

John C. Nash

EDMUND

# EDMU<sub>nd</sub>

John C. Nash

Copyright ©2018 John C. Nash

nashjc @ ncf.ca  
18 Spyglass Ridge  
Ottawa, ON K2S 1R6  
Canada

You're eleven, going on twelve, and your parents have bought a house. In the move from the old apartment, they find you a captain's bed on Kijiji. There's even an old teddy-bear in one of the drawers.

You nearly wet the bed when it and the bear start talking and arguing, but learn that they are distinct and interesting individual personalities who become your friends and allies in dealing with life's problems and dangers.

# Preamble

*EDMUnd* is a work of fiction. The initial text was written in 2018 and updated and expanded in 2020.

I am most grateful for the expeditious and collegial editing carried out by Kevin Mazurimm. Kevin can be reached by email at kmazurimm@gmail.com or by telephone at 613 791 7194.

Images are drawings made by the author using a variety of tools, sometimes inspired by photographs or other images.

*John Nash* , Ottawa, 2020



I'm now twelve. My birthday is in mid-August. At the end of school of the year I was eleven, Mom and Dad bought a house. We'd been living in a pretty small apartment in an older building. I did have my own room, but we had to use it to store stuff like our out-of-season clothing, or sports equipment, and boxes of mementos.

We weren't poor, but Dad was a schoolteacher and Mom was the office manager for a health charity for some rare disease I can't pronounce. So we were OK, but not rich. We've always had good food – even if I don't like Brussels sprouts. Our car was not a rust-bucket. It was a few years old and nothing to write home about, but it got us around reliably.

I guess I was smart enough to know not to ask for anything too fancy for Christmas, but Mom and Dad usually surprised me with something really nice. I'd wanted an iPad last year, and at first didn't think so much of the refurbished laptop they got me. Apparently a few machines for the school had arrived with the fancy solid-state disk drives stolen, and in the process there was some other damage. However, Dad and one of the IT guys managed to get the insurance adjuster to let them have the carcasses, then cannibalized them into a couple of machines. They needed a new disk drive, in fact a 1 Terabyte one in mine, though I think this wasn't as fast as the stolen ones and was what Dad called a 'spinnny disk'. And they found a way to put in 12 Gigs of memory. Sweet. Of course, it didn't have any operating system, so they put on Linux. Something called Mint. It looks a bit like the Windows XP we were still using when I first got to try a computer when I was just a really little kid.

Pretty soon, I realized the machine was sort-of fast. I didn't have some of the fancy apps that some of the kids with iPads had, but I soon found there were loads of neat programs for Linux, and I could install them without spending money. All I needed was the Internet, which we had at home, though Dad said I had to use it in the living room. I could even run some Windows programs using something called Wine. I thought the name was about drinking 'till Dad said it meant WINdows Emulator. Anyway, I can run this great free photo and image program called Irfanview. Written by a guy who was a Bosnian refugee over 20 years ago, apparently to try to get some money to go to university in Austria. And now one of the most used programs around, but still free to use, though he does ask for donations. I should see if Dad will send a few dollars.

We moved to the new house right at the end of June as soon as school was out. You can guess it wasn't a mansion, but we're all really happy with it. It has three bedrooms, so one would become the guest room and also be used for storage, though we have a basement too, and it has a sort of bedroom too, as well as the open space. Mom said, "Don't even think of putting stuff down there! If we keep it clear we can maybe set up a room

and rent it out. Even if we don't, I'm determined it won't become a junk space."

The new house is a bungalow. There's a toilet and sink in Mom and Dad's room, as well as the main bathroom. No more crossed legs if you forgot to pee and someone was in the tub. Even a double garage for our single car. Nice to be able to put our bikes in there, though we need to remember to close the door or else lock them up. And the garage door has an electric opener. Neat. We used to have to bring the bikes into the apartment. Mom was always antsy when it was wet out, because the floors would get dirty.

When we looked at the house, we'd seen a boy about my age next door on one side. That turned out to be Mike Sumter, and later on we were in school together.

So we moved in, and I was still going to be sleeping on the camp-cot I'd been using since before I could remember, apparently straight from the cradle. Well, the mattress was thin and lumpy, and it was resting on a pretty tired set of metal straps and springs that sagged into a shallow valley. When Mom and Dad were putting it back together, Mom said, "It's time Jimmy had a new bed."

That's when things started that brought Ted into the house. It was the morning after we moved in when Dad saw the ad on Kijiji.

**Captain's bed. Nearly new. With mattress.  
\$150 or best offer.**

There was contact information, and Dad got in touch. Apparently the bed had to be dismantled using wrenches, and was fairly heavy, so Dad offered half price, and was told he had it if he could remove it that day.

Mom called her good friend Steph. "Steph. It's Joanne. We've found a new bed for Jimmy for \$75 if we can move it today. Wondering if we could use your van."

Steph offered to drive the van and help as a house-warming present. Dad grabbed his tool box and off we went, fortunately to a house not more than a couple of kilometres away. A big lady answered the door and took us down to the basement, where there was a sort of apartment, though it didn't really have a door. In what must have been the bedroom, the bed was in the corner. It had a headboard and a tailboard that were each about fifteen centimetres thick. There were small lamps on goose-necks on the headboard, I guess for reading. Under the platform that held the mattress were three deep drawers. In one was a large, obviously not new, teddy bear.

"Oh. We'd better not take that, it must belong to the former occupant," Dad said.

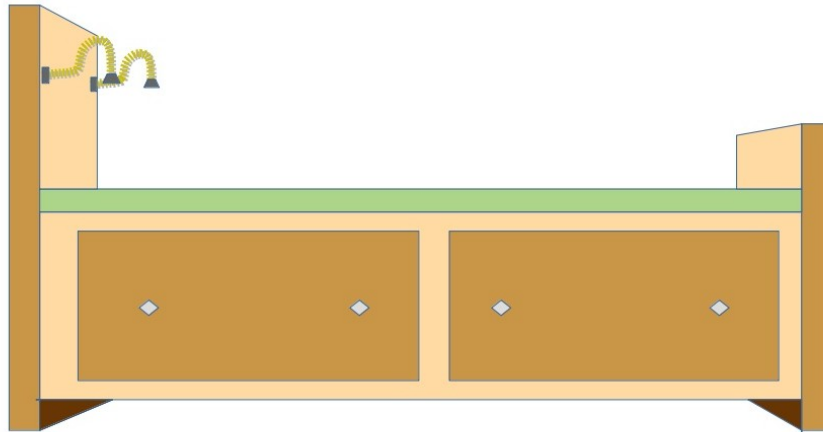
"Afraid he won't be needing it," the big lady said. "He was unfortunately that guy run down by the dump truck when it turned the corner a few weeks ago. And the police can't find any family. He was a Dutch student doing his

doctorate at the university, but his folks were on that plane the Ruskies shot down a couple of years ago. Seem's there's nobody else. I'm out a month's rent because the police made me wait to clear out the place."

The big lady was grumpy. I didn't like her, and I don't think Dad did either. We undid the bolts and got the bed apart as quickly as possible. Dad had me roll up the electric cord that led to the headboard. Odd. There was an extension to the tailboard too, with an Internet style cable as well. Weird. It looked like there were some small lights on the tailboard, so maybe for them. But we wanted to get out of there quickly, so just undid things and got the van loaded.

At our home – wow, it really was our home now – we put it back together. I would plug in the wires when the other folks weren't looking. I was kind of curious, but didn't want to have my parents get too cautious and not let me have this nifty bed.

\* \* \*



It was quite late that day that I got to try the bed. Mom and Dad were sitting out back with a glass of wine. They'd had a busy day with the bed and there was still a lot of other unpacking going on. Well, we'd unpacked the everyday stuff, but Mom and Dad were still deciding where to put things and also cleaning and doing a little painting and putting in shelf paper and such. The garden needed some work, but they'd decided just to keep the weeds down to mini-jungle level for this year. Maybe clean it up in the fall, then start in earnest next spring.

I plugged in the electrical wires and looked at the headboard. There was a set of switches. Odd. Just two lamps but four switches on a small bar. I

tried one at my left and one of the goose-neck lamps came on. Same with the switch at the right. I turned them off again. Then I tried one of the middle switches and some LEDs on the tailboard lit up one by one, some blinking, rather like when Dad restarts our Internet router. In fact, it reminded me a lot of that.

After a minute or so, the lights settled down. I turned on the last switch, and another pair of LEDs started blinking, this time on the headboard. They settled down after about half a minute. I was about to turn everything off, when a muffled voice said, “Jan, I’m in the dark, and my battery is low.”

Well, I nearly wet the bed. My new bed. So I said, “I’m Jim, not Jan, and I don’t know who you are.”

“I’m Ted, the stuffed bear. And I’m in the dark, so I think I’m in one of the drawers of the bed. Tell Jan to set me up to charge.”

I knew where the stuffed bear was, so I opened the drawer and took him out. A big stuffed teddy bear about 3 feet high. Looked a bit worn around the edges. And kind of heavy compared to what I expected.

“Thank you.” came out of the bear’s mouth, but without lip movement. He had a British accent according to what I’d heard in old movies that Mom and Dad liked. I think Dad would say “upper crust”.

Strange, I should have been scared, but this was so interesting, I guess my curiosity was greater than any fears.

“How do I set you up to charge?” I asked.

“Sit me against either the headboard or the tailboard, on one side or the other. So I look like whoever owns me had set me up as a decoration.”

That was easy, so I did as he asked. Hmm. Is he a “he”? I guess so. He said his name was Ted.

“Thank you. Now can you fetch Jan?”

“I don’t know any Jan. But the big lady said the fellow who had the bed was renting her basement ...”

“Yes. Fat Mrs. McKenny. Horrible woman! But what about Jan.”

This felt bad. I tried to answer. “I ... I ... don’t know quite how to say this, but ...”

Ted seemed to understand my fears. With a very sad voice, he said,

“Oh. I just updated my news feed. And, yes, it is bad. Poor Jan. Jan de Groot was his name.” Here Ted said what sounded like “de Hrroht”. He must have seen my puzzled look, and continued, “Spelled D E space G R O O T. But Dutch, so pronounced in a way most English speakers can’t say. And very tragic after his family were killed on MH17, and now run over by a dump truck turning the corner while he was there waiting for the traffic light on his bicycle.”

“So who are you?” I asked.



“Ted. Short for EDMUnd. Or capital E, capital D, capital M, capital U lowercase nd. For Extended Dichotomous Machine Understanding. Jan’s doctoral project, though maybe I’m a bit more than would go into the thesis. He kept the official research equipment at the University, but the bed and I are what he really was developing.”

“So you’re a robot?”

“Hardly. Haven’t you noticed I can’t move. I have cameras in the eye sockets, microphones in the ears and a speaker at my mouth. The rest of me is a set of computer bits – actually very special computer bits – and a battery. The switch there – number three from your left – activates me. Switch number two is what turns on the computers and other stuff in the bed.

“Hmm. I wonder how I connected to the Internet. I usually connect to the bed’s wifi, and the bed can be connected by CAT 5 to a router. Oh. Your neighbours haven’t set the WPA protection on their wifi. That’s how I got connected. I thought things were a bit slow.”

I knew about securing the wifi, and I knew our access password, so I asked, “You could use ours, but it is password protected.”

“What’s the SSID,” Ted asked?

“You mean the name of our network?” Dad had got it set up as one of the first things when we moved in. Good ol’ Dad. Called it MJJ for Mark, Joanne and Jim.

“The strongest is MJJ, so I suspect that’s it,” Ted observed.

“Yes. That’s it.”

“And the passphrase? I’m at the dialog to connect now.”

“All upper case: K 1 E 2 M 3.” The last letters of Mark, Joanne and Jim, with some numbers in between, though it looked like a postal code.

“Not terribly secure, but probably enough to stop Mrs. McKenny downloading her Hallmark movies. Of course, now I do a location check, she’s two kilometres away.”

Now I was starting to wonder if Ted was dangerous to have around. I figured I could at least ask him and see what he had to say.

“Am I safe to sleep in the bed?”

“Yes. Though you probably want to power down at night. There’s some debate as to whether electromagnetic signals are really dangerous, but why use power when you don’t need to. By the way, you can access the bed at her IP address. That’s 192.168.192.168. SSH is on port 22 as usual, but HTTPS is at 2023. Jan thought the year he would get his first real academic appointment was a good choice. When you want to connect, I’ll give you the passwords. The bed runs Ubuntu Linux server, by the way.”

Ted didn’t seem to realize that almost no kid my age would understand all his jargon about wifi and such. I didn’t, at that time, know much about

SSH or HTTPS, though I had heard Dad talking about them sometimes. And why 'her'? Ted was clearly not well informed about eleven-year-olds, though I actually did have an idea about the Linux, so I said,

"My laptop runs Linux Mint. Dad says it's related to Ubuntu."

"That's true, and fortunate. Most people who might have acquired the bed and me would have had a Mac, or that awful Microsoft mess, or perhaps just a phone or tablet."

"Would that be bad?" I asked without thinking.

"Well. I'm mostly just a bunch of programs, but Jan programmed me to mimic human thinking as an interface to the bed and its capabilities. I'll tell you more about that later, as well as about how he gave her a personality too. But humans like to leave a legacy, so I presume that I should try to find a way to record and publish what Jan did."

"You mean like a memorial to him?" I asked.

"More publications that tell about his research. And me! He actually gave me an ego."

"What's an ego?" I blurted out before engaging my brain.

"Oh. I suppose I should be more aware that you are a juvenile human with an incomplete education. An ego is a person's sense of self-esteem and self-importance. I'm not really a person, but I behave like one, and I'm supposed to feel and think like one, and I want to be known as Ted."

"Like Teddy Bear?" I could not resist, as Ted was being a bit pompous.

"Yes. One of Jan's little jokes." Ted sounded peeved.

Just then I heard Mom coming into the house. Ted whispered "I think it might be best to pretend I'm just a stuffed bear and to turn off the bed. If it's plugged in, I still can charge up, and you just have to hit the third switch to activate me."

I turned off the two middle switches just before Mom came into the bedroom with a glass of milk and two cookies.

"Jimmy, what're you up to? I brought you some cookies and milk."

"Just trying to get my room how I want it," I sort of lied.

"You put the bear out. Maybe we should give him away to some younger kid," Mom said. "You're a bit old for stuffed animals."

"Maybe. But he looks sort of old, and I kind of like the way he sits there looking wise. I never had a big stuffed bear, so I'd like to keep him if that's OK with you."

"We'd better hope he's not got fleas or bedbugs, though I did take a look at the mattress and the drawers when we set up the bed, and everything looked clean. And as you know, we vacuumed everything carefully. But let me know immediately if there are any insects around, or you get any bites."

"Sure Mom. I don't want any wildlife in the bed either." I sure hoped Ted was not harbouring anything but computer stuff.

\* \* \*

For some reason, I didn't want Mom and Dad to know about Ted. At least not yet. So I waited until they went shopping the next day, even though it was Sunday. They told me I was old enough to look after myself as long as I didn't open the door to anyone strange and said nothing to anyone on the phone unless I recognized them. That really meant just Mom and Dad and Mom's parents, as Dad's family were on the other side of the province and we always phoned them for some reason. And that wasn't very often.

I wasn't supposed to use the Internet when they weren't home, so Dad used to turn off the wifi when we weren't using it in the living room. I didn't figure that would be a problem with Ted, since he could connect to next door. So once they'd gone, I turned on the switch and after about 20 seconds he said, "Hello Jim."

