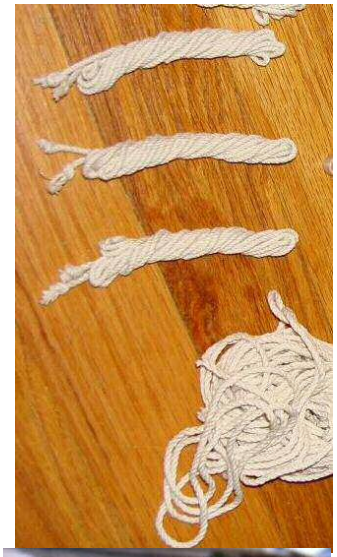
the way he did it until he produced a string that was much stronger than before.



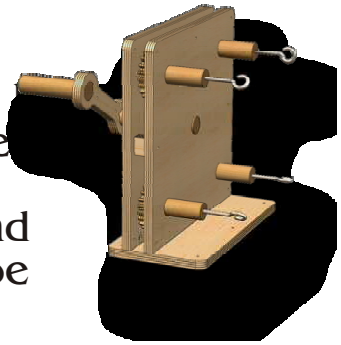
Filo showed the string to Signore Davide De Benedetti who was very impressed. "Voila." he said. "I think you have something here. All of my merchant friends want better string. You could go in business to make better string. I will help you."

A few days later, Mrs. McGillicuddy's grandmother, who was still vacationing in Italy, was visited by her friend from the United States, Mr. Schmidt the manufacturer. Filo showed both Mrs. McGillicuddy's grandmother and Mr. Schmidt his new string and both of them were very impressed. But then Filo said, "I have a problem. I do not know how to make enough string quickly."

Mr. Schmidt replied, "That is not problem. My friend, Olaf Erickson, and I can build you a machine that will makes lots of very good string. But first, we need to finish our axle-grease tea."

So, Mr. Schmidt and Olaf Erickson got together and started on the string-making machine right away. The machine was able to make very good string by twisting the fibers of the palm leaf and hemp plants very tightly. Then, they coated the sting with hot wax so the fibers would not unravel.

First, they started out with a very primitive hand-crank model like the one on the right.



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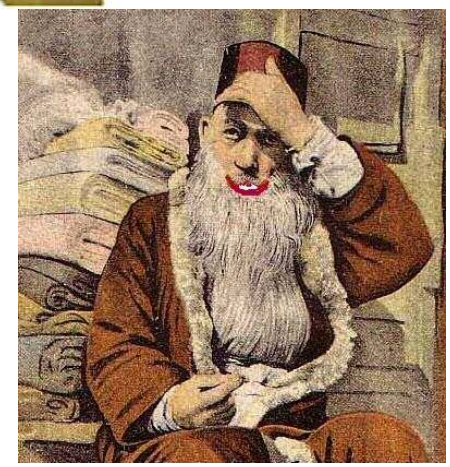
Then they produced a better machine made out of very good quality cast iron and steel.

Note that the individual strands are rotated one way while the whole string is tightly rotated the other way. That is the way ropes and strings are made.

Their next machine was even more capable. It could produce many colors of string at once.

Signore Davide De Benedetti was very happy to have the new stronger string available to him for his business. He quickly told his other merchant friends and they were happy also.



Soon, Filo became quite famous. His sting was very popular throughout Italy. It was even used to tie up the two most famous Italian criminals;

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Pietro Ponderoso and Samuale Slipperino.

Soon, Filo's string became so famous that the old sting was no longer used. In fact, the old name for string, **funiculus**, went away altogether. From that day onward, the Italians had a new word for string -- **Filo**. Filo still means "string" today in Italian. String was now named after Filo. So, finally, Filo amounted to something and something was named after him.

The moral of this story is that even pickpockets can amount to something if they do their homework, study their math, are good with machinery, and stop pickpocketing.

And that is the end of the story.

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Heroic Horatio and the Broken Ankle

Horatio was an exceptionally fine athlete. He played quarterback on the football tem and led the conference with 43 touchdown passes. He pitched 73 scoreless innings for the baseball team. He was so good at soccer that he could play both goalie and forward by running back and forth in time to both score goals (13) and save goals (14) in a single season. In addition, Horatio could juggle four bowling balls at once and play ping pong backwards, by facing away from the table.

But one day, Horatio unfortunately tripped over his lunch in the cafeteria while going after a fourth orange juice. He heard something crack. After school, Horatio's father and mother took him to Dr. Myopic McAver, the brother of Judge Cadaver McAver. Dr. Myopic McAver was a very conscientious and experienced doctor, but he had very thick eyeglasses and he could not see very well – even with the eyeglasses. But, the doctor asked his usual questions to start the examination.

"Stick out your tongue." he said.

Horatio stuck out his tongue.

"What color is it?" Dr. Myopic McCaver asked the nurse.

"Pink," she responded.

"Good. I'm glad its not green or yellow. I especially hate green

tongues. Open your mouth and I'll take your temperature," said Dr. Myopic McCaver as he grabbed a nearby pencil and stuck it in Horatio's mouth. After two minutes, he took out the pencil and stared intently at the lettering on the side of the pencil.

"Just as I though, 98.6 degrees. Perfect. Why are you here?"

"My leg hurts and I heard something crack," said Horatio.

"Well, let me have a look at it" said Dr. Myopic McCaver as he grabbed the arm of the examination chair an began to tap it with his little rubber hammer. "Does that hurt?" exclaimed the doctor.

"No," said Horatio, "but it is this leg over here." Horatio did not want to embarrass the doctor by telling him that he was examining an arm of a chair instead of a leg. "I tripped over my lunch in the school cafeteria. That's when it started to hurt."

"Well, let see what we can find out." Dr. Myopic McCaver grabbed Horatio's leg and began to tap it with an old lollipop that the previous patient had left on the examination table. "Does that hurt?"

Even though the lollipop had a severely soaked, and therefore pliable, handle, Horatio could still feel it and said, "Yes, I can feel that, all right. It is quite painful."

So, Dr. Myopic McCaver ordered an X-Ray and them said, "I have to study this X-Ray at very close range." He then went over and spent several minutes carefully staring at map of Italy which he

had hanging on his wall. As he looked at the area of the map south of Naples he remarked, "Aha, there's the fracture, right near Cosenza. We'd better put you in a cast."

So, Horatio went home with a very large plaster cast on his ankle. Obviously, the heavy cast made it impossible for Horatio to take part in any sports. He could not even juggle or play ping pong. For a while, Horatio was very bored. All he could do was continue to be bored. He didn't even feel like eating. All he ate was cheese.

But, the period of boredom did not last long. Horatio was a very talented and up-beat boy and he decided that he would have to do things other than sports. He decided that he would use the available time to perfect his skills in math, music, science, social studies, and literature.

Horatio's first act was to write a new 600 page novel entitled "Bore and Cheese," which was later translated into Russian. Then he cooperated with his close friend, Moe Zart, to write a 38 page piano concerto.

Feeling that he should spend some time cultivating his scientific skills, so he captured and carefully catalogued and 204 specimen set of moths, which earned him first place at the County Science Fair.

Back to music again, Horatio's science display triggered an inspiration to write a new opera entitled "Madame Moth," which premiered in Carnegie Hall.

As Horatio was reclining in the plush seats at Carnegie Hall, he began to compute the estimated combined weight of the 2400 attendees. He concluded, that if each attendee were to lose eight pounds, 548 starving children in Africa could live for a full three months on the available food.

Horatio went on, during his recovery period, to write six more books, compose two symphonies, propose a new way of stimulating the economy to Congress, and experiment with new ways of creating a viable ceramic substitute for stainless steel.

Then he entered fifth grade.

And, that's the end of the story.