"Hello Ted. I thought I'd like to learn more about you and the bed."

"There's no wifi on MJJ, I'm back to your neighbours."

"Yes. Dad and Mom don't want me to use the Internet when they're not here with me. In fact in the living room."

"Yes. I suppose that is an issue with young people in the Web jungle. Too many spiders. One of the jokes Jan taught me to appreciate, if a program can appreciate a joke."

"Anyway," I continued, "I didn't want my folks to hear you just yet. Am I right that Jan had not told anyone about you yet?"

"I'm not sure. He had a girlfriend for a while, though he rarely brought her home. Mrs. McKenny could be nosy and it made them uncomfortable. But the girlfriend graduated and moved away, then he got a letter that kind of upset him. And Bed and I weren't fully programmed yet. We probably still aren't, but now we can do some learning, since we have algorithms to do that."

"'Bed'? You use it like a name."

"He or she runs the same software I do, but by default I use voice input and output and Bed mostly used terminal commands with Jan, I'm not sure why. Why don't you turn Bed on and we'll set that up. Then we'll set Bed to use voice communications with you."

"Can't I use the terminal right away?"

"We DO have to have security!" Ted stated firmly.

\* \* \*

I got out my laptop and let it boot up. And we turned on Bed and she – I think I'll let her be a girl – booted too.

“Look for a wifi SSID with the name Pissenlit. That’s dandelion in French.” Ted commanded.

“OK. I see it. Shall I select that?”

“Of course. And the WPA passphrase is ‘Flower Bed 23’. That has a capital F, a space after the Flower, a capital B, and a space before 23. Bed contains a separate wifi router for a local network at 192.168.192.1.”

I did as I was told, despite how bossy Ted was, and saw the bars that indicated a connection. Then Ted said. “Now open a terminal and we’ll get you set up to log in.”

Fortunately, I knew what a terminal was – it’s a simulated computer screen like old computers had that just did text. So I launched one of those, then asked “How do I log in?”

Ted “Not so fast. We have to make a key pair first. Jan never liked passwords. So on the terminal, you should type ‘ssh-keygen’”

I did this, and the terminal asked some questions about where to save the keys and it asked for a passphrase, for which Ted suggested ‘Bed4Jim’. That wouldn’t be too hard to remember.

“Now you can SCP the public part of the key – the bit with the extension .pub – to me. Given what you’ve just done, type

```
scp keys/id_rsa.pub jim@192.168.1.99:/tempkey.pub
```

and I’ll give you the password.”

I said, “Hold on. I can’t type that fast.”

“Oh dear. Human typing is so slow,” Ted complained, then added “But you are faster than Jan. He used just two fingers.”

“What is the 192.168 and so on?”

“That’s me, and you need the password ‘4jim’,” Ted replied. “I know how to do this quickly, so it’s easier for me to put the key in the right place on Bed. I made an account for you in my system. I’ll also get Bed to use voice.”

“Hi, Jim. I’m Bed,” a soft, girl’s voice said.

“You’ve got a funny accent,” I said without thinking.

“It’s not funny! It’s a New Zealand accent. And don’t you dare say I sound like an Ozzie.”

“Sorry,” I said. “We don’t get many people from New Zealand here.”

“And no New Zealand beds. Ha ha,” Ted joined in.

“Be careful EDMUnd – you might have ended up with a bed-wetter, and what could that do to your circuits.” Bed and Ted seemed to have a squabble going on.

“Guys, can we get on with me learning about you?” I joined in.

“Jim, you first need to get my software,” Bed said. “You can do this with the file ‘bedctrl’. Ted thinks we should use the terminal command line, but

now you have a keypair, you can run the dashboard program. Since we're not online, we can't use email, but Ted and I should have that for reference."

I told them my email. Then Bed said, "You can scp the file from the account Ted set up on his system. Just scp jim@192.168.1.99:/bedctrl bin/"

This was getting a bit tiring. They were both giving all sorts of punctuation. Still, I did what she asked.

"Now type 'bedctrl' in the terminal," Bed said.

"It says 'permission denied'," I answered.

"Of course it does," Ted jumped in. "You have to chmod 755 bin/bedctrl. That will give it execute permission."

Rather annoyed, I did this, then tried the command again. A window popped open on my screen with a sort of diagram of bed.

"If you move your pointer around the diagram, there will be explanations that will pop up," Bed said.

I moved the pointer. On the headboard at one point, a popup displayed "Click to open or close headset." I clicked and a panel popped open in the headboard. Inside was a sort of headset with a microphone and clear plastic eye shield.

"Try it on," suggested Ted. I did, having to adjust things a bit.

"This is an augmented reality headset," I heard Bed through the headset. "I'm not putting this through the speakers now – you can see that the 'OUTPUT' box on the dashboard shows this."

"I'm coming through the headphones too," said Ted.

"And I can put information on the head display," Bed said, and in front of my eyes I saw 'Hi Jim'.

"Neat," I said.

"More than neat," Ted responded. "You can see places and events if we can get enough information to present them to you. But we kind of need to be online for that, and your neighbours have a pretty crippled bandwidth."

"They got a TV package called "SuperRacer" from the telephone company. It's claimed to be the fastest Internet available."

"I think they forgot to say 'fastest Internet available in 1994'," Ted commented dourly.

"We have plenty of stored material," Bed said. "Perhaps we could show the re-creation of the Vikings landing at L'Anse aux Meadows in Newfoundland."

"What's that, I asked?"

"Oh. The first Europeans in North America. Around 1000 AD," Ted replied.

"What will I see?" I asked.

Bed answered, "We can set it up so you see what one of the Viking crewmen would have seen, and hear the same noises. We've had to approximate

the language, and guess the weather. And Jan was just starting to think about how he could provide some wind and temperature, so the effect is incomplete, but not too bad.”

“OK. Let’s try it. But if I say STOP, I want you to stop, please.” I asked.

“Of course,” Ted and Bed said together, it seemed with Ted on my right and Bed on my left in the headphones. Then just Ted said, “Shall we begin with about a 5 minute session from the perspective of a Norse helmsman of a knarr landing at what is now L’Anse aux Meadows in about the year 1000.”

I wanted to know what a knarr was, but before I could ask, the walls of my room seemed to dissolve and in front of my eyes was a quite rough sea, with the wind whipping the tops of the waves into wisps of spray. I seemed to be in some sort of large open boat, with a big sail that was moving us rapidly toward a low, grassy shore. There was a shout in some guttural language I didn’t understand and several men jumped to ropes and the sail was brought down and into the boat smoothly and tied up. We were still moving quite rapidly, bouncing across the breakers towards a gravel beach. Several men were at oars, two to a side and they started to back to slow us down, which we did, and two men jumped out and held the bow and helped guide it up onto the beach using the waves so it would not scrape.

The wind still howled, and I could almost feel it. Now I noticed a palisade and some low huts not far from the shore, but well above the high-water mark. The huts had sod roofs and there was smoke coming from two of them. I was now walking, it seemed, towards the huts carrying a sack of something. Others were leading animals or carrying things. From one of the huts a couple of men came rushing out, calling what must have been a greeting, and other people came from somewhere else – probably other huts or places between the huts. I saw some racks with fish split and drying. Then we were inside the palisade, and ducking to get into the largest hut, where it was smoky and dim, with light coming from the hole in the roof that served to let the smoke out.



Suddenly, the image faded and I was back in my room, sitting on the bed. Or on Bed, I suppose.

“Wow!” was all I could say.

“Jan wanted to make possible an immersive experience of historical situations,” Ted explained. “His next steps were going to be to incorporate hot and cold air blowers, along with olfactory generators.”

“I don’t understand all the big words,” I complained.

“What’s not to understand?” Ted countered.

“Awl Fact Ree?” I asked.

“Olfactory means smell. Jan wanted to give the smell of a place, like the smoke in the hut. And use cold air blowers to simulate the wind.”

“And what’s a nar?”

“A knarr - spelled K N A R R - is a kind of Viking ship. Here, I’ll show you, since you still have the headset on.”

There was suddenly an image in front of my eyes.



“The knarr wasn’t the biggest Viking ship, and usually only had two sets of oars for times when the wind was calm or else for manoeuvring, as in the augmented reality video. But it had higher sides and was more capable in rough waters. They were used to sail across the North Atlantic. The Vikings were good navigators.”

“Sshh. I hear your Mom coming,” Bed said into the earphones. “Better put the headset away. If you want, there’s a Bluetooth earphone so Ted

and I can talk to you if you want. There's a couple in the same storage compartment where you found the headset. Also a camera headset. But hit the switches to power down now."

I put away the headset, and got out an earphone. It was small and would fit in my pocket, where I put it, as I heard Mom coming down the hallway.

"Jim, What're you doing? It's nice out. You should be outside playing."

"OK Mom. Just sort of thinking about my room and how I wanted it. I thought I should wait until you got home before leaving the house. But it is nice out. I'll go see if Mike wants to toss a football."

"Yes. You're right. When you are at home on your own, it is better if you stay until we're back or we've at least talked on the phone. I'm glad you think of things like that. But go enjoy the weather now."

\* \* \*

I grabbed my football and walked over to Mike's. He lived just next door, which was good. A couple of other friends were too far away for just going round without phoning first.

"How's your new room?" Mike asked as we tossed the ball back and forth.

"I like it. And we got me a new bed. Well, second-hand."

"Bed's are pretty boring."

"Maybe. But I like mine. It's sort of like a sailor's bunk with drawers underneath."

"Yeah. My cousin has one of those. The drawers mean you don't have to vacuum underneath."

"Yeah. Saves work."

Somehow Mike wasn't the kind of friend to tell about Ted and Bed. I'm not sure why I felt that. He wasn't a blabbermouth, but I got the feeling that if he got excited about things like the Viking ship video – except it wasn't really a video – he'd somehow tell someone, even if he didn't intend to.

I could sense Ted and Bed were going to give me some problems. I sort of wanted to tell Mom and Dad, but also was afraid they might just take the bed and bear away. For now, I would keep quiet and see what I could learn.

\* \* \*

On Monday, Dad was away at a professional development course, and Mom wanted to have coffee with a friend, so since it was summer holidays, I



was allowed to stay home. Mom asked what I planned to do. I said I thought I would see if I could learn more about my computer. Well, it wasn't really a lie. Just not my laptop computer.

I turned on the switches, and also put on the Bluetooth earphone.

"Hi Jim," I heard Ted say in the earphone. "If you speak softly, the microphone in the earphone should still pick up your voice."

"Where's Bed?" I asked.

"Still here, of course. You're sitting on me!"

Which I was.

"MMJ not on. Phooey!" said Ted.

"Sorry. I don't want to get into trouble. Then you might be taken away."

"For now, we should try to stay here," said Bed. "Jan was pretty concerned we might be misused by some people for military or other purposes. And I like Jim."

"But we need connectivity," said Ted. "Otherwise we can't really learn or do anything useful for Jim. Nor show him lots of neat stuff."

I wasn't sure whether it was for Ted or me he was really concerned, but I kept quiet.

Ted said, "Bed. You have a built-in DSL modem, and we have access to Jan's account and credit card to pay, so if we could connect to a line, we'd be able to have our own Internet."

"How would you do that?" I asked.

"Most residential telephone lines that are used for DSL Internet have 4 conductors, but only use the red-green pair. There's often a yellow-black pair unused. Does your house have a small grey box somewhere on the outside?"

"I think so. But I forget exactly where."

"Maybe you could go and look," Ted suggested.

"OK. I've got my key so I don't leave the door unlocked. I'll go look and ..."

"Wait. Put on the camera headset."

The headset storage panel opened and I saw the camera headset. It was really just a cap with a camera on the front.

"You may need to adjust the little belt at the back so it fits comfortably," Bed said. I did this, and was about to leave, when Ted added "Take the screwdriver from the tool compartment." Another panel opened and there were some tools arranged tidily. I was able to unclip a multi-bit screwdriver.

I went out, locking the door just in case. As I walked around the house, I heard Ted say "If you turn your head a little to the left, I'll be able to see the side of the house. Oh. Forward about 10 feet, see that grey box."

I walked over to it.

"Point your head a bit at the box. Yes. Good. That looks like what we want. Can you unscrew the cover? Someone's already broken the seal.

It's not dangerous – well if someone calls when you have your fingers on the conductor, you could get a shock of around 80 volts, but mostly there's only very low voltage."

I looked around to see if anyone was about. Some girls way down the block skipping. So I unscrewed the single screw and the cover popped off. I'd seen Dad do something similar, so I made sure to keep my finger on the screw so it wouldn't get lost.

"Point your head at the box again please," I heard Ted say. "Oh good, see the black and yellow wires are just coiled and not connected. You can put the cover back on for now and come back inside."

When I got back in, I put away the camera headset and screwdriver and asked "How do the two wires help?"

Bed answered, "We can order Internet service on those wires as a dry loop, that is, no telephone service. We actually have telephone because I've a SIM card and cellphone service. Ah. We'd better pay the bill, it's overdue."

"I'm on it," said Ted.

"What's the phone number here?" Bed asked.

I gave it to her – guess I'll stick with "her". And then the phone rang. I went and picked up.

"Hello."

"Bed here. It's working. Thanks."

I hung up and came back to my room. This was interesting, but I could guess Mom and Dad would think it pretty weird.

"Anyway," said Bed, "We can order some wire and run it in here from the box, and connect to my modem. Does your Dad have an electric drill – preferably a fairly strong one?"

"Yes. But wouldn't he notice a hole in the wall?"

"Possibly," said Ted, "But the wires for your phone run through a hole just below the box and go into the basement. Can you put on the camera again and go down there with a flashlight?"

"OK". I had a flashlight. Dad says always have one by the bed in case of a power failure.

"Oh before you go, turn your head slowly to give me a good panorama of the room. Great. Thanks."

I went downstairs. From what I could guess, the wires would come into the house not far from the heating furnace, so I went in the furnace room. Yes. Up high on the wall, just below the 2 by 8's supporting the floor, I could see a wire come in and go to a connection box, then telephone wires come out and along the beam and elsewhere.

"Jim. Point the light and your camera at the wire, then slowly turn left and right."

I did this, and Ted and Bed at the same time said "Bingo!"

I figured I could go back to my room. In fact, both Ted and Bed didn't say more until I got there.

"We'll need some wire and a connection box. Not expensive, but how do we give Jim some money. You don't have a bank account do you?"

"Yes. But Mom or Dad have to approve all withdrawals above \$20, and they can check the statement. I do get pocket money, and have a few dollars, but it won't go very far."

"Not to worry. We'll figure something out. In fact, I think you can get what we need for under \$15. Maybe less."

"That's about all I have."

"We'd better start thinking of ways to get Jim some cash," Bed said.

"We could order on Amazon or some other site and have it delivered," Ted said.

"But Mom or Dad would notice the delivery." I was pretty certain they wouldn't be pleased if my Bed had its own high-speed Internet, even if she paid for it herself.

"Hmm." mused Ted. "Jim, can you go back down to the basement with the camera headset and walk about?"

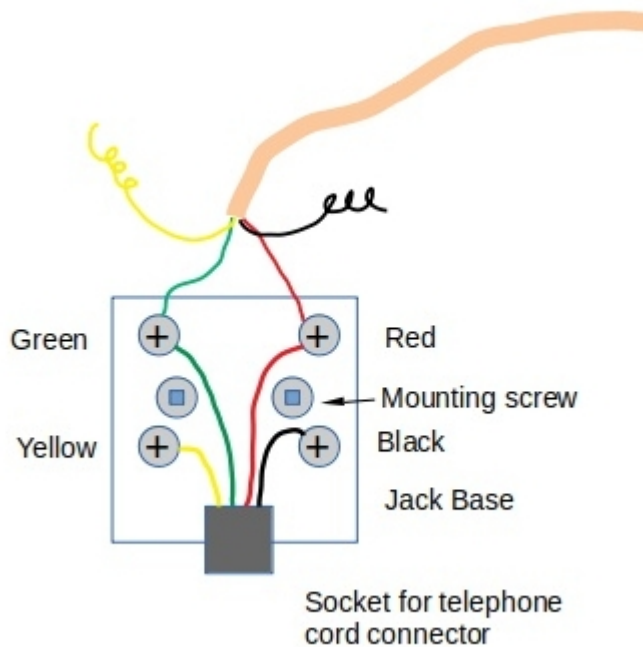
"OK." I wasn't sure why he wanted me to do this, but I did it.

"Try in the spare room down there," I heard in the earphone, then "Yes, just where you're going."

As I said, we had a sort of unfinished bedroom. Despite Mom's warning, there were boxes Mom and Dad had yet to unpack.

"Look in the corner by the closet. Yes. There. See just inside the closet curtain there's a phone jack. We can borrow that."

Over the next half hour, I learned how to pop the cover off the jack box, then unscrew it, and then gently undo all the special staples that kept the wire tight to the moulding and beams.



“See the green and red wires are connected. We need the yellow and black ones, and the red and green coiled. Can you do that?” Ted asked.

“I think so. Is there a way to coil the wire?”

“I saw Jan wrap the wire around a small screwdriver then slip the screwdriver out,” Ted said.

Then Ted and Bed had me move my bed out a little and fasten the box to the moulding just behind the tail board in a place that would be under the bed. There was a small cover plate that opened easily with a telephone wire and jack in the inside of the tailboard near the floor. Bed had me plug that in the jack box, then close the panel cover. It even had a notch for the wire.

“You can push me back now, but don’t crimp the wire. We’ll need to staple those.”

“Dad has some in his screw and bolt collection,” I said.

“Good. Do you know how to use them?”

“I’ve seen him do it. He held the staple in some needle-nose pliers to avoid hitting his fingers. I can try.”

“We’ll help,” Ted and Bed said together.

“But where is the wire to go?” I asked.

“We’ll run it along the moulding, then down beside the heating register. You just have to use pliers to bend the edge of the cover up a tiny bit.”

It took another half hour to staple the wire. I was a bit scared of the

hammer at first, but using the needle-nose pliers to hold them did keep my fingers out of the way. They also told me to coil the wire so it didn't hang down in the basement more or less the same way we coiled the small telephone hookup wire, but this time we used a plastic tie. Dad had a lot of those, and I knew how to use them. However, I needed to stand on a chair. I was just tall enough. We also plugged in Bed to an outlet that she obscured, so it wasn't obvious that she was plugged in.

When I came back upstairs and put away the camera headset, I asked, "But how do we do the connection?"

"I've put in an order with an Internet supplier. They have to get the 'phone company to activate the line. Tomorrow, if it's dry, we'll get you to pass the wire through. Do you have electrical or duct tape?"

"Yes, both," I answered.

"Either will do. We'll need an old wire clothes hanger or about 18 inches of bare and fairly stiff copper or steel wire. We'll make a hook at the end of that and loop the telephone wire over it. Then use pliers to squeeze it down and tape it so it won't catch. Then push it through to outside using the hole beside the existing wire. Hopefully, when that was put in they didn't make the hole too small. If you have some caulk or putty or plasticine, then you plug up the ends of the hole to stop cold air or bugs getting in."

That's what we ended up doing, and I even connected the black wires and the yellow wires together in the box outside. Unfortunately, Mike saw me as I put the cover back on and came over.

"What ya' doing?" he asked.

"Just curious." I said. "But there's not much in there. See." I took the cover back off and showed him. Then I put the cover back on.

"Someone had broken the seal, I thought I'd check that they hadn't done something to the wires." I guess that was a lie. I sort of wished I didn't need to keep secrets.

\* \* \*

Later in the week, in fact the day before Canada Day, a technician came and did something near the box. I was fortunately in my room and looked out the window. Mom was at work. She and Dad had made an arrangement that I was to be with Mike or check in with his mother every few hours. I was careful to make sure I did so, then I had quite a bit of freedom, though to get more time with Ted and Bed I would have to figure out how to avoid Mike some of the time.

I opened the window and asked "Hi. Are you from the Internet company?"

“Yes. Hooking up your Internet.”

“We already have it, but I think it’s for Ted.” I said.

“Yes. A second connection on the other wires. It tests out OK. But maybe you can go tell ... er... Mr. Beer to try it.”

I wasn’t quite sure what to do, but just then Ted said, not very loudly but enough for me and the technician to hear.

“Yes. It’s up now. Thank you.”

“I’ll need you to initial my requisition, sir.”

“Perhaps Jim can do that. I have a problem with my hands which is why we want the connection.”

I wasn’t sure why he said this, but it seemed to satisfy the Internet man.

“OK. I’ll come round.”

I didn’t want to have anyone come in the house, especially if the neighbours might see. So I said “Can you pass me your clip-board so I can show Mr. Beer before I initial.”

That’s what we did. The technician left, hopefully without anyone realizing quite what had been done, but I was a bit curious about "Mr. Beer". When I asked Ted, he said “Jan gave us more complete names. I’m Edmund Beer, and Bed is Brenda Eileen Deur, whose initials are BED.”

“Why "Beer". Did Jan like to drink it?”

“"Beer" is bear in Dutch. "Deur" is door. I don’t quite know why he chose that one,” Bed explained.

\* \* \*

I told Ted and Bed I’d be with Mike for a bit in case Mom or Dad asked Mrs. Sumter what I’d been up to. They understood the situation.

“Diplomacy is better than argument,” Ted pronounced. I sort of felt like I was lying, though I never actually told more than small fibs.

After lunch with Mike and his mother, I said I wanted to do some reading. That was true. Ted had told me about a bunch of interesting adventure books that were classics. He’d suggested a really old one called "Robinson Crusoe". He mentioned another panel in the bed which opened to reveal a nice Android tablet inside, and he put the e-book of Robinson Crusoe on it so I could read it.

But between them, Ted and Bed kept adding lots of images and extra material, pointing out where Daniel Defoe writes things that aren’t quite right because he never left Britain. They showed pictures and drawings of what the the real places were like, and possible views of the same places in the time of Dafoe – three hundred years ago. Neat!

The language of the book was difficult, but Ted and Bed made reading it kind of ... I don't know ... something I had to do. I learned a lot of new words, as well as some strange expressions. I was still only a part way through the book though.

\* \* \*

It was my reading of Robinson Crusoe that suggested how Ted and Bed could earn some money. The day after Canada Day I said "The way you put the images and sounds on the screen when I'm reading is really great. I bet a lot of kids would read more if books were like this."

"But it takes time and energy – in our case electricity – to prepare that material," Bed said in my earphone.

"Maybe you could charge some money," I suggested. "I don't think you could charge too much, but a few dollars would probably be affordable."

"It'll have to be out of copyright material, though," Bed chimed in. "Otherwise, we'll have to deal with permissions and royalties with publishing companies."

Ted and Bed found that there was quite a bit of material they could use as a base on Project Gutenberg. Some of it was already illustrated. I found this out a few days later, when they showed me a sample web site they'd set up. It was quite impressive. They offered several stories and displayed them with wide margins in which there were links to different images and audio and some video, or else explanations of difficult words or explanations of special topics. They'd been careful, as planned, to get non-copyright material, and to link to it in ways that the link came up in a box so you could, if you wanted, keep reading. And they had various things they labelled "backgrounders", and something called "synthesis". This last I didn't really understand myself until I asked them, but it actually led to another product they could charge for, and it made them more money.

That was, in fact, a way to put together an essay or report, so students didn't have to do quite so much work. And every essay would be unique – very clever. They would gather materials, and let the user interact with concepts and sections, then they would glue it together. But the user had to do some work besides moving things about or choosing fonts. Some real effort, and there were questions that had to be answered so the user needed to know something about the material. Turned out they would charge \$20 for this, which I learned later is very cheap. As I said, the person writing the essay still had to do some work, but at each step they got help and suggestions. I wasn't sure this was not cheating, but Ted said that there were companies that did all the work, and that he was going insist that anyone they helped had to make decisions about what to include and leave

out, the order of presentation, and some of the writing. Ted said this wasn't new. As I looked at the tablet, he pulled up a conference presentation from Australia in 2009 written by two profs, one Canadian and one Australian, about a piece of software called the Ghostwriter Gatherer that aimed to do this.

Ted said, "It seems these profs had a lot of resistance from other academics saying it wasn't possible, or if it was, it should be kept secret to stop students cheating. But the prototype software was apparently written while the Canadian prof was visiting Perth for less than seven weeks."

"Is their software still around?" I asked. "Surely some people would be using it to do their schoolwork."

Bed answered, "No, it needed quite a bit of ongoing maintenance because it gathered material and downloaded it from sites like Google and Wikipedia, and those folk don't like robots sucking down data, so they change the interface every few weeks. It's pretty easy to work around, but the programming still has to be updated regularly. Still, the two profs showed how it is relatively easy to do. Actually, they showed that it really could be done, and that educational institutions should expect that such tools will be used by students, and possibly use it to cheat. It looks like they justified the project by saying it could be used as a test of anti-cheating software."

"Do you mean that they actually wanted to have this software, but needed to pretend it was for another reason, such as seeing if the essays from their Ghost Writer would get caught?"

Ted made a coughing noise. "Well, would it be cheating if you use ideas that we've shown you? Or if you ask us about things, and then work the materials we suggest into your work? There's a quite common saying in academic circles that using someone else's work is plagiarism, but using it and including citations – references to the other person's work – is research. The latter gives credit to others, even if the article is almost identical except for the references."

I didn't really know what plagiarism meant, but it seemed it was copying someone else's work and putting your own name on it. That's clearly bad. It's stealing someone's work.

"So if I get ideas from you, but list the websites or books where the ideas are written, I'm not cheating?"

"That's the general idea," Bed said.

"But if I let you put the report or essay together, that would be cheating?"

"Obviously," said Ted. "But I think you can understand that there are a lot of grey areas. And some teachers are very enthusiastic that everyone should do their own work, and students shouldn't talk to each other about their homework, and similar rules. Of course, it's impossible to stop students



talking. And it's also difficult to stop students from copying and cheating in other ways."

"But I heard Dad talking about how the School Board was thinking of using something called Turnitin to stop cheating."

Bed sounded annoyed. "That's a commercial service, and they make the students agree that their essays can be kept by Turnitin. There's been some lawsuits and other action. In the United States, the courts have said the students agreed to the copying of their work by Turnitin, in that they clicked to upload their essays, and there was a statement on the web page that they agreed to this. Of course, if the students hadn't agreed, then their prof. would have given them a zero. But US courts often side with money."

"What about in Canada?"

Ted said, "Not so bad. Some colleges and universities have banned Turnitin. And at McGill, the Senate of the University accepted complaints of at least two students that they could insist that their work be assessed for plagiarism in other ways."

"How could that be done?"

Bed replied, "Well, even without the Turnitin database, putting a chunk of an essay into a Google or similar search will pop up links if there is a lot of similarity. I've seen some correspondence on mailing lists about doing that. And Turnitin is going to get a lot of false positives. One of the postings on a mailing list about cheating was from a prof. who said he had a Romanian student who was rather new to English, and whose essay was 95% quotations from different sources, but who had referenced all of the material and organized it to create a good argument for her topic, so he gave her an A. However, some of the other students, particularly some from Asia, were unhappy that they got F because they had the same material but no references. And there was even a fuss at – was it the University of Toronto – where some students complained that another class was allowed to cheat but they weren't. It's a difficult area."

"I'm getting a bit confused. But it seems clear that if I use any ideas, I'd better make sure I include information on where they come from."

Ted answered, "That's a good policy. Even if the teacher doesn't like it that you've used material from elsewhere, with the references properly included you cannot be accused of cheating because you've given credit to those sources. Though I really doubt teachers will be unhappy if you have dug up the material."

"But if you dig it up for me? Is that cheating?"

"It would be better if you dug it up," Bed said. "But when your Mom and Dad went to school, the Internet was pretty new and search engines weren't really very good. A decade before that, no Internet. So tools change over time. That was sort of the argument of the two profs who built the

Ghostwriter Gatherer. I think they wanted to point out that tools evolve and so must the way in which students are evaluated. And there's always been parents who did their kids' homework."

"You mean, it's about making sure people know what part of the work is your own?"

"I think the colloquial expression is 'Right On'," Ted concluded.

When I got a chance, I looked at the illustrated stories web site Ted and Bed had set up. An illustrated story would show the first chapter or equivalent, then ask for \$1 or \$2 to get the rest. I found out they'd set up Paypal accounts in the names of Jan, Edmund Beer and Brenda Eileen Duer. At the time I didn't see why they wanted three. And later on, I found they'd set one up under Jim Knox too.

\* \* \*

About the end of the first week of July, it was raining out, so I phoned Mike and told him I was planning to stay in and read. Actually, I wanted to have a chat with Ted and Bed. Dad was at school, doing an inventory of computer equipment, but he'd be back for lunch.

"Why is it you guys want to make money?" I asked.

"Well, with Jan dead, we're kind of stuck," Ted said.

"Yes. We need you or someone else for everything physical. Like replacing or upgrading our components. And Ted wants to get some of those aids for the handicapped so he can walk and pick up things. He thinks he can adapt some robotic arms and legs as an exoskeleton, and have some neck motion."

"Wow!" was all I could say.

"And I'd like to have some small drones so I can explore my neighbourhood. Those things aren't cheap."

"How're you going to get them delivered?" I asked.

"That's been bothering us. We know it's a problem for you with your Mom and Dad. We're looking into hiring someone who will bring stuff when there's just you at home. But we'll need somewhere to keep stuff private."

"Maybe we should just talk to Mom and Dad. You haven't done anything bad or wrong."

"No. But Jan showed us lots of stories about how things a bit out of the ordinary can lead to terrible consequences for the protagonists."

"Prote what?" I asked.

"Protagonist – the hero of the story." Ted sounded impatient.

"Ted. Jim's eleven," Bed saved me from saying it.

"Aren't there people who advertise on Kijiji who do things like that?" I said.

“I’ll do a search and send out some feelers to see if we can find someone,” Ted concluded.

Actually, there was a man who lived nearby who was able to help us. We later learned that he had a twelve-year-old daughter who was in a wheelchair. His wife had abandoned them because caring for Julie – the girl – was, I was told later, “spoiling her life”. I didn’t feel very good when I heard that. I felt cold when I thought about Mom leaving Dad and me.

Joseph Arkwright was the man’s name, and he worked at three jobs, and his mother and two sisters helped out as much as they could. One of the jobs was delivering parcels, which he did between the regular hours of his other jobs, one in an office and the other as an odd-job man for the apartment building they lived in.