Beam Deflection and Matokeo Makiida

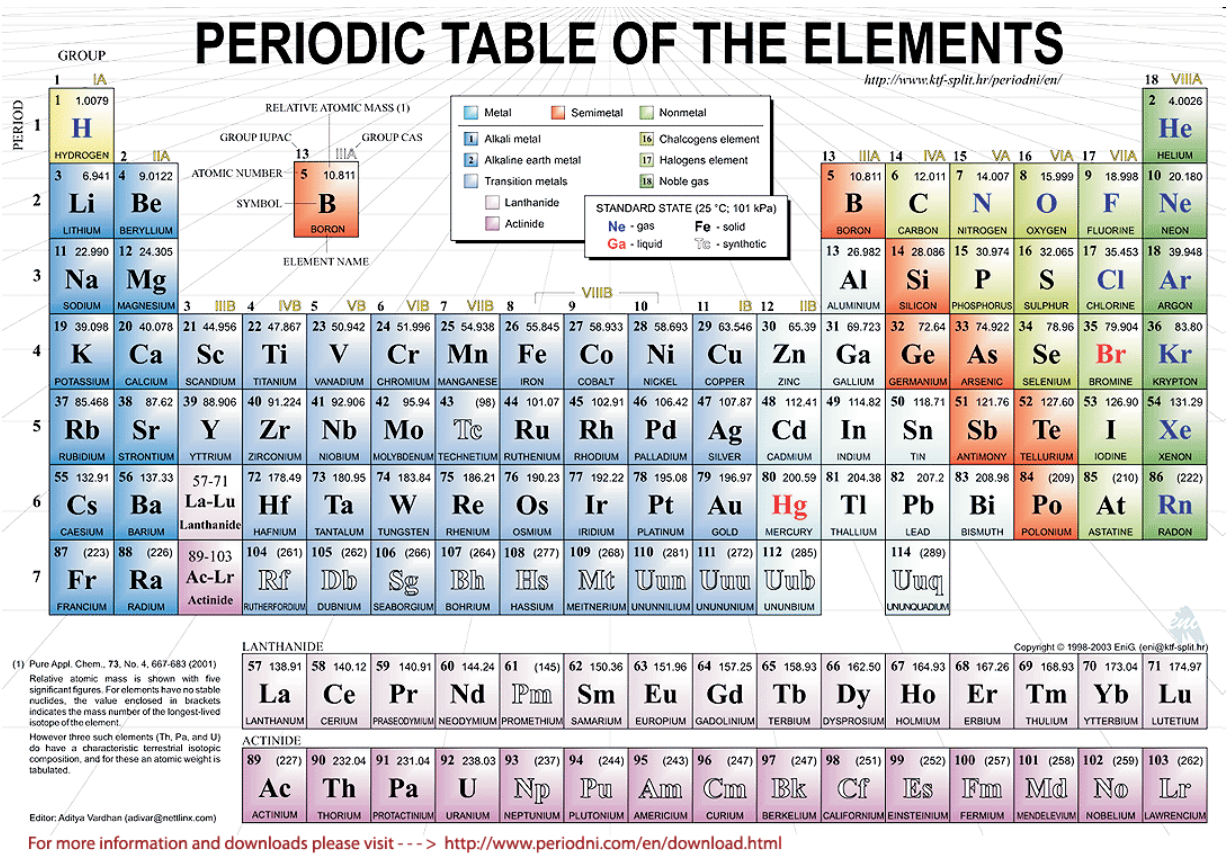
Once upon a time, Julius and Ira were traveling in Africa searching for of new sources of chromium. Chromium is a very shiny, silvery, metal used as a coating for water faucets, tools, and some parts of automobiles. Do you like wrenches? I do.

Sometimes chromium is mixed in with iron to make stainless steel which is used in making pots and pans, sinks, and other metal parts that are not supposed to rust.

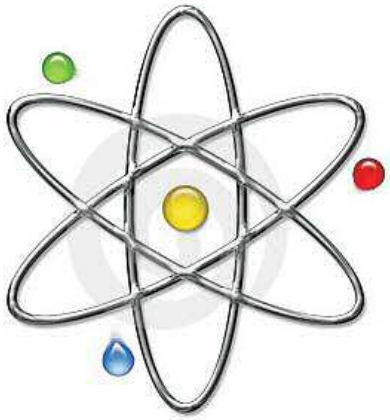
Chromium is also used to make very strong steel, like the steel used in making very powerful pumps and engines. See how shiny the parts are. That is because chromium almost never rusts.

Chromium is one of only about one hundred **elements** that make up everything on earth. All oceans, mountains, machines, cars, airplanes, and even plants and animals are made up of these 100 (or so) **elements**.

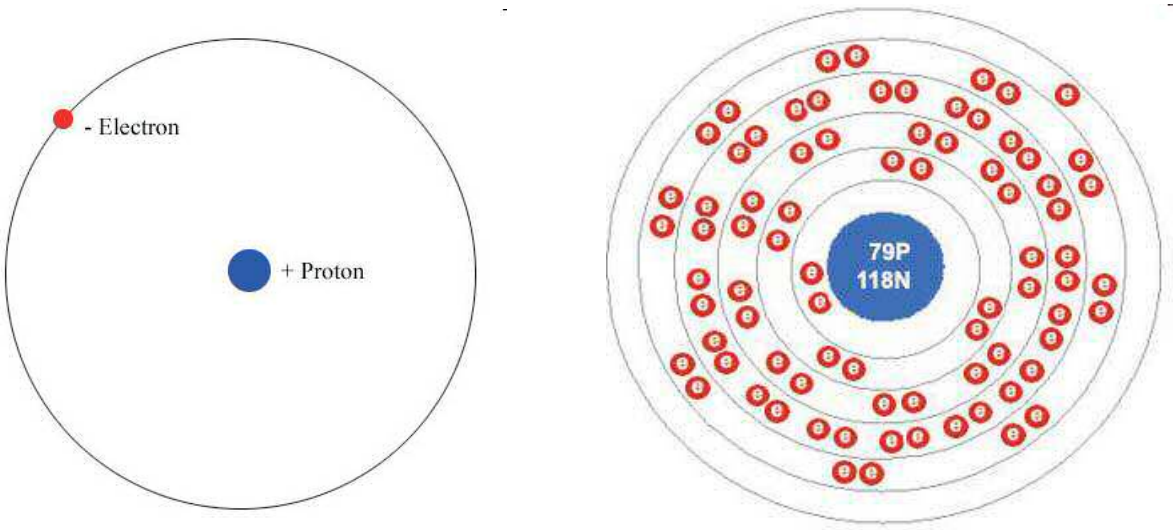
So far, scientists have identified 103 elements but the may fine a few more later. They are described in the table below called the **Periodic Table of the Elements.**



Elements have small parts called **molecules**. Each molecule of each element is a little like a miniature solar system with a sun and planets running around it. The sun part at the center is composed of **neutrons** and **protons**. The planets ziping around the center are called **electrons**.



Some lighter elements like hydrogen, which combines with oxygen to make water, are very simple. Hydrogen has only one planet (or electron). Heavier elements like gold have many more. Gold has 79 electrons, so it is like a very big solar system.



Can you guess which of the above atoms is gold and which is hydrogen?

The **periodic table of elements** shows how all of the elements are arranged showing the number of electrons called the **atomic number.** You can see the atomic number of each element in the upper left hand part of the square showing each element. Can you find out how many electrons oxygen has?

Also, in the upper right hand part of each square you will find the **atomic weight** of each element which indicates something about whether the element is light or heavy. Which do you think is heavier, Helium or Lead? Look at the atomic weights and see.

You will also see that each element has its own one or two letter **symbol**. For instance, CR is the symbol for chromium. Can you find the symbols for hydrogen and oxygen?

Each of these elements has a job to do. Water, for instance, is made up of only to elements, hydrogen(**H**) and oxygen(**O**). A water molecule has two atoms of Hydrogen and one atom of Oxygen so the chemical description of water is **H** $_2$ **O** (two hydrogen, one oxygen). The next time you are thirsty, ask your mom or dad, "May I have some H $_2$ O please?"

Well, back to chromium. it is such an important element, but we are using it all up. At the rate we are using our chromium, it will be mostly gone in about fifty years. So that is why Ira and Julius went to Africa – to find more chromium.

Africa is a very good place to look for minerals. Important minerals such as gold, copper, cobalt, chromium and many others are found in Africa.

It is not easy to find chromium, though. Before it is refined into pure metal, it looks pretty much like any other rock. A picture of chromium ore is below. So they had to look a long time before the found some.

But, a big problem developed as they were looking for chromium. They ran into Matokeo Makiida.

Matokeo Makiida was the chief of the people who lived in that part of Africa. He was a nice man and a pretty smart man, but he was also a very clever trader.

When he saw the boys, Matokeo Makiida said hello and asked how he could help them.

Julius said" We are looking for chromium. Do you know where we can find some chromium?"

"Yes, I do know where you can find some chromium," said Matokeo Makiida, "but what do I get in trade if I tell you where it is?"