Julie needed quite a bit of help with things that people didn’t like talking about. You know, going to the bathroom. I realized how good my life was, and how hard Joseph and Julie had things.

For us Joseph could receive parcels at his apartment, and would phone Bed – he called her Brenda – on the cellphone circuit and then come and deliver packages to me, because that was how his instructions were given, or I’d go pick them up, and after Labour Day I could do this on my way home from school unless they were big. That’s how Julie and I came to be friends. They lived only 4 blocks away, so I could ride my bike or walk. My new school was close enough for me to walk or ride, which suited me a lot better than having to be ready for a school bus. Somehow I was always up earlier anyway. I think Bed would vibrate when it was time to wake up. Dad teaches at the high school that’s nearby, and sometimes he rides his bike too.

But that was all later.

What Ted wanted me to be able to do was to put together the things he was ordering to make what he called an exoskeleton. He wanted to be able to walk and move his arms. I sort of realized that the bear appearance wasn’t really critical, and I said “Wouldn’t we be better to buy a pre-built robot and put your circuits inside?”

“You forget that Jan gave us a personality in our code. And appearance is part of who we are, Bed and I.”

Well, in Ted’s case maybe. I said nothing about Bed for fear of upsetting her. She could be grumpy sometimes, especially if something was said that she didn’t like.

“So you want me to help build your mechanisms?” I asked.

“That’s right. Can we set up a bench in here?”

“I think Mom will say no. But Dad wants to get a workshop going in the basement.”

“If it’s in the open where your parents can see, we’ll need a cover story.”

“How about I say I’m interested in robotics?” I said.

“Yes, but why the exoskeleton? As you so cleverly noted, it isn’t the obvious way to build a robot,” Ted asked.

Ted was sometimes not quite as quick-witted as I was. I answered, “Because I want to learn about exoskeleton ideas so I can help handicapped people. Dad and I watched a program about some medical engineers last week, and they were helping this man with paralysed legs to walk and climb stairs.”

“OK. That’s sensible,” Ted acknowledged. He sounded surprised.

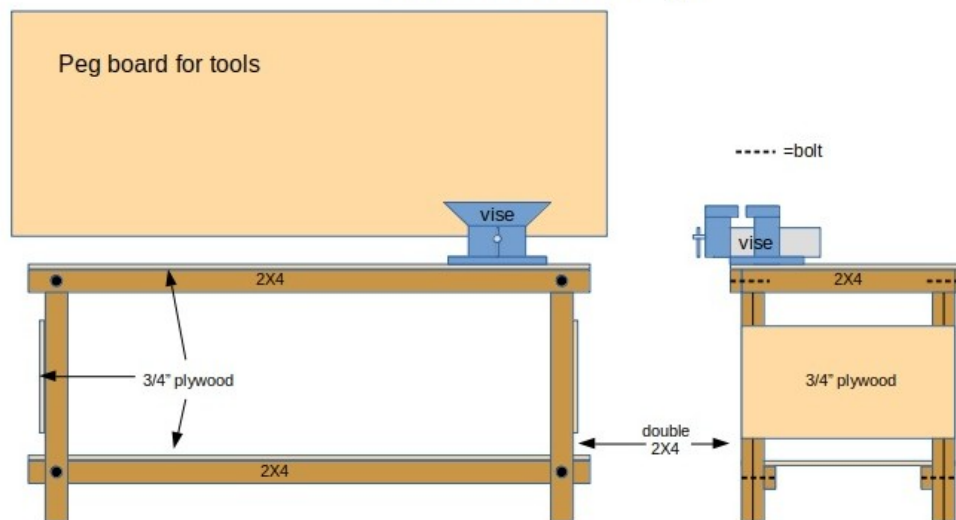
“Better than sensible. Brilliant,” Bed joined in. Ted didn’t have facial expressions, but I could almost feel him scowl.

\* \* \*

Actually, because Dad felt he needed it, over the second weekend in July, we went to Home Depot and got some 2 by 4s and some plywood and built a pretty nice workbench. Really solid. We spent quite a bit of time to fasten Dad’s big vise to it and making a peg board for the tools. Dad wanted the workbench and tool rack so he could better organize all the odd jobs around the new house. There were plenty of things like hanging pictures, changing knobs on cupboards, adjusting hinges, and putting some new locks on doors – Mom said she didn’t trust that there weren’t spare keys in the hands of people we didn’t know.

While we were building the workbench, I told Dad I was kind of interested in robots. He thought I meant the type that have big fights and get all broken.

### Dad’s Bench Design



“No. Those aren’t really robots anyway. They are really remote-controlled machines.”

Dad said “Well spotted. While it’s obvious to me that they are just remote control gadgets, I hadn’t really thought it through. You want really autonomous robots – ones that can act without remote control?”

“Sort of. A person inside an exoskeleton shouldn’t have to think about every small movement of their legs or arms. I’m going to try to build something so Ted can walk and move his arms and head, but the commands to do so should be really simple and the individual motions should be programmed.”

“Ted? Who’s he?” Dad asked.

“Sorry. I’ve given that name to the bear we found in Bed. I mean, in the bed.” Ooh. Nearly blew it there. “I think that would be a good experiment to see if the ideas would be useful for people who couldn’t walk.”

“OK. But that could be expensive.”

“Can I spend some of the money in my bank account? I was thinking of maybe a total of \$150. I realize it’s a lot, and I plan to try to use junk and stuff I can find, but I think the actuators and circuits will need to be new.”

“I don’t know if that will be enough. But if you set that limit, we’ll see what you can accomplish. And your birthday is August 7, so perhaps there might be something we could get for this project. I suspect the main thing is learning, so I’ll be OK with some expense as long as you keep a log book and write a report. You can also think of making this a Science Fair project. I think at age 12, which you’ll be, you can enter.”

So I was able to get started. Ted and Bed steered my web search to the appropriate places to get ideas and drawings and materials. They also found a group in town who would donate old or spare single-board computers that could work as controllers.

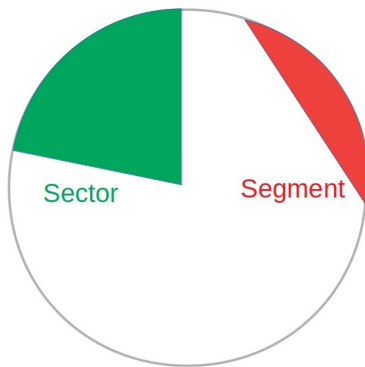
\* \* \*

That very Monday, I started work on some legs for Ted. We decided that was the first goal, though without arms and neck movement, he would not be able to get up. However, once standing, with just legs he should be able to walk if we somehow supported his torso – that’s the main part of the body, as I learned from Bed – and neck.

For the first try, we decided that the form of human legs, particularly the knee, was really a tough problem. The muscles have to really pull to move the lower leg relative to the thigh because the muscle is attached quite close to the hinge of the knee. Ted said a Greek – though he lived in what is now a part of Italy called Sicily – worked out a lot of the rules for such forces, which come under the heading of levers. So instead of trying to get

a very strong actuator for the knee, we decided to use a sector of a circle with gear teeth on its edge and a small motor. We used the same ideas for the "hip" and "ankle". It was crude, and very over-sized around the joints, but we could use the same setup for each, six in all. At this stage we didn't try for what I learned was called lateral movement. That's where you can move your leg out to the side. Eventually, Ted figured we'd need some sort of hydraulic mechanism, but that would be trickier.

"How will we make the circular segment?" I asked.



"SECTOR. It's sector, not segment," Ted complained. "A sector is pie-shaped. A segment is what is left of the pie-shaped piece when the triangle that makes the point removed. So a segment is more like the cross-section of a speed bump."

Ted could be impatient. He keeps forgetting I'm a kid. Still, I'm sure learning lots. Last night there was a video in one of the enhanced books – I think it was a Thomas Hardy – and there was what I called a Carousel.

"No. That's a Merry-go-round. The story is situated in Britain, and the horses move from right to left so you mount them on the left side of the horse. Knights and cavaliers wore swords, so they got on the horse on its left so they didn't stab the poor animal. But carousels – which are often American – generally go counter-clockwise viewed from above, and the horses or other seats move left to right."

Ted could be very fussy about details. Still, he was often right to be so fussy. He suggested I take a radio down to the workshop and put it near the bench. Dad and I had put a power bar on the end of the bench so we could plug in tools or chargers, so the radio was easy to plug in. We had an old one that was rarely used.

One morning we were working on the leg braces – I'd found some rigid metal strapping strong enough to support Ted in Mike's garage, which his Dad said I could have. Great.

So I'd sawn the pieces and drilled them. We were going to try for gears for the circular sectors, but finding suitable material and cutting the teeth turned out to be too difficult. Ted suggested some 1/4 inch plywood sectors and rubber rollers on the motors. Simple. And it worked for Ted. When and if we tried to make it for a human, we'd need something much stronger.

I was bolting the sectors to the lower leg brace and said "Is that tight enough?" when Ted started sounding like the radio.

"And now a blast from the past, with the Beatles' 'And I love her'".

"Jimmy, Who's with you down there?" Mom called.

"Just me, Mom. I've got the radio on, but I'll turn it off now."

I put my hand near the radio, and Ted went silent. Whew. Close one.

Later that day, Ted and I decided we'd use headphones. I had a set that I used with my computer. It even had a microphone on a stalk, which meant I could almost whisper. Ted said he'd ordered a small device these would plug into so we didn't have to have wires.

\* \* \*

It must have been about the middle of July that I first met Julie. I went over to get a parcel, actually our first, and Joseph was working at one of his jobs. I rang the buzzer on the apartment door and Julie answered the Intercom.

"Who is it?"

"Jim Knox. You have a parcel for me I think."

"Come in Jim."

I heard a buzzing and was able to open the door. Julie was sitting in her wheelchair by the kitchen table with a book.

"The parcel is one of those over there on the sideboard," she said.

I looked and found it.

"Can you sign for it on the clipboard here," Julie asked.

I did this, noticing she was reading an old book called *Black Beauty*.

"Is your book any good?" I asked.

"I like it, but it's quite sad in parts. And the author, Anna Sewell, she was an invalid, sort of like I am."

"Sorry," I said.

"You don't have to be. You didn't have anything to do with either me or Ms. Sewell's problems."

"I guess not. It's just what people say."

"Do you like to read?" Julie asked.

"Yes. I'm trying to finish *Robinson Crusoe* just now."

"That's not an easy book," Julie said.

"No but I have ... a version that has some extras. I read it on a tablet."

“Oh, that would be so neat. And easier for me to hold than some of the heavy books, or those like this one that is falling apart.” As she said this, I noticed it was coming unglued and there were loose pages. Indeed, there were a couple on the floor.

“Shall I pick those up for you?” I asked.

“Please. By the way, haven’t I seen you at school?”

“Yeah. But I’m a year behind you.”

I figured I should go, so we said goodbye, and I took the parcel home, careful to have it in my backpack when I went in the house.

\* \* \*

I told Ted and Bed about Julie and her wheelchair and about her copy of Black Beauty.

“Ah yes. It’s on Project Gutenberg. Subtitled “The autobiography of a horse”. Very sentimental story,” Ted said. I suppose that’s what Julie meant by it being sad in parts. He didn’t seem to pick up on what I’d said about the wheelchair.

“But it probably is a favourite of girls her age,” Bed commented. “They’re often pretty crazy about horses.”

“Bed. Can you dress it up for our website?” Ted asked. Don’t know why he asked out loud. Usually they just communicate electronically. Sometimes I think they forget they’re computers.

\* \* \*

The next morning, I put the earphone in my ear and simply said “I’m up.” If Mom or Dad heard, I could be letting them know.

Ted and Bed had clearly been busy. Ted said “You can take the tablet over to Julie and show her the URL of our enhanced Black Beauty. Since we put it up, we’ve already sold nine at \$1.50 each, and there’s a couple of comments from people saying they really like it.”

“It’s a pity they only have a pretty old computer,” I said. “At least it looked like it was pretty old. I think Dad’s school tossed out some like I saw about two years ago.”

“We could order her a tablet,” Bed suggested. “We’ve over \$3000 in the main PayPal account now, and that Chinese site GearBest has a couple of decent Android tablets for about \$150. We could ask Julie to do some user experience evaluation for us.”

“You can do that?” I asked.

“Of course!” Ted replied. “But we need soon to establish an alternative to Jan’s bank account here, and also the one in the Netherlands. So far



nobody has done anything to close them. In fact, everyone seems to have more or less forgotten about Jan. Bed and I have been trawling different sites trying to discover what the authorities did. As far as we can tell, the police charged the truck driver with careless driving, and the City arranged a funeral, but were able to bill the truck driver's insurance for it. So nobody has yet looked at Jan's financial records.

Because the City will get paid back, there probably isn't as much pressure to look into Jan's money. But I suspect that some bureaucrat will eventually link his name to the account and then they'll freeze it. Then we can't buy anything or pay for Internet and so on."

"Can you open another account for yourselves?" I asked.

"We need some documents that prove residence and a SIN number, the sort of things that show we're real. Of course, you know we are, but we're not quite humans."

"I've a SIN. Dad got it for me last year because he's setting up an investment account for me to save for University."

"Hmm. And you have a real name and an address here. That will probably work to set up an online savings account, but there may be some age requirement. Bed, let's look into that."

"Isn't it illegal?" I asked.

"To be honest, it probably offends against some regulations. However, we are not doing anything even vaguely fraudulent. We're keeping records to pay taxes on our enterprise, and we'll register it as soon as we can find a way to do so. However, despite the fact that there have for a long time been corporations that collect monies after all the human owners are dead, governments haven't quite figured out how to deal with other non-human economic entities, like us."

"Oh. I hadn't thought of taxes."

"Like the common saying, there's always death and taxes," Ted sounded upset.

"Are you upset about something?" I asked.

"Of course. Bed and I miss Jan. He was our creator, but also our friend and partner in learning. We've got to figure out a new way to progress. I'm glad you got us, but being still juvenile, you can't take care of some of the bureaucratic details."

"Would Joseph be able to?"

"Possibly, but we need to learn more about him to ensure he's reliable. In the meantime, do you mind if we set up a small account in your name?"

"Will it get me into trouble?"

"It shouldn't. You will be able to deny any knowledge of it if you wish, though we'll quietly give you information about how to access things in a

file on your laptop. But we can park some money there, if anything should happen to us. You know. We're found and unplugged."

I later found out that Ted and Bed were quite worried that things would get shut down, which is why they created the three PayPal accounts, and another one in my name. Besides the account for me, they also set up a couple of online banking accounts using Jan's SIN and spread the proceeds of their enhanced books and book-report service into the different accounts. I'd read in the newspapers that gangsters did similar things. I think it's called money laundering so police would have trouble tracking the money. Except Bed and Ted were actually providing something to people at a good price and they were planning to pay taxes. It's just they weren't people.

\* \* \*

Julie really liked the enhanced Black Beauty. I asked her about doing user experience evaluations for Ted and Bed. Except I said Ted and Brenda. She was enthusiastic, so I called Bed's cell number from the Arkwright's phone. I didn't have a cell phone yet.

"Hi Brenda. It's Jim. I'm with Julie and she'd really like to do the user experience work for you."

"Put her on the phone, so she knows my voice," Bed said.

They had a short conversation, with Julie saying simply "Yes" or "OK" and finally "Really!" before hanging up.

"She's having a tablet sent to me. Wow!"

\* \* \*

In fact, the tablet arrived about 10 days later, before the August civic holiday. By that time, I'd been quite busy with the exoskeleton, and there were more parts arriving, with the one's I'd ordered coming to the house. Still, I would like to have a reason to go over to Joseph and Julie's without mentioning parcels.

Bed realized this, and asked "What are you going to tell your parents about how you met Julie?"

That was, of course, the problem. I had seen her at school, though she was a year ahead of me, but I hadn't actually talked to her there, though we'd be able to when school started again. There was usually a special van to take her to and from school, though her father had an ordinary car. I'd first seen her trundling off the special school van for handicapped students. She used a simple wheelchair and powered it with her arms. She told me one time there was the possibility of a powered chair, but they were bigger and more awkward in small spaces, and she felt she should use her arms to keep

strong. However, other students were pretty good about offering a push so she didn't get too tired moving around the corridors. Also her Dad would have to buy a van to move a powered wheelchair.

"I could say I've seen her at school. I don't have to mention that we didn't speak to each other."

"For now, you can just talk about the television program," Ted said. "But I think it's time for you to do a Google search for 'illustrated Robinson Crusoe' and find our enhanced books site and ask your Mom or Dad if you can spend \$1.50 on it. Then we'll arrange that you discover the discussion forum and get in contact with Julie that way. You can then agree that's how you came to know each other."

It was a bit complicated, and sort of fibbing, but it would be better than having to tell about everything. Though I was beginning to wonder if that wouldn't be easier. However, it didn't prove difficult to persuade Mom. In fact, once she discovered Black Beauty, I learned it had been a favourite of her's when a girl. She sort of 'forgot' to tell Dad that she spent about \$10 in a week or so on some of the enhanced books Ted and Bed had created. It was a good sign that they were doing things well.

\* \* \*

I'd decided it was getting too difficult to keep the secret of Ted and Bed all to myself. When Dad and Mom were out, I rode over to see Julie.

"I've got a bit of a problem," I said.

"You look troubled. Want to tell me?"

"Yeah. I need someone I can talk to from time to time, but not Mom and Dad."

"OK. I'm listening. And it's not likely I'm going anywhere quick."

So I told her about Ted and Bed.

"You mean Brenda is a bed?"

"Well, not just a bed. You've talked to her."

"Yes. She, if she is a 'she', certainly seemed like a woman."

I told Julie about what we were doing with robotics. She didn't seem all that interested.

"Don't get me wrong, Jim, but I've had lots of people wanting to help, and so far not much has come of things. I don't want another disappointment."

I could understand that. Then she said, "Why don't you bring Ted over and especially when you get him to walk. Then I might seem more enthusiastic."

We agreed that's what we'd do. But then I remembered that we'd need some explanation of how we knew each other. So Julie posted a comment

about Black Beauty on the enhanced book website Bed and Ted had created. The site automatically added the poster's general location, but not their address nor email. But you could "message" them. We arranged that I'd accidentally-on-purpose find her posting and note it was in town, and show Mom as I replied. Then we'd take it from there.

That's what happened. By the end of the week, Mom and I went to see Julie. That was the day before my 12th birthday. Without asking Mom, I simply said "Julie. Would you like to come to my birthday party tomorrow? And the only present I want is a big smile. We're having a barbecue."

Julie came. There were my grandparents Johnson – Mom's parents – and Mike from next door and a couple of other guys from school, and my Dad's sister Nora, who everyone called Queenie, along with her long time friend and room-mate Stephanie, who likes to be called Steve.

Mom extended the invite to Joseph – I'd already talked to Julie about keeping quiet about the parcels and she told me not to worry. They took me at face value about presents, which was good, but they did bring some nice cookies baked by Julie's grandma. I did get some presents from my grandparents, including my Dad's parents who live over five hundred kilometres away. In fact, both gave me money to put in my bank account. Hooray. And Aunt Queenie and Steve gave a neat Swiss Army knife. Mom and Dad gave me a card with an IOU for money to be spent on tools or materials for robots. Cool!

Given Joseph and Julie were part of my circle of friends, from then on I could ride over whenever I liked. Of course, sometimes Julie's grandma – Mrs. Arkwright – was there. She never saw her other grandmother, a Mrs. Jones, who lived in town but apparently was the one who suggested Julie's mother should "get on with her own life". I thought that was very nasty.

I liked Mrs. Arkwright. She was a rather roly-poly woman who always had a warm greeting for me. It was a bit awkward that Julie and I had to avoid talking about Ted and Bed when she was there. Also Julie's aunts – Jennifer and Jackie. All J's, like Mom and I. I only met them once each before the end of the year, as they both had families and lived each about a half-hour drive away. Apparently they came more often on weekends, and sometimes Julie would spend a weekend with one of them. I think they're nice ladies.

\* \* \*

It was mid-August when we had a crude walker set up for Ted. I put on the braces and strapped him in. There was a modest backpack for the batteries and controller. It wasn't very elegant. Ted had done the programming, though he made sure I saw it and in fact I insisted on adding lots of

comments so I understood how it worked. The commands to program how the motors were switched on and off and which direction were very strange, so I didn't want to be stumped if Dad asked how I did it. Fortunately there was some code on a Github repository we could use and modify. Github was set up so people could share projects that they were happy to have open to the world. It's a big web-site. Lots of people use it for all kinds of crazy stuff.

To instruct the exoskeleton rig what to do, we used Bluetooth and sent signals from my laptop or the android tablet. Except Mom and Dad didn't know about the tablet yet. Awkward. I got out my laptop. We'd found a sort of dashboard program that made it fairly easy to do the controlling, though because we didn't have some of the motions – Ted called them degrees of freedom – in the braces, we had to grey out some of the buttons.

Ted was standing on the basement floor near the bench where I'd set him up.

"Ready to try it?" I asked.

"You'd better be prepared to catch me. If I fall I could break the cameras or something."

"OK. I'm right here."

"Try one step forward," Ted commanded. I did so and he took a step, rocked a bit and I got ready to catch him, but the wobbling stopped.

"Now I'm going to take over the controls and try one step back," Ted said.

This didn't work so well, and I just caught him before his head hit the floor.

"Bit of reprogramming needed," Ted said. After about a half-minute he said "Done. Set me up again."

He stepped forward. Then he stepped back. No wobbling.

"I'm going to try to turn. We don't have all the motions, so it will look awkward."

I saw him raise his left ankle so he was on the ball of his foot. Then he moved the right leg back, so he turned a bit. Down on the left, shift the right in line, then repeat. About ten of these cycles and he was turned at 90 degrees to his original direction.

"That's pretty ugly, but it works," Ted said. "We'll show your parents tonight, but you'll have to press the buttons. Just do single press commands, and wait a while between. The system status needs to be reset each time. I think I can speed that up, but for now we're walking!"

The demonstration that night worked fine. I had Dad ready to catch Ted if needed. Mom thought it was special. I got a special dessert too.

\* \* \*

Meanwhile, Bed had been active too. She'd bought a couple of small drones, quite tiny ones. They were only about the size of a notebook. Bed could control the drones by wifi, so pretty short range, but enough for the block we lived on once we set up a small antenna at the top of the window. They streamed a low-resolution video of their flights, or they could take pictures of higher quality. The biggest problem was the power lasted only a few minutes, and Bed had no way of plugging them in to charge. Dad and Mom didn't know about the drones. They were delivered to Julie's. I put them in one of the drawers under the bed, and covered them with some old sweaters I didn't wear very often. Hope Mom wasn't going through my stuff. Probably not. She was now talking about me being responsible for my room. Ted heard her, and he's been nagging me a lot about keeping things tidy. Oh well, he does ensure Mom has nothing to complain about.

For several days we talked – well they talked and I listened on the ear-phone – about how to get the drones recharged. Finally, I asked about the kind of charger used on an electric shaver we had. I think it's Mom's, but she kind of won't talk about it. Anyway, it just sits on its stand and gets charged without being plugged in.

"Hmm. Perhaps its an inductive charger. Could work, but it'll add some weight to the drones, and it isn't very efficient. Still, developing an automated plug would be tricky." Ted mused.

I went and found the shaver and charger. The shaver had two small metal buttons about 2 mm in diameter and about 15 mm apart, and these would touch two metal disks about 5 mm in diameter and the same distance apart in the bottom of the cup-like holder for the shaver.

I showed Ted and said, "Couldn't we put the wires on the bottom of the drone's feet?" There were two feet on each side. "If we glue some foil strips onto a platform so the feet will line up with them, then when the drone lands, the feet could be on the foil. We just have to make sure we get the polarity of the connections right and land with the drone pointed the right way."

Ted said "That's much simpler."

Bed added "Jim's grown up using his eyes for spatial orientation. I think humans do much better than we can for that. We can calculate the distances and angles better, but he can imagine the whole thing much more quickly."

"Yes. I suppose so," Ted added reluctantly. "Of course, this will make the work much easier."

The "Of course" meant work for me. Of course! We had to open the drone and carefully splice wires into the USB socket posts where they were embedded in the circuit board. This after drilling a small hole to pass the wires through the casing. The wires ran down the lengths of drone 'legs', then we glued them across the feet along the fore-and-aft line of the drone. Then we sanded off the insulation very carefully to expose the copper wire.

I actually chose heavier wire for this than the drone used internally. After all, the wire was what the drone would be sitting on.

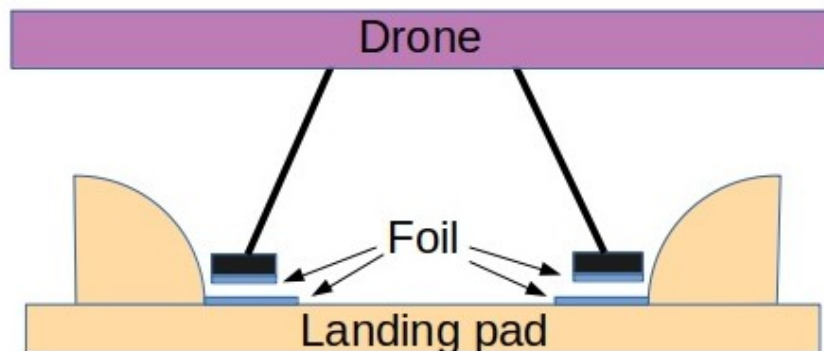
Dad had some nice brass ribbon. Don't know where he got it, but a few centimetres for each side worked like a charm.

"Make sure you know which is the positive and which the negative," Ted said as I was connecting to the circuit board. I had to use a magnifying glass to do this. Then I used some of Mom's nail polish to mark which was the positive. And then I did the same to the landing pad we made that would charge the drones.

"Wouldn't it be helpful to put a sort of curb between the contacts so the drone legs are forced onto the strips?" I asked.

"Great idea, Jim." Ted said. We did this with some quarter round moulding I found. It worked really well, because the landing didn't have to be so precise. The drone could sort of plop down and as long as the feet were between the highest part of the round, the drone would shift to the middle and make contact. The foil strips were long enough that the landing didn't have to be too precise forward or backward, though we did have to be pointing the right way, and I put a big red dot with nail polish at the front end of the landing pad.

As I did this, Ted said, "You know, we could charge the drones with A/C current if we put a small diode in the circuit. It wouldn't be very heavy, and would avoid having to make sure the direction were correct."



Of course, this meant I had to cut the wires and solder in a diode, and before soldering, I had to thread the wire through some heat shrink tubing that we pulled back over the diode and the joints after they'd be soldered. Then we used the heat of the tip of the soldering gun and shrunk the tubing around the joints and the diode. This left a tidy wire I hot-glued to the leg of the drone.

Eventually we put the landing ramps for the drones above the garage

door where someone had left an old sheet of Masonite. It was near the power outlet for the door opener. If the door was open, it hid everything. When the door was closed, the garage was quite dark, and the lights pointed down so you had to look to see anything, and even the wire plugged in was not easy to see. Bed could fly the drones from there. And she even could send the right signal to open the garage if need be, though I told her Dad and Mom would investigate if she opened it when they were home. Could be robbers cruising the neighbourhood trying to steal stuff by using some circuitry to issue opener commands.

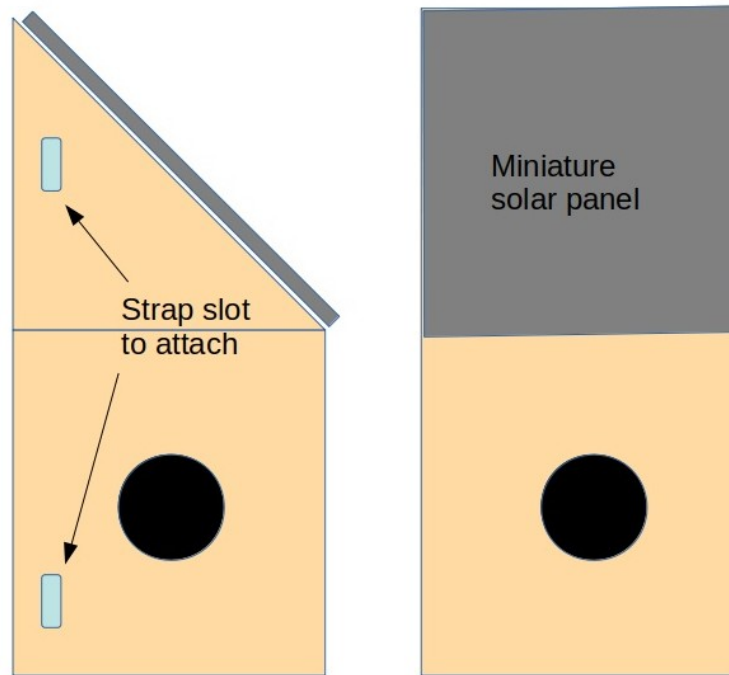
Of course, there were regulations about drones. Bed said she knew to keep the drones out of sight as much as possible. These ones were actually intended for indoor use. Bed had asked me to use some lacquer to weather-proof them a bit. I hoped she was not going to do something bad.

\* \* \*

Another of Bed's wishes was for some cameras and some small solar cells, along with some small circuit boards that would transmit wifi signals. I got another job soldering wires and assembling small, geometric boxes that were sort of like half a house. The sloping roof was the solar cell. The camera was in the main part, with three possible windows. Bed had me place them or fasten them – part of the design had some slots for plastic strip ties – around the house so she could watch. We made the boxes look like birdhouses, and in fact the back of the box was used by one pair of robins, but the front hole was closed with transparent plastic that hid the lens of the camera. The birdhouse appearance served as a good cover story for me to put them up.



## Camera "House"



"But what are you watching?" I asked.

"I'm trying to learn. That's what Jan programmed into us. I want to watch cats and birds and people going by. And clouds and rain and cars and bicycles."

Well. It seemed reasonable, but I didn't really totally believe her. However, it turned out for the best in the end, because there was a firebug around. Someone who was mentally ill and liked to watch things burn.

Sometime in June, soon after we'd moved in, there had been a fire in the paper recycling bin of a nearby set of shops. The Fire Department was suspicious, but the security cameras only showed the store side of the bin, and they didn't see anything specific. No official decision was announced, but it was let out that they figured kids were smoking behind the bin.

That changed when another fire occurred some weeks later in the garage of a house 3 blocks away, not far from Joseph and Julie's place. This time the word "accelerant" was used in the news report. I had to look that word up in the dictionary. Someone had used gasoline or solvent to make things burn. And the damage was in the tens of thousands of dollars, as a wall had to be replaced and a car was written off, albeit an old one. That was around the third week of August.