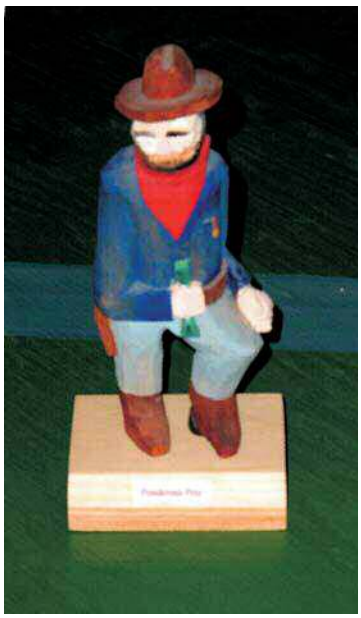
"Well, what do you need," said Ira. "Who knows, maybe we have what you need."

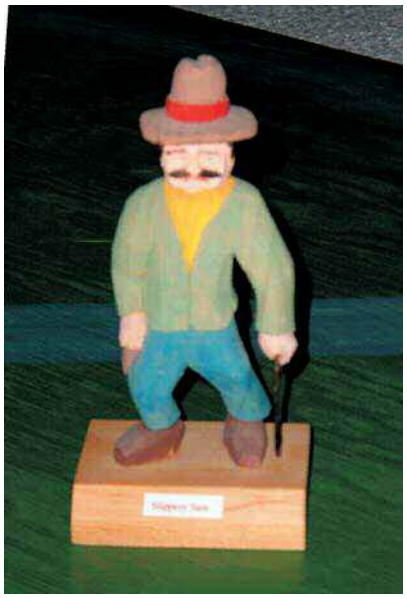
Chief Matokeo Makiida began;"I do have a problem. It is important for the chief to receive the proper respect and attention. I do not need the attention for myself, but so that the people can have a good chief. There is someone else who would like to be chief, but I don't think he would be good for the people. He would not take care of the people problems, All he would do is build statues of himself. He also has two helpers that I do not like. His picture, and the pictures of the two helpers, are on the next page. You can peak, if you want to."

The chief continued, "There is a bridge across the small river in our village. I would like a light to go on and for a bell to ring when I go across the bridge. But then I would not want to light to go on or the bell to ring when somebody else goes over the bridge."

Julius then said, "Well, let's see what we can do. Can we look at the bridge?"

"Of course," said Chief Matokeo Makiida, "I will show you. Follow me." He then led them to an old wooden bridge across a small creek.





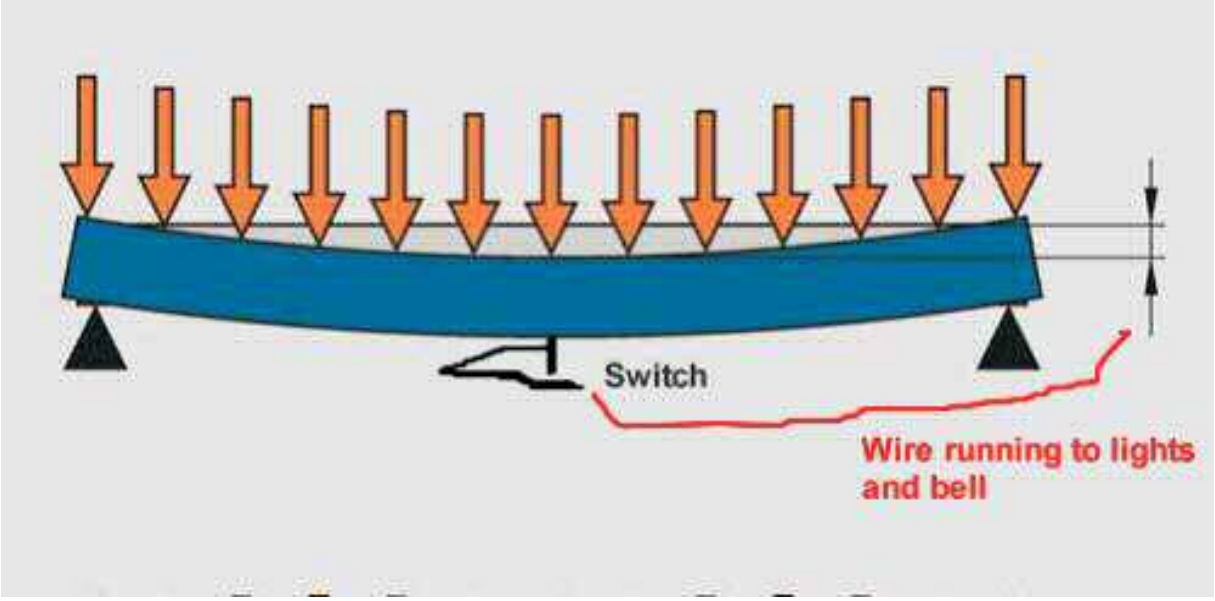
Julius could see that the bridge was not very strong and that it would likely sag if someone very heavy walked on it. "How much do you weigh," Julius asked.

"I weigh 308 pounds," said Chief Matokeo Makiida, "I am the biggest person in the village. I weigh 80 pounds more than anyone else."

That gave Julius an idea. Then he asked if he and Ira could take a look at what it was like underneath the bridge. Immediately they saw that there were some old boards supporting the top part of the bridge where people walked. "Those beams, the old boards, are likely to bend with the weight of heavy people walking on the bridge."

"Yes, that is correct," said Ira. "We call that **beam deflection**. Everything is sort of like a spring, and the boards **(beams**) will bend (**deflect**) with weight."

Julius then added, "That is how we will solve this problem. We will put an electrical switch below the boards in the bridge. Then as the boards bend under the weight of Chief Matokeo Makiida, and the electrical switch will go on just like a light switch."



Ira thought that was a great idea and he shook Julius' hand and smiled. So then the boys went to work and wired up the lights and the bell. They put the switch in exactly the right place so that when somebody weighing more than 275 pounds walked onto the bridge, the lights would go on and the bell would ring. They were very pleased with them selves and Chief Matokeo Makiida was pleased, too, when he heard about it. The boys invited the Chief to see a demonstration.

But, a problem developed just as the Chief, Ira and Julius were walking toward the bridge. An old cow was standing on the bridge. The lights were flashing and the bells were ringing because the cow weighed 563 pounds.

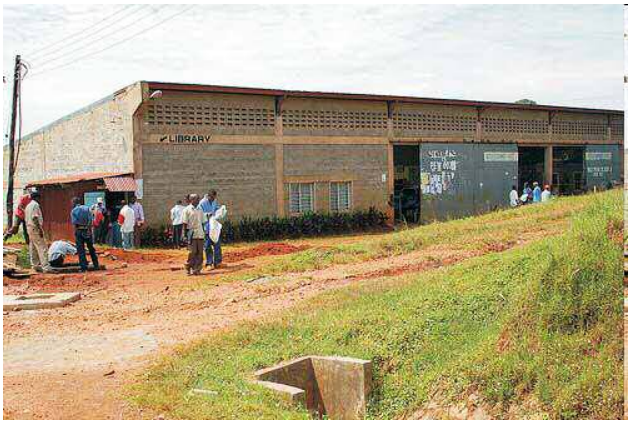
At first, Chief Matokeo Makiida just laughed at the fact that the cow might get all of the attention.

"Oh Oh," said Ira. "We are going to have to change our design."

So, the boys went to work and installed two switches, one that would go on if the weight on the bridge was more than 275 pounds and one that would shut off the electricity if the weight was more than 325 pounds. Then the lights and bells on the bridge worked perfectly.

Chief Matokeo Makiida was very happy and was very pleased with what the boys had done. So, he then took them over to a nearby mountain where they were able to find some chromium ore.

Julius and Ira then told the American Barrick company about the chromium ore and they were pleased to buy the ore from the people in Africa. With that money, the people in Africa were able to build a new hospital



and a new university where people could study both beam deflection and the literature of Charles Dickens. Below are pictures of the hospital and university.

Julius and Ira also received rewards. They each got two hundred dollars for their college funds and a trip to the Steel Dynamics steel plant in Butler, Indiana.

And that's the end of the story.

Judge Cadaver McAver and the Clogged Ear Trumpet

Judge Cadaver McAver was the best deaf judge in the county. He was VERY honest. He never took bribes. He earnestly tried to see both sides of every question. He always did his homework by reading a lot about all of the cases that came before him. Even from an early age, he always knew that reading was important to every success. And, he always encouraged the young people in the neighborhood to read whenever they could.

There was only one thing about Judge Cadaver McAver, though. It was very very difficult for him to hear. One time when the defendant loudly proclaimed, "I am Innocent," The judge replied, "I know your not worth a cent. That's why I am sending you to jail."