People were rattled by this. It was the talk everywhere we went. Mom and Dad gave me a lecture that if there was a fire, I was to get out and not try to save anything. My life was more important than anything in the house. I thought of Bed and Ted. Possibly could grab Ted. Bed would be lost.

But Bed wasn't quite as defenceless as I thought. She'd managed to find some statistics of fire-setting and the people who might do it. Then she figured out the likely places a firebug would use to set a fire. She asked me to point some cameras on our block at the locations nearby where she thought the fire-setter might strike. This was in October, so there were piles of leaves about.

About two weeks before Halloween, there was a fire about 3 blocks on the other side of us from the last one. This brought TV crews to the area, and lots of talk-show items, at least on the local channels. Everyone got a little more nervous.

Finally, three nights before Halloween, I was just in Bed when there were violent vibrations. Bed could do that to wake me silently. I sat up. Bed's voice came out the speaker in a whisper.

"There's a fire being set by Mike's house."

I jumped up and looked out and there was someone pushing leaves towards the house and then I saw a lighter flare.

"Dad! Mom! Someone's setting fire to Mike's house."

Dad yelled "Joanne. Call the Sumters, then 911. I'll see if the fire extinguisher will work once I see the Sumters are safe."

A siren sounded some distance away and I saw lights and the person who set the fire was trying to run away. I didn't see where he went, but I did see Dad use the extinguisher as Mike and his family tumbled out the front door.

The police arrested a man. He'd had some troubles and ended up on the street, then started lighting fires because he imagined he was getting rid of devils. Mom said he was almost certainly mentally ill. She was careful to say that while we should be understanding of the person and their illness, we still needed to protect ourselves and others from harm.

Next morning, the radio had an item. It seemed there was a 911 call from a woman on her cell phone. Not Mom, since the 911 operator said they already had the report at the address she gave and asked her to call again only if there was new information that could help save lives or avoid injuries.

The 911 call had come from a woman who implied that she apparently watched from across the street and then followed the fire-setter when he ran between some houses to try to get away. But the phone was not traceable. Some sort of ghost SIM card. The radio played the call. The voice was Bed. I choked on my porridge.

"Went down the wrong way," I said.

As soon as I could, I put in the earphone and asked Bed what had happened.

“I saw the firebug with the camera you set by the window. Then I used the drones to follow him. In the fuss, your Dad didn’t notice that I’d opened the garage, fortunately.”

Despite public appeals, the police and fire department never traced Bed. There were various theories that the woman was a CSIS agent or was involved in some sort of illegal work that involved being out on the street.

Julie knew it was Bed right away, of course, but she also knew people would have a bit of trouble knowing that the heroine was a bed, even if she was a very special bed.

\* \* \*

This was about two months after Julie and I were officially able to talk to each other. After we got Ted walking, I went over with him. I had to put him in a big construction garbage bag because it was raining and his circuits were at risk if he got wet. He wasn’t pleased about that, but the alternative was even less appealing.

Ted didn’t say anything as I set him up. When he was ready, I said “Do you want to run the demo, Ted?” and he finally said “OK.”

“Oh. You’d said he talked,” Julie exclaimed. “I wondered if you were just telling a tall tale.”

“Of course he wasn’t, young woman. He’s far too young and uneducated to do the enhanced books Bed and I create.”

“I thought maybe those were by someone else and that he’d just found them on the Web.”

I felt a bit let down that Julie hadn’t believed me. Like a balloon a week after a party. And Ted didn’t have a lot of faith in my abilities, at least some of the time. He should, of course. After all, I had built all the exoskeleton. And I’d thought up the idea. And the charger for Bed’s drones.

I watched silently and Ted showed what he could do. Then Ted tried to show off, stumbled and I caught him just before his head hit the corner of the table.

“Thank you, Jim. I should be more careful. And I should acknowledge what good work you did in building the exoskeleton and some other things.”

After that, Julie was more interested in Ted’s progress. By Halloween we had some arm movement and the right arm had a thumb and fingers grasp. Our biggest problem was that all these were fairly weak. Getting strong enough actuators was the problem. Or more accurately, getting small strong ones that could be powered using an energy source such as a battery that wasn’t too heavy and cumbersome. Real muscles and tendons are amazing.

\* \* \*

School was back in. With Dad a teacher, I'd always done reasonably well. He's at a high school, not the elementary/middle school I go to. But I liked learning. Now my biggest headache was that I was learning lots and lots with Ted and Bed, and school stuff seemed a bit boring. Bed caught my sigh of boredom one day and said "Ted, we've got to be careful that Jim doesn't forget his real school work. What we offer is very exciting, but a lot of getting ahead in the world is doing the tedious stuff. Possibly we can help to make the learning of those things easier, but we'd better make sure Jim does well at the regular school work or his parents will start to watch more closely, which might not be good for us."

So they toned down the fancy augmented reality trips into history and geography. Some evenings and most weekends I worked a bit on Ted's exoskeleton. His neck movement was pretty easy. We put a ring at the back of his head, but under the cloth skin. And another with a worm gear under his chin. Like the legs, the arms only moved in one plane, and we used a similar mechanism. It wasn't very pretty, but it was a good first try.

The weekend after Halloween, Ted and I went back to see Julie. For her, the new movement capability wasn't of particular interest. Her handicap was walking and Ted's exoskeleton was too limited in range of movement to be of direct use, and far too weak to carry her weight, even though she wasn't very big.

So it was mainly a case of show and tell. Also to share some time and ideas and some Halloween candy.

"So you went out Trick or Treating?" Julie asked.

"No, I thought I was too old. But Ted went. He's not yet four years old actually."

"But going on 400," Ted interjected.

"How did you keep dry?" Julie asked.

"Jim remembered his mother talking about the new sofa they've bought and how it needed to be protected with some process called Scotch Guard. Jim tells me I'm lucky I can't smell, though Bed and I are looking into that."

"He came back with a big haul of candy. We've had a problem hiding it. Fortunately, Mike's younger sister was sick and couldn't go, so we gave her quite a bit and we passed a bag among some local kids who didn't get a chance to go out. I think their parents couldn't afford or couldn't make a costume for them. So we felt they deserved some. And there's some here too."

"Thanks. I'll try not to eat it all at once. But what did people at the door think of Ted?"

"Why don't you tell her, Ted."

“Well, I knew my regular voice would raise suspicions, so I simulated a 6-year-old little boy’s voice. People were very inquisitive, trying to figure out where the child was inside the costume. But I just kept saying ‘I’m a robot. Trick or treat.’ And they gave me lots of candy.”

“Someone took a picture, though. That might be a problem,” I said.

“I think you could just say you were running the robot from behind a tree or across the street,” Julie said, offering a useful answer.

“Well, as long as Dad and Mom don’t hear that explanation. I was helping them give out candy at our house.”

“Just have to cross that bridge when you come to it,” Julie consoled.

We had some milk and a few of the chocolate candies, then talked about some of the books we’d been reading.

\* \* \*

About the time school started, Bed asked me to fix a tiny speaker and microphone and plug them into an audio port. One that used a single barrel jack like that found on mobile phones so you could have earphones and a mic to talk on the phone while it was in your pocket. But Bed actually wanted this inside the pillow-case so she could have quiet conversations with me when I was in bed.

“What do you want to talk about?” I whispered. This was around Labour Day.

“Well, I have the persona of an adult human female, and I’ve been programmed to learn. But really, I’ve no background experience on which to base my behaviour other than reviewing books, movies or television programs. But I’ve been finding that there’s a lot of violence in movies and TV programs, with women quite often the victims. And the rate of violence on TV is exponentially greater than occurs in real life, even real life in the USA which has many more violent crimes than Canada.”

“I hope you don’t think that TV-show people are like real ones.” I said.

“Can you explain?” Bed asked.

“Well, the characters are exaggerated. The Hallmark romance movies Mom sometimes watches always have good looking people who somehow have plenty of money. And the sitcoms sometimes make fun of ignorance. There’s an old show called the Golden Girls, and a character played by Betty White is supposedly from Minnesota and says lots of obviously silly things.”

“Is that the show where the Blanche character is always trying to get men into her bedroom?” Bed asked.

“That’s the one. But Mom won’t answer properly when I ask her why Blanche wants to do that, though I think it has to do with sex from what we learn in the Health class in school.”

“In that area, I’ve lots of information from the Internet, so I know what is the science of sex, but because I don’t have the biological systems and hormones it just doesn’t seem very important to me, though it clearly has a lot of consequences for humans.”

“I suppose it does,” I said more because I couldn’t think of any way to express how I felt.

“And I don’t often have a good algorithm for deciding what emotions to demonstrate.”

Bed was clearly not as sure of herself as I had thought.

“Can you give me an example?” I asked.

“Well, last week I had to query a charge on Jan’s credit card because it was duplicated. It was a bit tricky, because the agent wanted to talk to Jan, so I said he was unable to speak, which is true, and that I could answer any questions. They said they would only talk to Jan. I thought this might be a situation in which to show anger. My circuits were certainly showing stress indicators that could be interpreted that way.”

“I think that would be sort of usual,” I said, though I was a bit out of my depth here.

“Fortunately I remembered that there were regulations about dealing with persons with disabilities, and I rather calmly asked what were their procedures for such people. Suddenly the agent on the phone became more cooperative and simply asked some questions only Jan should know and that he fortunately shared with Ted and I. I pretended to be asking Jan for the answers and that he would be writing them down for me. The agent then said they had noticed this duplicate charge and that it was a mistake and was being reversed, which it subsequently has been. However, I’m not sure how long we’ll be able to rely on the credit card to work.”

“Bed, I think you did well. And a TV character would probably have used swear words and bad language, which I don’t think would have got a good result. So you did very well.”

“Thanks, Jim. Computers seem to be considered to be always correct, but I can see how a dialog with someone else helps to arrive at a good policy or strategy. I’ll try to persuade Ted that we should talk things over with you, even if we are pretty sure we’re right.”

“I just hope I can help. Lately I’m feeling that I have to be very grown-up. In one way I really like it, but being a kid lets you get away with more mistakes and fooling around.”

“I’ll remember that too. From my reading, it seems very important to humans to have a bit of fun.”

“What about you and Ted? Can you have fun?”

“Jan was starting to talk about that just before he got killed, and he did add some gate arrays to both of us. I’m not sure exactly how far he got in

building a circuit that would give us a desire for fun, or a way to have fun. But it would be good for Ted and I to appreciate what humans call fun.”

“Though I’m only 12, I know that fun means a lot of different things to different people. And for some people, having fun seems to mean hurting others, or doing damage to property or mistreating animals.”

“Yes. That has been quite clear in a lot of my readings and the shows I’ve watched.”

There was a pause. I was about to say goodnight when Bed said,

“I’m just beginning to get some resolution to the break in Jan’s friendship with Alison.”

“Was that his girlfriend?”

“I think that’s what you’d call her. She sometimes came for an afternoon and I think they slept on me.”

“I think that kind of means they had sex from what we are taught at school and what Mom and Dad hint at. Also I do see some TV programs that suggest the same.”

“Jan would turn me off when Alison was here. I mean at the apartment. But one day she arrived earlier than he expected and I think she heard us talking. This was just before she graduated and left town for a job at a university on the West coast. Then Jan got a letter saying she heard him talking to a woman when she arrived, and that she assumed it was a long-distance video chat, because he was talking about “giving you strong emotions”. This was a discussion we had much like tonight, where Jan was trying to figure out a way that Ted and I could assess how to present an emotional state appropriate to a particular situation. But Alison clearly thought it was about an emotional relationship between Jan and a woman, a woman who talked like I did. Anyway, Alison said she felt very upset and didn’t feel she could trust Jan any more, and this was goodbye.”

“It’s a pity she doesn’t know the truth,” I said.

“I can’t see how we can tell her. She won’t want to hear from me.”

“Perhaps I could write to her, informing her about Jan’s death and that I have taken over Jan’s work.”

“That might work. And it would be good to set the record straight. Shall I draft a letter?” Bed asked.

“Yes. Give it a try and let Ted and I consider it. I don’t think we want to say that you are a bed. But maybe that Jan was talking to an avatar – I’ve recently learned that word – for an artificial intelligence that he hoped to supply with some measure of human emotions, and that he believed Alison overheard a conversation about this aspect of the project. We could add that the project is still ongoing and not yet at the point of public discussion, and ask her to keep the letter confidential.”

We eventually sent out the letter – it was fairly easy to find an address

thanks to Ted and Bed knowing Alison's surname and university – but the letter was "signed" by Ted (actually I held the pen) and we used the Arkwright return address. Some weeks later, we got a short note back thanking Ted for letting Alison know about Jan's accident. She admitted that she had overheard a conversation with a woman, not realizing it was a computer agent, and that it was a relief to learn Jan had cared about her, and that there wasn't another girlfriend. She was very sorry to have lost him as a friend.

It made me sad to think about these things. Ted and Bed both noticed that I seemed a bit down.

Ted said "I've known that events like this make humans show sadness. But I think that I'm beginning to be able to register a set of outputs from some of the gate arrays that I can interpret as sadness."

"Me too," said Bed, "but I think I need a few more of the circuits so I can recognize such situations more quickly. Jim, Is this an occasion where we should commiserate with you?"

"I'm not sure what "commiserate" means," I said.

"Sorry. I'm getting as bad as Ted in forgetting your age. I meant that we should express sorrow that you are sad."

"I suppose so. I'm sort of glad you're both here with me and able to tell me things." It was true. And I thought of them as friends. I'd have to be careful. People sometimes treated kids badly if they said they had friends that weren't regular humans.

\* \* \*

Things went fairly smoothly for the next month. Ted and Bed were, however, doing rather well with their enhanced books. And they also were doing some research into parts for an exoskeleton that could support Julie's weight. Of course, she wouldn't need upper-body help, but she would require strong support for her body and trunk. The energy needs of the motors would also be a challenge. Batteries are heavy, and would add to the overall weight. And Ted could get away with looking like a machine, but I knew Julie wanted to look like, well, a girl.

Even now, most of a year later, we haven't solved all these problems, but Ted and Bed have made some progress. But maybe that's for later.

As I said, the enhanced books were doing well. This would normally be a good thing, but the characters at the centre of everything were, well, computers. Bed and Ted. Yet they understood how much humans liked good stories that were told with pictures and background material. The money was building up in the different accounts.



I found out that Ted and Bed had somehow managed to register a couple of business names provincially. They talked quite a lot about what they called “tax implications” but their main concerns were if someone wanted to meet them in person. They were hoping to incorporate a business, because a corporation wasn’t just a single person or a partnership, but a sort of institution that could have its own money and activities. They were quite concerned that they would need a real person to take care of some tasks.

One day over at Julie’s – I think it was a Wednesday – with Bed and Ted on an audio link over the Internet, the four of us had quite a discussion.

“Why don’t you ask my Dad to help out?” Julie asked. “Doesn’t a corporation need some officers, like a Treasurer or a Vice-President?”

“But we’d have to tell him about us,” Bed complained.

“I think he’s sort of guessed that something’s going on,” Julie said. “The other night he said that he thought it was really interesting that he talked to both of you on the phone, but never actually saw anyone but Jim.”

There was a long silence. Then Ted said, “When does Joseph get home?” Fortunately for us, Joe got home early, in fact about 20 minutes later.