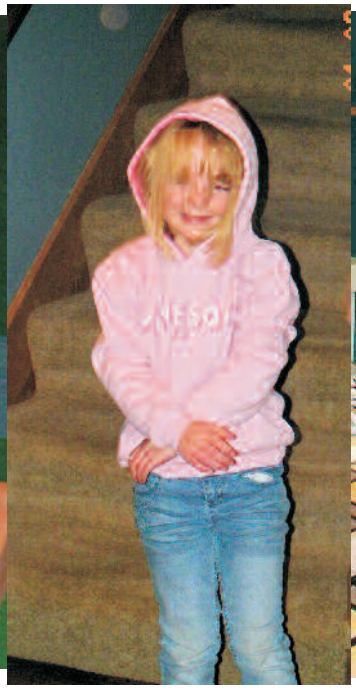
Judge Cadaver McAver's hearing had been a problem for many years, and he worried about not being able to hear the people in court. So, he decided to go see his very good and trusted friend, Dr. A. B. Thoughtful.

Doctor Always. B. Thoughtful was the town's physician and surgeon who was fair, honest, hard working, studious, and above all, thoughtful. When somebody asked him a question, he would scratch the side of his head, shut one eye, and think about the answer before he said anything. He always thought before he talked, which was the opposite of the Mayor.

Well, Doctor Thoughtful thought and thought about what to do about Judge Cadaver McAver's hearing. The Judge did not want to have a battery powered hearing aid because the batteries were so small that he had trouble putting them in. So, Doctor Thoughtful decided that he would consult with a very talented young scientist who was always very good at coming up with clever ideas that could be used to solve difficult problems. This particular scientist was one of the best.

Now, this very talented scientist knew what all talented scientists know. A few heads are better than one.

So, the talented young scientist enlisted the help of a few of his capable friends. Together, they worked out a way for Judge Cadaver McAver to hear better without needing any batteries.



Well, the team of scientists decided that they would investigate a wide variety of mechanical ear trumpets that amplify the sound so that Judge Cadaver McAver could hear the people in court.

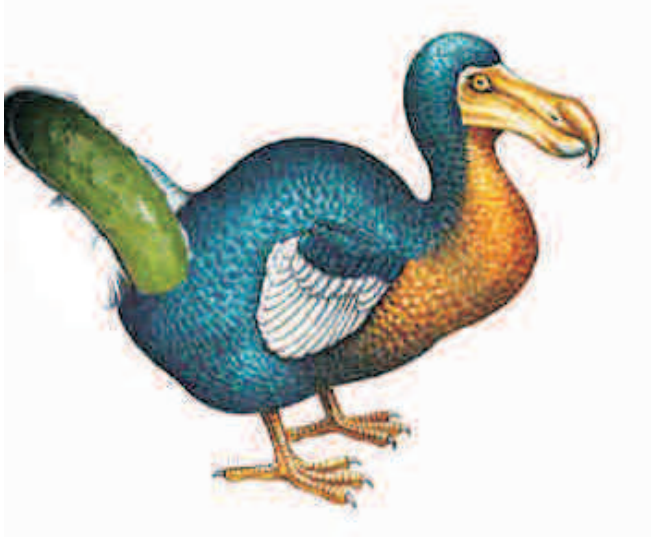
The scientists decided that several of these would not work well because they stuck straight out the side of the head. That would not be so good because the judge needed to both <u>hear and see</u> what was going on in court. They finally decided on a curved design so Judge Cadaver McAver could hold it up to his ear and still look straight ahead and see the defendants and the lawyers. (Actually, he thought the lawyers and the defendants looked quite a bit alike.)

The team also thought the ear trumpet should be much larger than most because the judge's hearing was pretty far gone. Also, they wanted it to be a darker color so it would go with his courtroom robes.

Mr. Schmidt agreed to build it in his factory.

Judge Cadaver McAver liked his new ear trumpet very much – even when we was going for a ride in his car, which he had purchased when it was new. The complaints about the judge not hearing what was going on in the courtroom dropped from 737 during the month of March to 414 for all of April – a drop of nearly 46 percent.

But, there were other things happening in the town. It turns out that the town had been invaded by a very disruptive and pesky bird – called the Pickle Plattled Gullysnoot bird. It was sort of an ugly bird to begin with but, in addition to its mean looking face, it had some unsightly feathers growing out its back that looked an awfully lot like a big pickle.



Pickle Plattled Gullysnoot birds were an enormous nuisance to nearly everyone in the town. Olaf Erickson didn't like them because they ate his corn. The mayor didn't like them because one time they pecked a hole in his inflatable shoulder pads, hid his false teeth, and ate his wig – thus leaving the Mayor exposed. Mrs. McGillicuddy's grandmother had to get after them with her umbrella because they were eating the feed intended for her chicken. Mr. Schmidt did not like them because they ate his rivets and sipped on his axle grease tea.

An especially serious problem then developed for Judge Cadaver McAver. It turned out that the Pickle Plattled Gullysnoot birds had found an appealing place for a nest in the judge's ear trumpet when he was asleep. One morning when he got up, his ear trumpet was filled with a nest and three Pickle Plattled Gullysnoot eggs. He did not notice them right away, however.

The judge did notice that his hearing was especially weak that particular day. He was quite unable to understand what people said. The attorney Habeas Corpus had announced very loudly, "Your honor, I move to have the case dismissed."

Judge Cadaver McAver replied,"You say somebody shot at your place and just missed?"

"No. Have the case dismissed."

"Did you say – Have a case, it won't be missed? I won't take a case of anything. That would be bribery."

Well, Brunhilde was serving as the court reporter that day and she did notice that there was something in the judges ear trumpet. "Get that filthy crow's nest out of your ear trumpet," she yelled. (Brunhilde was not very diplomatic.")

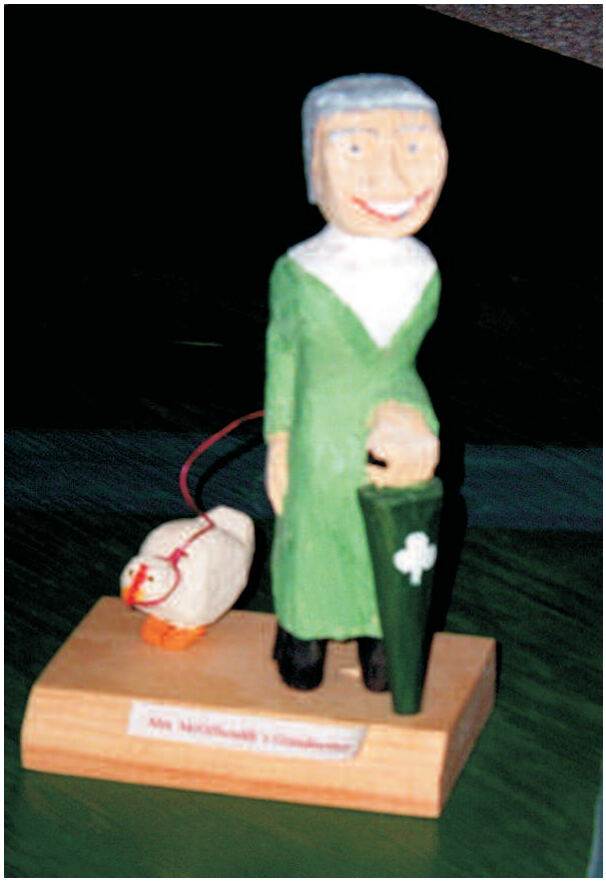
Then, Judge Cadaver McAver did notice that the nest was in his ear trumpet. He was first inclined to step outside and gently put the nest and the eggs down on the lawn.

Just then, he heard somebody say "Hold it!"

It was Persnickity Procedureperson who announced that he was chairman of the Subcommittee on Disadvantaged Repugnant Animals and that, after four years of meetings, the Subcommittee had designated the Pickle Plattled Gullysnoot as an endangered specie. Persnickity Procedureperson explained that it would absolutely not do to put the nest and the eggs out on the lawn. They would have to be put in an environment compatible with the bird's disposition.

"Where can that be?" said the judge.

"We don't know yet," said Persnickity Procedureperson. "We are going to discuss that at the next meeting."



Now, Mrs. McGillicuddy's grandmother happened to be standing by and she asked, bravely, "Would it be all right to put them in a temporary place until the Committee finishes it's work, as along as the place is compatible with the bird's disposition?"