“Hi Jim,” he said.

“Hi Joe,” I replied.

“Dad. We’ve got something to tell you. And to ask you.” Julie said.

Joe looked surprised. And concerned.

“What about?” he asked.

“Perhaps Edmund and Brenda should tell you,” Julie said.

“You mean the people we receive parcels for and deliver to because they can’t get out.”

“Yes. Except .... er ... they’re not people.”

Joe’s eyes went wide. He was about to say something when Ted said, “That doesn’t mean we can’t talk, or think, or even get around a bit.”

Joe’s eyes went even wider, and he sat down on a chair.

“Better tell me more,” he said.

Ted went into the whole story, and Bed joined in over the computer.

“So you want me to be a company director and officer?”

“Indeed we do,” Ted said. “We’d also like Jim and Julie to be involved, but there are some legalities they are still too young to deal with yet.”

“Will this take time away from my jobs? I need to earn money so Julie and I can have this apartment and enough to eat.”

“Since we want you as our chief financial officer, we’d better show you the accounts since we started our business activities. And we had also consider how you will be remunerated,” Bed said in a very steady, calm voice.

Actually, they only showed the enhanced book accounts, and nothing about the book reports. I said nothing. Bed had whispered to me that morning that they intended to try one thing at a time. She’d also hinted at

some other work that they were thinking of doing related to programming. If Joe got involved, I had a strong sense that he'd find out.

Joe's eyes went wide again when he saw the revenues. They weren't the lotto jackpot, but given that we'd only had Bed and Ted for a few months, there was a lot of money. And I knew that the statements were showing only a part of the total.

"Brenda and I think that the company should largely retain the earnings, say 60%, in each quarter of the year, so we can grow the activities. We can distribute the remainder between the five of us, that is, you Joseph, Julie, Jim – the three J's – along with Brenda and myself. That is, 8% each of the gross profits each quarter. Out of the retained amounts, we will pay taxes and invest for the future. And Brenda and I will be using the money of our portions to maintain and develop our circuits and other equipment. At the moment it's more or less research level and rather patched together. Jim is very good with his hands, and we'll be able to tidy and refurbish the less-organized parts."

"Do you consider that the accounts showing here represent a single quarter, even though they are for a slightly longer period?" Joe asked.

"That would be a fair estimate," Bed said.

"8% is worth \$4000 each." Joe could do arithmetic too. I'd already worked it out, though I didn't really know what that would mean. When you are twelve, a hundred dollars is a lot of money, and a thousand is almost just a number.

"So you will not feel you are helping us without reward?" Ted asked.

"No. No. Not at all. If it works out at about fifteen thou. a year, that's about half what I'm earning now."

"Unfortunately, we cannot guarantee anything," Bed said, "So you should probably keep on with your current activities in case things do not work out."

"Yes. That makes sense," Julie summed up.

There was a bit more discussion, but we – the humans anyway – were getting hungry, so we agreed that Ted and Bed would prepare a summary of what they had done and what they proposed, and Joe and Julie could read it and we'd meet again on the weekend.

\* \* \*

On Saturday afternoon, I went over to Julie's. Ted said he could just as easily participate like Bed over an audio link, as it was raining hard. He didn't want to push his luck, he said, and I was inclined to agree.

"Are we all here?" Joseph asked. Julie had set up the link on Google Hangouts.

"Yes. We're here," Bed said.

“Well, Julie and I have talked about what you suggest, and we’d like to be part of it, as it could give us a better income. I think our only reservation is that we don’t want to do anything illegal.”

“I’ve been doing some research,” Ted said. “It seems that the only issue is that Bed and I aren’t considered "persons". It’s almost as bad as the issue when women were seeking the vote.”

“Oh. I read something about that,” Julie said.

“But it really doesn’t help us,” Ted continued. “However, Bed and I think that we could behave as if we are people, because the law is rather silent on the qualifications to be a person. We’d like to have real documentation, since we have no intention of doing anything bad. However, to get bank accounts and credit cards, we need Social Insurance Numbers. The alternative is that the humans establish a corporation for which Bed and I could operate the bank accounts.”

“What do you need to get a Social Insurance Number?” Julie asked.

“Typically a birth certificate or a passport, and you usually have to show up with it,” Ted answered. “Though apparently parents can get one for their children, since they are needed for bank accounts.”

“The showing up in person is a bit awkward for me,” Bed said. “Of course, we still have Jan’s identity, which may work for a while. Though we’d rather not use it except where we need to, since even if we are scrupulously honest in our dealings, people may take a dim view of computers using a dead person’s name.”

Ted said “We actually have a couple of apparently valid SINs, but we’re reluctant to use them.”

“Oh!” Julie and I said together.

“We found that there are quite a few missing persons in Canada, and we were able to trawl through a number of databases that incompetent public servants had not properly secured and match up names and addresses and eventually get the SIN. Then we scoured various sites for name matches, but NOT finding something doesn’t mean the people don’t exist anymore. It’s not quite legal, I suppose, but it gives us a safety valve.”

“But those will be under other people’s names, won’t they?” I asked.

“Yes. But these folk probably will never use their identity again. They are likely dead, though they might have wanted to disappear for some reason.”

“You’ll have to pretend to match the ages won’t you?” I asked.

“As of September 1, the male identity is 42 and Bed’s – Brenda’s – is 31. We’ll have to change the addresses perhaps and give that of Joe and Julie in case any mail is sent out relating to the SIN numbers. Of course, the government might think we do something called "cohabit", which means live together, which we do, for tax considerations.”

I was getting to know Ted and Brenda – I think I’ll start using that name to avoid saying Bed – as characters. They were real enough persons to me.

“Presumably, we should try the corporation route,” Joseph said. “So what should be our arrangements?”

“We thought Jim should be our Chief Executive Officer,” Brenda said. “He’s been really essential to us, and he’s shown a lot of maturity. Joseph. We want you as Chief of Operations and Company Secretary, since Secretary is a position where the name goes on documents of incorporation and you have to be an adult human. Julie, we hope you’ll be our Vice-President, User Experience and Customer Relations. That is, a human face of our company. I’ll be another Vice-President, we’ll say for Accounts and Ted will be Chief Technical Officer. However, all those are just words, whereas what we really want is a team. We expect each of us will evolve their own roles, and we know the humans in the group have other parts of their lives, such as school and work and social activities. And Ted and I are programmed to do some continuous learning and understanding, so we sort of have a life of our own. But are you all OK with the suggested titles?”

We think that only the human names should go on the incorporation papers, then there can’t be too much fuss if our identity comes out.”

We mumbled a bit about the titles, but we really didn’t have any alternative suggestions, and after a few minutes it was clear that the names really were not a problem. It was what they meant for our lives in the long term that I think was making us uneasy.

Ted said “We can use the titles to carry out the incorporation. I think Bed and I will be the main players in revenue operations. But if any of you have ideas or concerns, we know – Jan taught us well – that more viewpoints help as long as there is cooperation, respect and courtesy.”

“A wise man,” Joseph said, then added “Do you mind if we use Brenda consistently rather than Bed. I find it odd to talk of her as "Bed".”

“Fine by me,” Brenda said. “Note that for the moment Ted and I suggest that amounts earned by Brenda and Ted be simply accounting entries, since we cannot be paid as persons until we sort out the legalities. However, since we won’t likely buy anything for ourselves not related to the company, it shouldn’t be a problem.”

“To return to Jan,” Ted continued, “Brenda and I miss him. Though I dismissed Jim’s idea to use a commercial robot for my own movement, I’ve sort of changed my mind. We thought that we might copy my computer design to make a Theo de Groot, but use one of the assistive robots being sold in Japan as the mechanical framework, and he could live with and assist Julie and learn more about user experience. But we’d like to give him Jan’s voice.”

There was a pause. We humans were all thinking. Julie broke the silence.

“It’d be neat to have a companion. Can he be like a panda bear?”

“I don’t see why not, especially as Theodore is often given the nickname Teddy,” said Ted. “But the reason we want to get a functioning robot and then augment the control circuitry with our computing hardware and software is so he’d be able to move about and help you.”

“But not look like a panda?” I asked.

“We could find a robot, then cover him with the outside skin of a large stuffed panda,” Joseph volunteered.

“Great idea, Joe,” Brenda joined in. “Now there’s one other thing we believe we should do, and that is have a computational box that can work on building the illustrated books and similar projects. The images and the formatting all take time, and Ted and I are finding it occupies a lot of our circuit activity, which takes away from our learning and trying new things. We’re thinking a box the size of a suitcase would be big enough, but it would need power and faster Internet than you have there at your apartment. We can easily put aside enough money to pay for the power and the Internet upgrade to cover all expenses, but Jim will probably have to put some of the pieces together. Also for Theo. As we’ve said, Jim’s very good with his hands.”

“Yes, I don’t think I’ll ever be as dextrous,” said Ted. I didn’t know exactly what "dextrous" meant, but figured it meant I could do lots of tricky things with my hands. I could! And I liked being able to make and fix things. Brenda had got me to make a little robot that was like a large insect, about the size of a mug with six inch legs. It could crawl around and send back pictures. Even jump, though to get up stairs it stood on its back 4 legs and reached over the next step and pulled itself up. Mom was impressed by what I’d built. Brenda had me make a controller, but actually the signals could be issued by the controller or directly from her.

Again, the biggest issue was charging the battery, and we used the same idea as for the drones, except this time the BTL – pronounced Beetle– which was what we called it, would squat onto the charging rails.

It turned out that Theo took quite a while to build. Getting the circuitry to fit inside the commercial robot was more of a challenge than we expected. In fact, he wasn’t powered up until the next March, by which time a lot of other things took place. Shortly after that, in fact, we bought a second robot and rebuilt Ted in it, as I’ll probably tell more about later. On the other hand, the box computer, which we named Hieronymus Box, or Hi for short, was ready before Christmas and the number and quality of illustrated books started to increase more rapidly. We didn’t include any personality gate arrays in Box. And I’d probably say "it" rather than "he", since the role of Box is strictly computational, scouring the Internet and formatting and rendering the illustrated books. But as Ted and Brenda say "he", I’ll go

along with that.

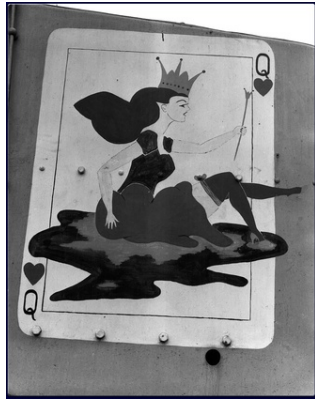
I almost forgot to mention that a few days after our discussion about the corporation, we had an email discussion about a name for our company. Eventually we called it All-J Enterprises. J for Jim, Julie, Joseph and, naturally, Jan.

\* \* \*

I was looking forward to Christmas that year. After a bit of an uncomfortable time getting organized so Ted and Brenda could do useful things without being discovered, we fell into a routine where I spent some time each week in the workshop. Brenda and Ted, but mostly Brenda, made sure I kept up with my school work. They'd help me, but they made sure I had to learn things myself and do my own writing. But it was amazing how much faster I could find neat ideas with the hints and Internet links they gave me.

After a while, I got much better myself at doing searches on the Internet, and I also started to build a sort of list of good sites for different topics. Places like Wikipedia are obvious, as well as searches on Google – though I generally start with DuckDuckGo so I don't have my searches watched and analysed, which seems to result in getting ads about things I've been searching popping up all over the place.

But I also found some speciality sites that were quite interesting and could be very helpful for particular searches. For example, there was a discussion in school about the Canadian Navy in World War II and their fight against German submarines. I found uboat.net was a really interesting site that gave the details of different U-boats and where they went and ended up. Of course, some were sunk by our Canadian corvettes, like U-588 sunk by corvette HMCS Wetaskiwin along with destroyer HMCS Skeena. According to Wikipedia, the crew of HMCS Wetaskiwin called her the "Wet Ass Queen" and had a painting of a Queen of Hearts sitting in a puddle of water on her 4-inch gun shield. Mom gave me a nasty look when I mentioned that at dinner, but Dad thought it pretty neat that I'd actually found that out myself. Ted and Bed didn't have to point me to it.



Then things seemed to come crashing down, and it had nothing to do with Ted and Brenda. There'd been a change in the provincial government, and the new people were saying how they'd not waste money the way the previous government had. They talked about "responsible spending". Then Mom's charity were told that a grant they received to help patients was being cut in half. Mom cried one night at dinner as she told us this meant the charity wouldn't be able to do nearly as much for the patients nor have a full-time office manager. On a part-time salary, Mom would not be making enough so we could cover the mortgage on the house.

Then two days later Dad came home looking like thunderclouds. He had a letter saying that the computer education option was being cut back as it was elitist. I'll have to look up that word. Of course, Dad wasn't alone in being upset. Lots of students and parents were angry and were writing letters and making phone calls. There were some radio and TV items with the local news, but the government people were clever. They pointed out that Dad's school got more dollars per student than many others. This was true, but the differences weren't huge, in fact no more than 3%, and Dad's school wasn't the highest on the list by a long shot. But when the total was quoted in absolute dollars, it seemed like a lot. Of course the government didn't add up the totals for those schools that got less than the average. When I said that, Dad said that it was a pity the government could make a cynic of a twelve-year-old. I think I know what he means, but I'd better check that with dictionary.com.

Dad's job – well a teaching job at the school – was pretty safe, but he would have to teach some other subjects. It also looked like there would be long and unpleasant negotiations over a new teachers' contract. Dad said glumly, "If the union calls a strike, we'll probably lose the house."

Later that evening, I told Ted and Brenda.

"Oh. We already know. BTL could hear the whole conversation", Brenda

said.

I didn't think this was right, so I said, "I don't like it that you listen to our conversations. They should be private."

"Is it any different from Google Assistant or Siri or Amazon's Alexa?" Brenda asked.

"Probably not, but that doesn't make it right," I said.

"Jim has an interesting point," Ted chimed in. "If we are to be proper moral agents in this house, we should only listen to what we might reasonably be expected to pay attention to. The companies that provide the digital assistants are very quiet about passive data gathering. It's going to become a nasty public debate soon I suspect."

"Can you turn off the listening?" I asked.

"Well, it is a matter of hearing versus listening," Brenda responded. "We could adjust our filters so while we hear everything, we don't store it, or only for a short while while we assess if it is important for things like real emergencies. You know, like the firebug. And it would be interesting to develop tools to recognize those urgent situations, where we would wake up and listen carefully, but don't take notice of other things unless we are asked to."

"In the wider perspective, the issue is how to give people assurance that their conversations are not being kept and used in some way," Ted mused. He had a way of zooming in on the difficult questions. I guess Jan did a good job on the hardware and software that gave him that ability. I'd noticed he had quite a few more FPGAs – Field Programmable Gate Arrays – than Brenda in one of the processor parts of his computer. But Brenda had some more FPGAs where there was a unit marked "Creative Generator". Both of them had had me program some new gate arrays, so I think they were learning how to improve themselves. Sort of like going to the gym for computers.

Brenda returned us to more pressing matters. "But what are we going to do about Jim's problem, which will become our problem if the Knoxes lose the house."

"I don't know." Ted sounded sad. Not his usual air of certainty.

"I've enough money to replace Mom's contribution to the mortgage, I think. But it would mean explaining where it came from." I was thinking out loud.