"As long as it is compatible with the bird's disposition, the location would be permissible," replied Persnickity after checking his rule book.

Then I know just the place." said Mrs. McGillicuddy's grandmother. "Ponderosa Pete and Slippery Sam's hideout. Their dispositions are just the same."

So, with great fanfare, about twenty people from the town escorted the nest and the eggs out to the hideout of Ponderosa Pete and Slippery Sam, because they had the same disagreeable disposition as the Pickle Plattled Gullysnoot. Persnickity Procedureperson had pronounced the environment as "compatible on a temporary basis until the Subcommittee on Disadvantaged Repugnant Animals finished its work." The procession even included the services of Tony the Trumpet Player who played in the town band.

Mrs. McGillicuddy's grandmother then went to have tea with two of her best friends.

That did not end the story, though. It turned out that the Subcommittee on Disadvantaged Repugnant Animals did not act very quickly and the eggs were out at the hideout for many years. In fact, the subcommittee went on for so

long that the eggs hatched and the last remaining Pickle Plattled Gullysnoot grew very old with a long white beard and long gray hair.

And that is the end of the story.

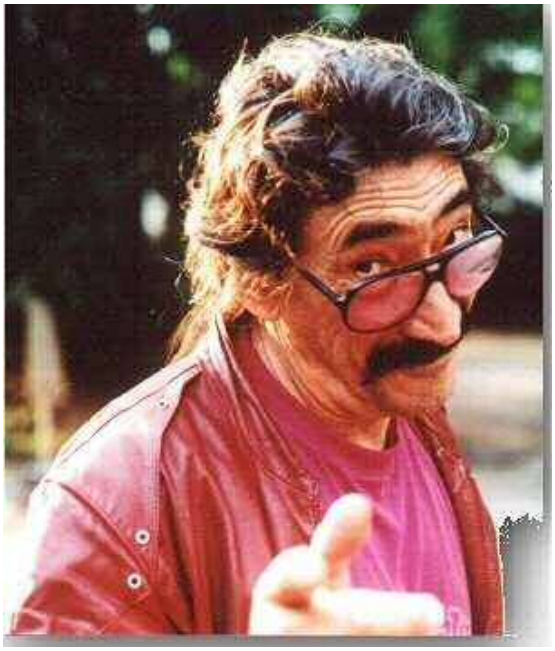
Goodbye for now.

Cousin Heinrich's Dinner Dilemma

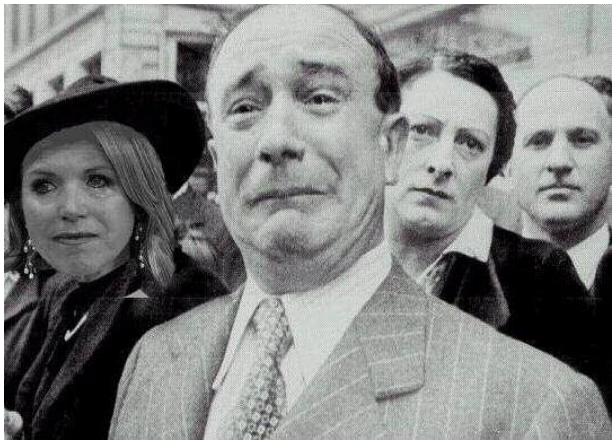
Mr. Schmidt recently heard from his cousin, the famous Bavarian chef, Heinrich von Sauerbratengemusesuppe, who encountered a difficult scheduling problem in his restaurant Gasthof Alte Post, in Siegsdorf, Germany. It seems that cousin Heinrich offers a very rare Kalbschnitzel ala Holstein that is delicious (according to some) but keeps for only one day, and sometimes less according to others.

None-the-less, Kalbschnitzel customers are exceptionally loyal and, if their favorite dish is not available, they abruptly stomp out with their hobnail boots leaving gouges in the floor.

Cousin Heinrich obviously did not approve of people making gouges in his floor with their boots -- even though they were among his best customers. He did try to scold them, but he found that many of his customers were not very good listeners.



As a matter of fact, some of them tended to be a bit down-at-the-mouth in the first place.



And, some of them did not even pay attention.

But, Cousin Heinrich had to keep his business going. In order to keep it going, he had to have enough customers pay for food to cover the cost of buying and preparing the food. Heinrich had many expenses; groceries, meats, drinks, waiters, cooks, hostesses, maintenance people, supplies, dishes, rent, taxes, insurance, and other expenses. The person at the right came from another country to help out as the hostess in the restaurant.

The amount charged for each kalbschnitzel dinner is 7 Euros, or about $9.10. However, Heinrich has to buy all of the materials and prepare the Kalbschnitzelen in advance and the actual cost for all of the ingredients is 3 Euros. If he makes the exact number of Kalbschnitzel dinners that his customers order, the profit from each kalbschnitzel dinner is 4 Euros.

However, if Heinrich prepares 15 dinners and only 12 people show up, then he has the extra costs of the 3 Euros times the three dinners that he did not sell.

On the other hand, if he prepares 12 dinners and 15 people show up, then three of his customers will be angry and they will stomp out of the restaurant and leave gouges in the floor from their hob-nail boots. Then Heinrich will have to hire the noted handyman on the left to come in and remove the gouges in the floor at a cost of one Euro for each incident -- or, three unfed customers times one Euro each for a total of 3 Euros -- if he ran three meals short.

Now, it turned out that Cousin Heinrich was not very good at mathematics because he spent too much time watching television and listening to music on his IPOD.
None-the-less, he had the feeling that there ought to be a way to figure out how many dinners to prepare, but he did not know how to do it. For a while he was sad. But then he wrote to his cousin in the United States, Mr. Schmidt, about his problem and the need to find a solution.

Mr. Schmidt thought about the problem and then wrote back to Heinrich.

"Ich denke, dass ich für Sie eine Lösung habe. Ich weiß von drei Menschen, die alle sehr gut mit der Mathematik sind. Sie sind mit der Mathematik so gut, dass sie Zahlen für Namen hochhoben."

Then Mr. Schmidt enclosed their pictures with they names.

"Mein Name ist 3.14159"

"Und, ich heise 186,000 miles pro Secunda."

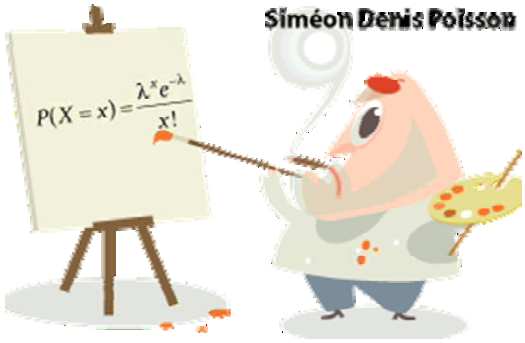
And, some of them did not even pay attention.

"Und ich heise 2.718"

The first of the three mathematicians to speak was 3.14159. She explained that a good fundamental knowledge of mathematics would enable a person to get more accurate estimates and answers to any problems that needed to be solved.

Then, 186,000 miles pro Secunda (166,000 miles per second) explained that sometimes we have to use established mathematical formulas and approximations to arrive at correct answers.

Then, 2.718 explained that Heinrich's problem could best solved by using the Poisson Approximation. She explained that the Poisson Approximation is used to estimate the percentage of times *(P)* an outcome *(X)* will occur if occurrences are expected at a rate of λ **.**



2.718 went on to explain that Simeon Denis Poisson was a French Mathematician who lived from lived from 1781 to 1840. He worked with several other famous French mathematicians, LaPlace, LaGrange, Lacroix, and Legendre, which was lucky because he learned to be a leader in linear and nonlinear estimations.

For instance, if a baseball player is hitting .300 (3 hits for every times at bat), then we can use the Poisson approximation to estimate the percentage of times he will have 0, 1, 2, 3, 4, 5, 6, 7, or 8 hits out of every 10 times at bat.

The formula for the Poisson Approximation is at right.

$$P(X=x)=\frac{\lambda^x e^{-\lambda}}{x!}$$

or, three unfed cu[illegible] Euro each for a total of 3 Euros -- if he ran three meals short.

Everyone immediately noticed that 2.718 had her name in the formula because mathematical constant e is equal to 2.718. She was exceedingly pleased that he name was a part of this important formula.

Fortunately, we have tables for the Poisson Distribution so we do not always have to compute the answers (unless we want to because we are tied of television and our IPODs). For instance, if an excellent baseball player like 186,000 miles per second, has a batting average of .300, here will be the percentage of times he will have 0, 1, 2, 3, 4, 5, 6, 7, or 8 hits out of every 10 times at bat.

Number of Hits out of 10 times at Bat for a .300 hitter											
Hits in 10 times at bat	0	1	2	3	4	5	6	7	8	9	10
Probability	.050	.149	.224	.224	.168	.101	.050	.021	.008	.002	.001
% of times	5.0%	14.9%	22.4%	22.4%	16.8%	10.1%	5.0%	2.1%	.8%	.2%	.1%

ome of them tended to be a bit down-at-the-mouth in the first place.

Now, over a period of several years, Cousin Heinrich noted that he sold an average of 10.6 Kalbschnitzel meals every Wednesday evening (Mittwochabend). Even though 10.6 was the average number of meals wanted, sometimes there were eight meals sold, sometimes nine, sometimes 12, and sometimes other numbers of meals were sold. This, too, followed the Poisson distribution. The table below shows this distribution.

Number of meals wanted when 10.6 meals is the expected number (average).											
Hits in 10 times at bat	6	7	8	9	10	11	12	13	14	15	16
Probability	.049	.074	.098	.116	.123	.118	.105	.085	.065	.046	.030
% of times	4.9%	7.4%	9.8%	11.6%	12.3%	11.8%	10.5%	8.5%	6.5%	4.6%	3.0%

And, some of them did not even pay attention.

So, with so much variation in the number of Kalbschnitzel meals people wanted, Cousin Heinrich was not sure how many meals to prepare each Wednesday evening.

Fortunately, Cousin Heinrich had the services of those three highly talented mathematicians; 3.14159, 2.718, and 186,000 miles per second. So the three mathematicians produced the following table which showed how much money (in Euros) Cousin Heinrich would make if he prepared various numbers of Kalbschnitzel meals for sale on Wednesday evening.

Table of Possible Outcomes if 10.6 meals are expected		
Expected Meals Sold	Meals Prepared	Profit in Euros
10.6	0	-10.6
10.6	1	-5.6
10.6	2	-.6
10.6	3	4.38
10.6	4	9.33
10.6	5	14.17
10.6	6	18.79
10.6	7	23.02
10.6	8	26.65
10.6	9	29.50
10.6	10	31.41
10.6	11	32.35
10.6	12	32.33
10.6	13	31.48
10.6	14	29.94
10.6	15	27.89
10.6	16	25.47
10.6	17	22.81
10.6	18	20.00
10.6	19	17.10
10.6	20	14.15

You can see that Cousin Heinrich would make almost as much money if he prepared either 11 meals (for a profit of 32.35 Euros) or 12 meals (for a profit of 32.33 Euros). But, if Heinrich prepared fewer than 11 meals or more than 12 meals, he would not make as much money.

rdent -- or, three pnfed customers Imes one Euro each for a total of 3 Euros -- if he ran three meals short.

Well, Cousin Heinrich decided that it would be worth something to him if he could avoid having too many people mad at him for running out of the Kalbschnitzel meals. Apart form the cost, Heinrich did not want to face did not want to have people stomping around in their hobnail boots. So, for a cost of less than one Euro (32.35 -31.48 = .87 Euros), Heinrich decided to prepare 13 Kalbschnitzel meals every Wednesday evening. The Table below shows this tabulation.

Gasthof Alte Post Kalbschnitzel Meal Tabulation			
Expected Number of Meals Sold =	10.60		
Number of Meals Prepared =	13.00		
e =	2.718		
e^Expected Sales =	40134.84	Expected Profit =	31.48
Probability 0 Arrivals =	0.000025		
Probability 2 Arrivals =	.00140		
Probability 6 Arrivals =	.04909		
Probability 10 Arrivals =	.12296		
Probability 14 Arrivals =	.06462		
Gross Profit per Meal in Euros =	4.000000		
Material Cost per Meal in Euros =	3.000000		
Gouge Removal Cost in Euros =	1.000000		

ome of them tended to be a bit down-at-the-mouth in the first place.

Besides, if Cousin Heinrich had meals left over, he could serve the extra to three very special friends of his:

And,

And that is the end of the story.

Counting with Computers

Mr. Schmidt teaches children to count

One day, when Mr. Schmidt was sitting in the beak room of his factory having his afternoon axlegrease tea, one of his grandchildren and other children approached him and wondered if he would show them the machinery he had in his manufacturing plant.

"Oh," he said. "I would be delighted to show you the fine machinery we have. But first, let's get you all set up with safety glasses. We would not want to have anything get in your eye as you walked through our fine factory."

The, Mr. Schmidt opened the door to the splendid factory.

Mr. Schmidt's Recipe for Axle Grease Tea

Start with 1 gallon of water.

Add 2 cups of cheap tea.

Add 1 cup of corn silage animal feed.

Add three tablespoons of grease from the rear axle of an old Ford truck with at least 100,000 miles.

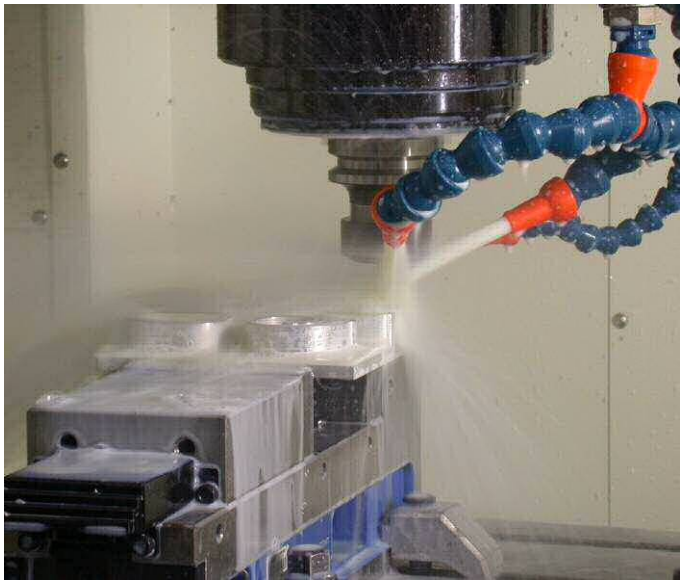
Note: Boil extensively because there may be a few germs in the axle grease.

Mr. Schmidt was very proud of his factory, including the Haas VF-4 vertical machining center which he had just purchased. He explained that it is called a "vertical" because the spindle that holds the milling cutters is vertical, rather than horizontal. It is called a "machining center" because it can automatically change and utilize many tools -- all under the control of the computer control that is part of the machine.

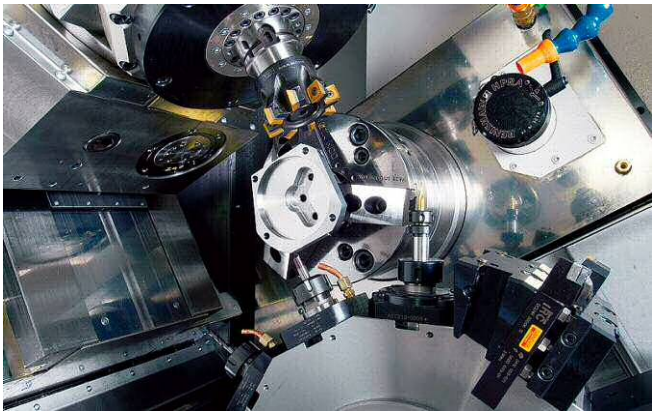
Then, Mr. Schmidt asked the operator to tell the children more about the machine.

"Vell, it's a humdinger. That's all I can say" said Olaf Erickson, the operator."Dis ting can do more vork in ten minutes than eighty congressmen could do in a year."

Then, Olaf showed the children how it looked inside the machine when it was cutting the metal. "Notice how ve spray fluid onto the part to keep the temperature down and to make the cutting go better."



Next, Olaf showed them the inside of another machine that can machine a part from many directions. It was called a "turning center" because the part could be turned as it was cut.



Mr. Schmidt explained that careful attention is essential in manufacturing and everything has to be done in the proper way.

Then, one of the children asked, "How do you make sure everything is done properly?"

"We have a very effective shop supervisor who makes sure everyone is doing what they are supposed to do.

One of the children asked the plant superintendent what she did to make sure everyone did what they were supposed to do in the factory.

"Oh, its not a problem, she said. If anybody gets out of line or doesn't do what they are supposed to do, I just whack them with my umbrella and they go right back to work."

"Order is important in a factory," said Mr. Schmidt. "Everything is hooked together and everything has to be done exactly as it should be. That is the best thing we can do to make sure that the company remains in business and that everybody has a place to work. In our community, almost one out of every five employed persons work in a manufacturing plant. If we don't do it right, the company will close and we will all be out of work."

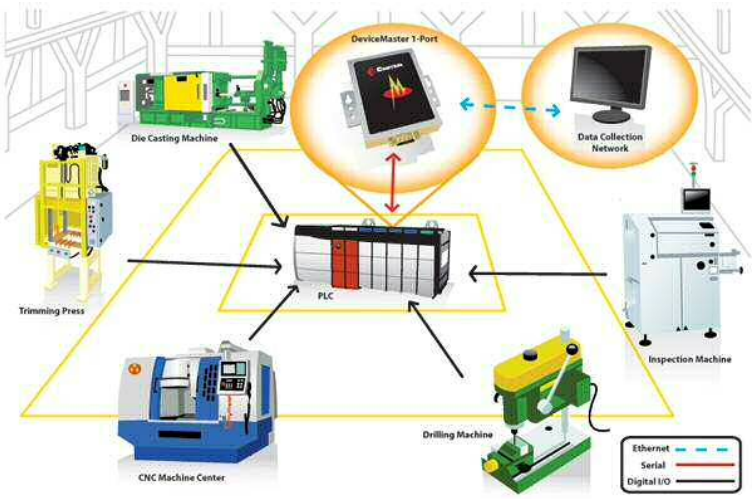
Then, Mr., Schmidt described how the whole factory was connected to computers that transferred around all of the information about jobs to be run along with the instructions so the work could be done exactly as the customers specified.

"Those computers must be very smart," remarked on of the children.

rol that is part of the machine.

"Actually, computers are not very smart at all," replied Mr. Schmidt. "All they can do is add one to one, but they can do it fast and in many different formats."

Then, Mr. Schmidt asked the operator to tell the children more about the machine.



"Well," the child said, computers certainly do handle some big numbers."

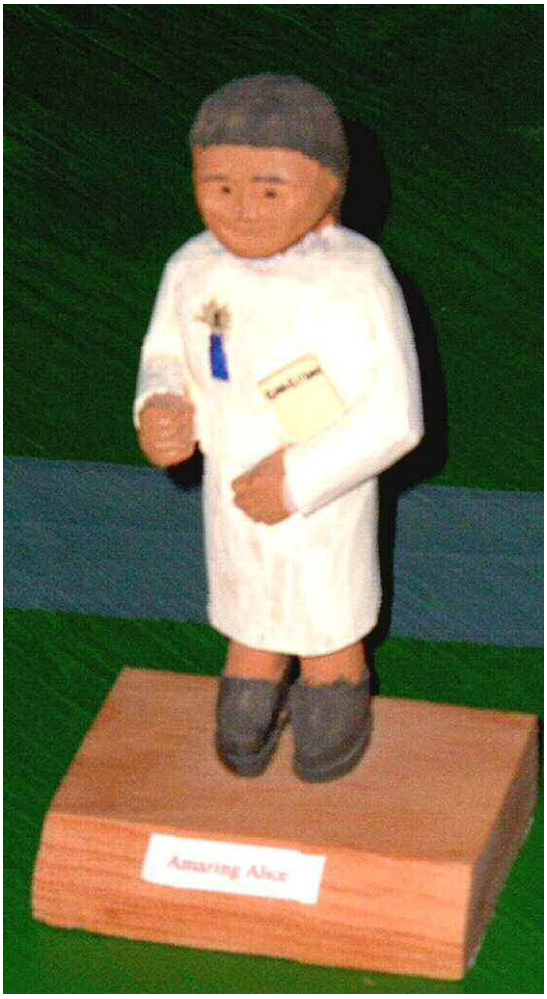
"Yes, that is true, said Mr. Schmidt. "But, lets see how they do it. To explain this better, I am going to ask the head of our computer operations to explain how computers handle numbers. Amazing Alice, can you teach the children to count like computers?"

"Of course," said Amazing Alice. That will not take any time at all. Just say, 'zero."

"Zero," all of the children replied.

"Now say 'one'."

"One." they all said.



Amazing Alice then explained, "Well, now you can count like computers, because that is all they can do is to say zero or one."

Mr. Schmidt then elaborated. "You see, the inner-working of a computer is something like a lot os switches wired together. Each switch can be off or on. When the switch is off, it is a zero. When the switch is on, it is a one. That is all computers can do. Of course, they do it very fast and they do it millions of times every second. So, computers get al lot done -- even though they are really not very smart."

Then, one of the children asked how computers could get big numbers if they can only count to one.

isor who makes sure everyone is doing what they are supposed to do.

"That's an excellent question," answered Amazing Alice. they can only do it by changing the base of their numbering system away from the base of 10 (our current system) to a much smaller base. Computers use a numbering system with a base of 2 -- which is called the binary system. So, for instance, the number one is written as a 1, just as it is with the decimal system. But the number two is written as 10. A three becomes 11 and a four is written as 100.

Computers also use other numbering systems. Some use the hexadecimal system based on the base of 16. Some older computers used the octal system with 8 as the base. However, non-binary systems are only used for external communications to printers and other devices. The only number system used internally in computers is the binary systems. One and zero are the only numbers the computers can handle.

The tables below show the value of decimal numbers under the binary, hexadecimal, and octal systems. So, how old is Grandpa Fred? Well he is either 78, 4E, 96, or 1001110 depending upon which numbering systems you use. To the computer, however, Grandpa Fred is only 1001110 years old.

Take a minute and see how old you are and how old your father is. Then remind him of it.

Decimal and Other Number Systems

Decimal	Binary	Hexadecimal	Octal
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7
8	1000	8	10
9	1001	9	11
10	1010	A	12
11	1011	B	13
12	1100	C	14

rol that is part of the machine.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

13	1101	D	15
14	1110	E	16
15	1111	F	17
16	10000	10	20
17	10001	11	21
18	10010	12	22
19	10011	13	23
20	10100	14	24
21	10101	15	25
22	10110	16	26
23	10111	17	27
24	11000	18	30
25	11001	19	31
26	11010	1A	32
27	11011	1B	33
28	11100	1C	34
29	11101	1D	35
30	11110	1E	36
31	11111	1F	37
32	100000	20	40
33	100001	21	41
34	100010	22	42
35	100011	23	43
36	100100	24	44
37	100101	25	45
38	100110	26	46
39	100111	27	47
40	101000	28	50
41	101001	29	51
42	101010	2A	52
43	101011	2B	53
44	101100	2C	54
45	101101	2D	55
46	101110	2E	56
47	101111	2F	57
48	110000	30	60
49	110001	31	61

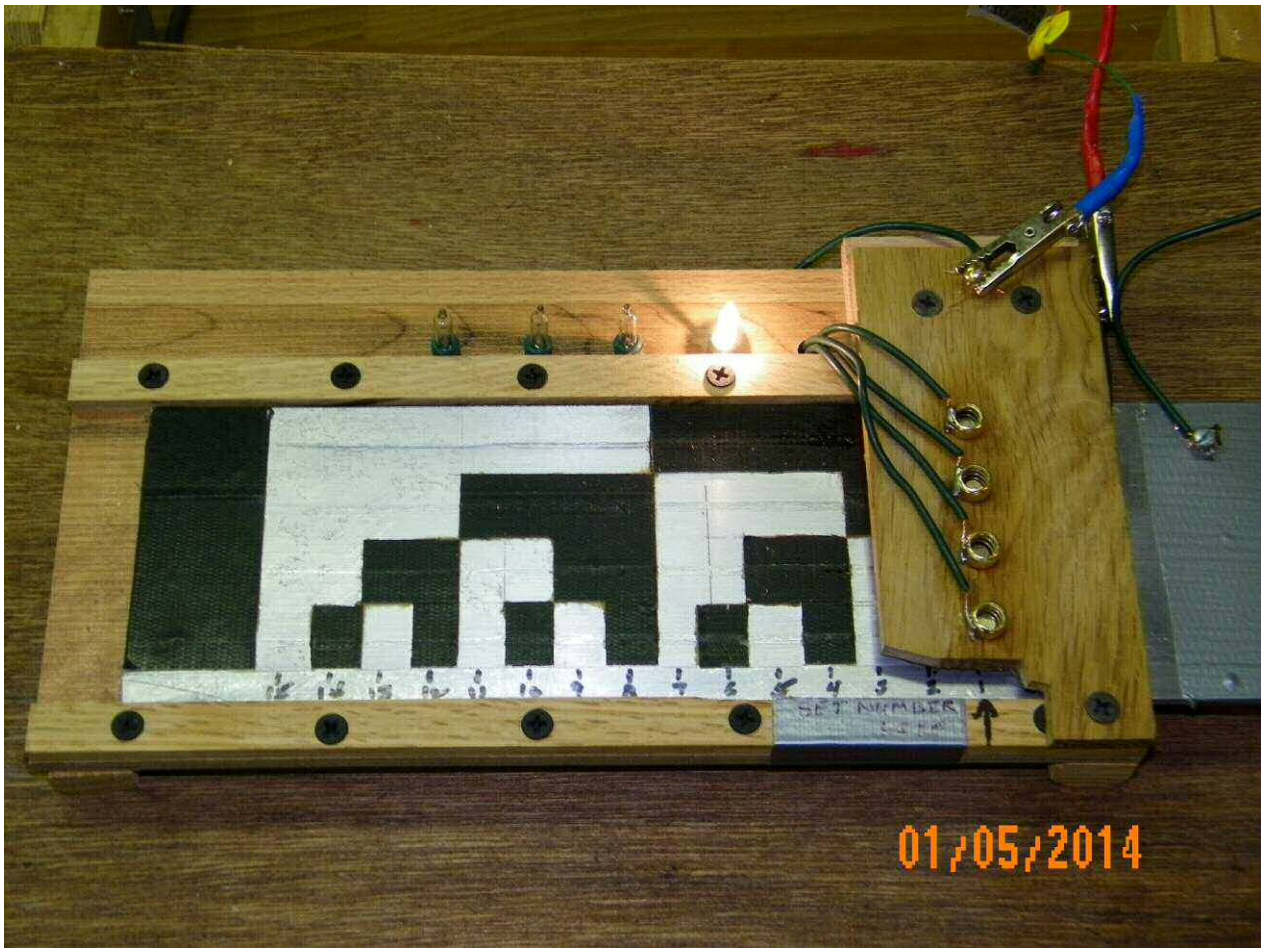
isor who makes sure everyone is doing what they are supposed to do.

50	110010	32	62
51	110011	33	63
52	110100	34	64
53	110101	35	65
54	110110	36	66
55	110111	37	67
56	111000	38	70
57	111001	39	71
58	111010	3A	72
59	111011	3B	73
60	111100	3C	74
61	111101	3D	75
62	111110	3E	76
63	111111	3F	77
64	1000000	40	80
65	1000001	41	81
66	1000010	42	82
67	1000011	43	83
68	1000100	44	84
69	1000101	45	85
70	1000110	46	86
71	1000111	47	87
72	1001000	48	90
73	1001001	49	91
74	1001010	4A	92
75	1001011	4B	93
76	1001100	4C	94
77	1001101	4D	95
78	1001110	4E	96
79	1001111	4F	97
80	1010000	50	100
81	1010001	51	101

rol that is part of the machine.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

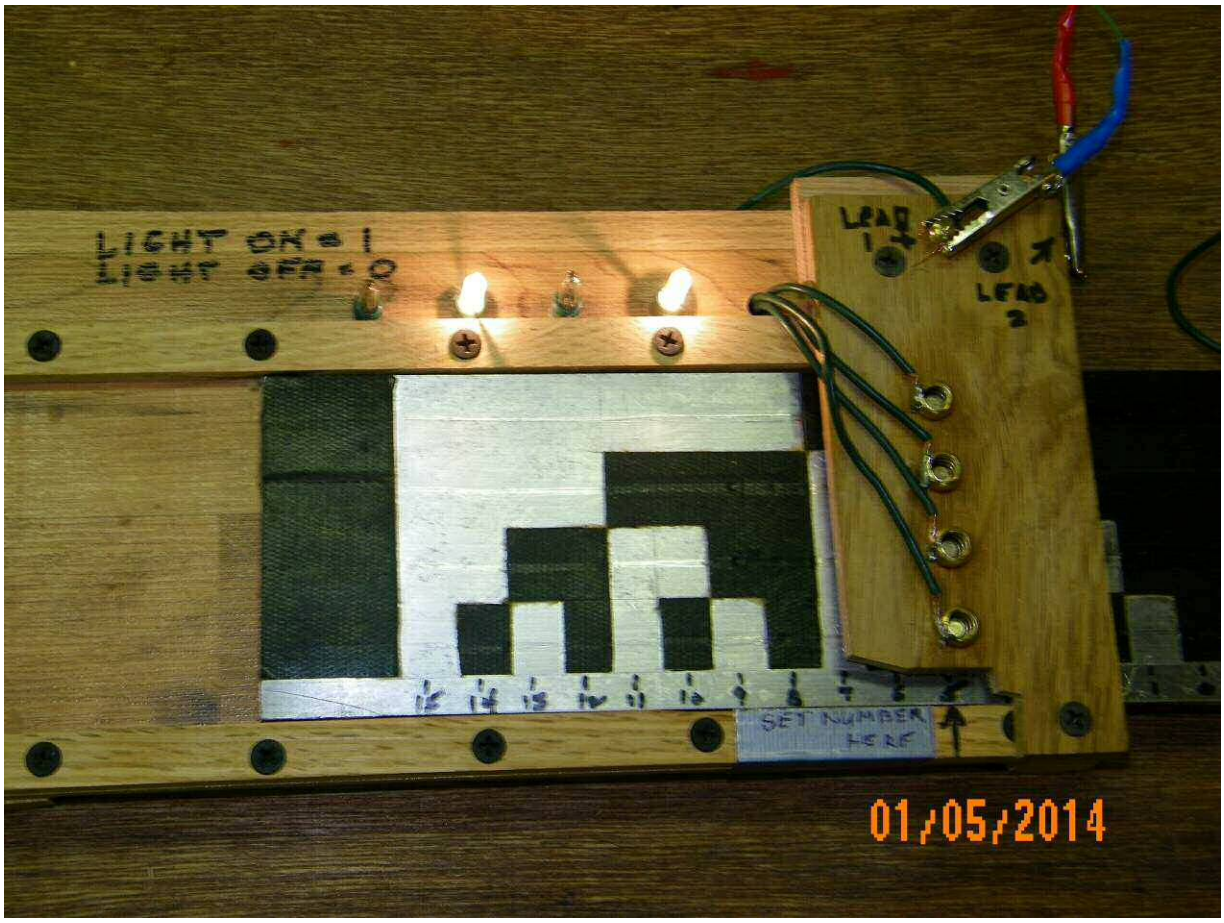
It turned out that Mr. Schmidt designed a machine that would help his employees understand the binary numbering system used in computers. It involved a patterned way of illuminating four electric light bulbs in ways that would represent the way numbers would be stored in the computer. If the light bulb was on, it would be a one. If the bulb is off, it would be a zero. The machine below shows the number 1 displayed as 0001.



The machine works by sliding an aluminum coated connector bar (the one with black and aluminum spots) under four connectors points, each of which is connected to one of the four light bulbs. The black spots on the connector bar is gorilla tape stuck onto the aluminum so the connection will NOT be made and the current will not flow. When the connector is over a black spot, the appropriate light will not light up. When the connector touches the aluminum, a connection is made and the light WILL light up.

isor who makes sure everyone is doing what they are supposed to do.

The user can slide the aluminum coated connector bar (the one with black and aluminum spots) back and forth to get different numbers in the binary system. Below shows the machine set to display the number 5 or 0101 in binary.



Well, the children were all fascinated with the explanations of computer numbering system provided by Mr. Schmidt and Amazing Alice. The next week, they told all of their friends in school about it. They even asked Mr Schmidt if they could borrow the binary counting machine and bring it to school. The teacher was very pleased to see it.

rol that is part of the machine.

Then, the next week, Mr Schmidt had to go to the doctor. The doctor he went to was Dr. Ambrose McAver, the brother of Judge Cadaver McAver.

Then, Mr. Schmidt asked the operator to tell the children more about the machine.

When Mr. Schmidt walked in, Dr. McAver asked him a few questions about his health. At one point, Dr. McAver said, "How old are you?"

Well, Mr. Schmidt thought he would show off a little bit and so he thought he would give the anser in binary.

"I am one zero zero zero one zero zero," answered Mr. Schmidt.

Dr. McAver looked a little puzzled ane then said, "Hero? You don't sound like much of a hero to me! You don't even know how old you are!

And that is the end of the story.

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