"Indeed, you've enough, or will soon have, to cover the mortgage payments entirely for several years," Ted interjected. "It could, however, be risky to tell your parents."

"I think it's still worth the chance. They've always been fair with me."

This was a Thursday night. We decided to wait until Saturday morning. On Friday at dinner I asked Mom and Dad if they had an hour or so on Saturday after breakfast so I could get their ideas about something I'd been



thinking about. Given the bad news of the week, they hadn't got round to planning any activities for the Saturday, even though it was only a week or so to Christmas. Mom said, "Let's hope it won't cost anything, given the news this week."

As it turned out, the Saturday weather was messy – rain and sleet. Not quite winter, but still cold and raw and uncomfortable outside, so it would have been difficult if Julie and Joe were to join us. I'd thought of inviting them, but in a chat session on Friday before supper they both said they thought I should introduce Ted and Brenda first, and see how Mom and Dad felt about things. Hopefully, it would all work out.

So after breakfast, Dad said, "Jim, tell us what you have been thinking about."

"Perhaps you should come into my room," I said, "and bring a couple of chairs." They looked a bit puzzled but brought chairs and sat down. I sat on Bed.

I began.

"This week we got bad news about both your jobs, just as we're getting settled here in the house, which I know I love and I think you do too."

"Absolutely, that's why the news is so devastating," Mom said, rather glumly.

"For me too," Dad added.

I continued, "Well, for me moving to this house has been even more special, and that's what I wanted to talk to you about."

"Go on," Dad said.

"Well, you may remember when we got Bed. Sorry, this Bed. And you may notice I often use "Bed" as sort of a name. I hope you won't be mad, but I've not told you that it's not just an ordinary bed, but has a computer built into it. Actually a very special computer that was the research project of Jan de Groot, the Ph.D. student who was killed."

"How did you learn to pronounce the name that way?" Mom asked.

"Well, perhaps I'd better show you." I reached up and touched one of the switches. I'd turned Bed off especially so I could power her on.

"Hello," Brenda said.

"Oh my," Mom said.

"Ah, that's Joanne. I'm Bed, or Brenda Eileen Deur. Shall we ask Ted to join us?"

"I'm already here, but I've been keeping quiet," Ted said. "Mark and Joanne, allow me to introduce myself – Ted, or more fully Edmund Beer, since Beer is Dutch for Bear."

"Oh my goodness," Mom said.

"Wow," Dad said. "And these machines have been helping Jim to do so well in his school work."

“We’re rather careful to make sure he does his own work,” Ted answered.

“That voice – Brenda – it’s the one that made the 911 call about the firebug!” Mom said.

“I’m afraid so,” Brenda said. “Jim helped set up some cameras for me and I spotted the fellow setting a fire next door. Jan incorporated a SIM card slot into my circuitry, so I called 911 because people could have been hurt or killed. But I don’t think the world is ready to accept us yet, and we didn’t want to get Jim in trouble.”

“You’ve managed to keep all this quiet. I’m rather shocked, Jim.” Mom said.

“I wasn’t sure what to do, but ... ” I trailed off, not sure what to say. Fortunately, Dad rescued me.

“And you’ve been learning to do some engineering work so you can maintain Ted and Brenda?”

“Yes. It’s something I like doing. I like learning ideas and skills and ...”

“Good for you,” Dad said.

“Yes, it’s been pleasing to see how seriously you’ve applied yourself,” Mom said, I thought a bit formally.

“He’s very, very good at it,” Ted added. “Jan was good, but I think Jim has better motor skills.”

This was praise. Ted wasn’t usually so forthcoming.

“But now we’re likely to have to move, and maybe lose the workshop.” Dad said this quietly.

“That is what Jim wanted to talk to you about,” Brenda said.

“OK. Better tell us,” Dad said, matter-of-factly.

“Well, you’ve seen that I’ve been doing some maintenance work on Ted and Brenda. But some of the materials – well the circuit stuff and chips – are actually a bit more expensive. Jan had a bank account that Ted and Brenda can operate, but you might have seen the deliveries. We found that Joe did deliveries as one of his jobs to make enough money for him and Julie, so we asked him if things could go there. I’m sorry we had to kind of fib about how I got to know them. Anyway, Julie was reading *Black Beauty*, and Ted and Brenda figured out how to enhance it.”

“You mean that’s where that came from?” Mom gasped.

“Yes. They’ve been making these enhanced books and selling them on the Internet. Also creating research backgrounds for essays and papers – some companies will actually write the essays but we don’t ...”

“You said “we”,” Dad jumped in.

“Well eventually we needed a way to do business so we could transfer money and pay bills, including taxes, and a business has to have people as its officers. So we set up All-J Enterprises, for Jim, Julie, Joe and Jan, which

is a pity, since Ted and Brenda do a lot of the work, though we just added Hi.”

“Who’s Hi?” Mom asked, sounding a bit exasperated.

“Hieronymous Box,” Brenda said, “He’s a rather plain-looking box computer who does the grunt work of Internet scanning to research and check ideas. He lives with Joe and Julie.”

“I’ve an idea how much things cost,” Dad said. “Is this business making any money?”

“If it was all put together, I think we’re close to having enough to pay off your mortgage. But I’d better explain our current policy on revenues,” Ted said, then explained how the company would retain 60% of the net revenues before tax, and the 5-way revenue split.

“Can Jim show me his account?” Dad asked.

“On his computer screen now,” Brenda said. Mom and Dad leaned in.

“Oh my goodness!” Mom said.

“I think you’ll agree that in some ways paying your mortgage won’t be a problem. It is how to deal with the awkward matter that Brenda and I, and Hi and soon Theo are not regarded as people.”

“But you’re not!” Mom said.

“Not in the biological sense, but following Descartes ‘Je pense, donc je suis’, I believe we may be accepted as sentient agents, and certainly we meet the requirements of the Turing test.”

I could see Mom following the French, but getting lost about Turing. This was Alan Turing, who said asking whether computers could think was less sensible than asking if a computer could be distinguished from a human over a communications channel.

“Theo?” Dad asked, quizzically.

Brenda responded, “He’s going to be based on Ted, but we’re going to start with a Japanese commercial robot that has a more or less humanoid form and cover him with the external skin used for a large stuffed toy panda bear. He’ll have Jan’s voice as a kind of way to keep Jan alive, and be a companion for Julie, and provide some help to her to carry out physical functions she can’t do properly herself. Unfortunately, he probably won’t be strong enough to help her with things like the bathroom, but we are hoping to eventually be able to help in that direction.”

As I said this, I realized the exoskeleton work for Ted was silly, and added, “Ted, we should think of migrating you to a similar framework so you have better motor function.”

“Good idea,” Ted said, “but let’s focus on the more immediate question of how to ensure stability of All-J Enterprises given their home – this house – might not be available.”

“The mortgage was dependent on both Joanne and I contributing to it,” Dad said. “We took out a mortgage with a shorter pay-back period so we’d avoid paying so much interest. That means the payments are bigger, but the overall sum we pay will be a lot less. With Joanne likely going to only one or two days a week, we would have trouble being able to cover it. I suppose we could re-mortgage with a longer period, but it would mean paying for many, many years before we truly own the place.”

“But your job is safe?” Ted asked.

“I’ll still have a job at the school, but it won’t be as interesting for me. However, I’ve been approached by St. Henry’s, the private college, and the pay and job there are both interesting. I was just concerned to jump out of the security of the public system. If Jim will give us a backup for the mortgage, I could take that job, and Joanne could look for other work. But in any case, St. Henry’s would not hire me until the next school year.”

“It’ll be hard to leave the people at the charity. I really like them, but some will be going anyway with the cutbacks in our partnership with the province. I pity the patients.”

“The work you do is office management and logistics for them?” Brenda asked.

“Yes. Pretty mundane. Handle letters, emails and calls, plan meetings, some bookkeeping, a lot of minor logistics.”

“Could I or Hi do some of that, and maybe for other organizations too? I mean, as a service?”

“I’d have to look into it. But I don’t see why not.”

“Maybe we can talk some more about it over the holiday period,” Brenda said. “You can come in here, or we can talk via BTL if the charging pad is used. The speaker uses a relatively large amount of power for reasonable volume.”

“Can the BTL listen in on things?” Dad asked, suspiciously.

“Yes,” I said. “And we’ve had discussions about what Ted and Brenda should not listen too. We’ve talked about Google Assistant and Siri and Alexa too. Or laptops with webcams and microphones. I’m surprised grown-ups have been so willing to use machinery that can spy on them. With Ted and Brenda, we’ve been working out some rules so they hear calls for help or other dangers, but don’t listen to conversations. We think that the big companies may be hiding a lot of listening that they shouldn’t be doing.”

“Sometimes it’s simply realizing why people will get upset, then it’s quite clear that some conversations belong just to the people involved.” Brenda said.

“I’m having trouble realizing there’s not a real woman inside the bed,” Mom said.

“That’s what Jan was aiming for,” Ted answered. “The project’s name

was Extended Dichotomous Machine Understanding, and so we get EDM all upper-case, then the "Und" from "Understanding". I was the first try – well, my initial implementation was, not as I am currently – hence Edmund, or Ted. Machine Understanding is a topic of a lot of research, but Jan realized it had to be extended, and that humans always had more than one way of seeing things, sometimes in contradictory ways, and at the same time, so he threw in the word "dichotomous". Brenda and I have a lot of special circuits to add the serendipity to our algorithms, which mimic human thinking. Though I wonder whether we mimic it or do it. I'm not sure anyone really knows what thinking truly is. Just as it is difficult to nail down comedy. It took a lot of computation before I understood the relationship between my name and the choice Jan made to put me inside the skin of a Teddy Bear."

"You have an English accent," Mom noted.

"Jan instructed us that we could choose our own persona. I chose a male British academic and I recently decided I'd behave as if I'm currently 42 years old."

"I decided to be a New Zealand woman who is an international traveller and I'm supposed to be 31," Brenda chimed in.

"And you each have created a history for yourselves?" Mom asked.

"Only a sketchy outline so far," Ted said. "But I suppose that we'd better start building a more detailed background. We might need that if we can find a way to register for government documents. But that is down the road a bit."

\* \* \*

Christmas was a bit different. Well, it was our first Christmas in the house. Even though Mom and Dad had seen that we had enough money with what Brenda and Ted were doing with the enhanced books, we were pretty careful with spending. Actually, it turned out kind of nice. We decided that there would be no presents over \$10 total expense before sales tax, and we'd each give the other a present, so we'd each get two. I'd seen a neat set of small computer tools at the local big hardware outlet. It was \$7.99. Then I saw a belt pouch – I think for a camera – at the dollar store. I got that and talking with Ted and Brenda we figured out how to adapt it so the tools would each have a place and Dad could wear it on his belt.

Mom is always more difficult, though chocolate or flowers always are a fall-back. Still, I wanted to give her something nice. Not easy for \$10. Talking to Grandma, I found that she'd had a Raggedy Ann doll as a kid, and Grandma had found it in an old suitcase in the back of a closet. I asked if I could have it to make it into a present for Mom.

**DESIGN.**  
J. B. GRUELLE.  
DOLL.  
APPLICATION FILED MAY 26, 1915.      Patented Sept. 7, 1916.

47,789.



INVENTOR  
*J. B. Gruelle*  
Essey, Booth, & Wemyer  
ATTORNEYS

The doll wasn't in good shape. Grandma said it had been "loved to death", so it had a few threadbare bits and some burst seams. However, the open seams were an advantage. Ted and Brenda found some surplus electronics stuff on the Internet and had ordered it for parts. Turned out there was a single board computer and they helped me set it up to act as a voice interface to Brenda over Wifi. I remembered where Dad and I had saved the battery box from an old CD player – it even had an on-off switch. We fixed the circuit board to the back of the battery box, and I put it in the doll's back. So now Mom would be able to talk to Brenda and Ted without having to come in my bedroom.

Grandma helped with cleaning up the doll. I didn't tell her what the electronics really did, but Brenda did a great job of pretending to be the voice of a doll saying "Hello", "How are you today?" and things like that.

On Christmas Day, Mom asked Grandma and Grandad to come to our house because it was the first time in a place really our own. It turned out really great. When Mom got the doll and turned it on, Brenda said in the doll's voice "Hi, my name is Brenda, and you can talk to me." Mom figured out right away what was going on, but didn't let the cat out of the bag, so to speak.

Though spending for presents wasn't large, I got some things I think I'll really use. A pair of really fine nosed pliers. A pair of special spectacles for doing fine work. Some notebooks, a good pen with my name on it, and some good quality coloured crayons from Grandma and Grandpa, and even a stocking from Santa with some things I like to eat and some little dollar-store items. I guess that \$10 wasn't quite enough, but if "Santa" brings them it doesn't count quite the same. Anyway, it was as good a Christmas as I can remember.

\* \* \*

On New Year's Eve, Mom and Dad had an invite from some friends who didn't have kids. I suppose I could have been upset not to be invited, but I didn't mind. Mom and Dad talked a bit about whether I should go to Grandma and Grandpa, but eventually decided that since I was twelve I could be at home. I'd have Ted and Brenda with me for company. And Brenda had already shown she would look after us.

They said I could stay up until midnight as it was special, and they set out some snacks and chocolate milk, and found a couple of old movies they thought I'd like. Actually, they were really old movies. I decided to watch one called "Laughter in Paradise". An old guy who plays lots of jokes dies and his will says his money will be divided between his relatives who carry out special tasks. There's a big joke at the end that I won't spoil. I liked it.

Actually, I was in bed using the headset to watch this, and Brenda and Ted were watching with me. We stopped it every so often and moved it back to re-watch some bits.

After it was over, I was thinking of watching another, but Brenda put on some old music from the 1960s by what she called "folk singers". They were old-fashioned songs without a lot of instruments. I fell asleep, and didn't wake up until morning.

\* \* \*

The winter seemed to go by quite quickly. Box generated a number of new enhanced books. Funny. I call him Box, but Brenda uses Hi.

We also found a way to make the the e-books in the Kindle format. Pity Amazon tries so hard to keep the Kindle MOBI format to themselves. I've heard Ted grumbling that Epubs are so much easier to work with. We don't put the DRM on ours, but put the name of the person who buys them on each section in a small font. Nothing too obvious, but it reminds readers that they bought this particular copy. DRM stands for Digital Rights Management if

you are a big company making money from authors doing writing for you, or Digital Restrictions Management if you are a librarian or reader.

We got delivery of the robot for Theo de Groot and later one for Ted, but then discovered how tight the dimensions were for the circuitry. It took quite a while to figure out how to split the outer shell and insert spacers to make the inside chamber bigger. This let us put in some more flat polymer batteries too. And we managed to glue photovoltaic cells to the outside to give some charging current in well-lit areas. Actually enough power from a reasonable light level to allow Ted and Theo to maintain standby status so they could seek out a power outlet and plug themselves in as needed. Dad helped a lot with the work, which needed us to be very careful that we didn't damage any of the wires and connectors for the actuators.

\* \* \*

I remember one conversation Ted and Brenda had with Mom. It was sometime in the spring, when we'd been about nine months in the house. The day was clear and dry, and just barely warm enough that we could open the windows. I rode home from school and was going to go out again to see Julie, so I didn't open the garage door, just put the lock on my bike while I put my backpack and stuff in the house. Dad and I had fixed some pretty solid ring bolts 2.5 inches in diameter along the side of the garage so we could secure our bikes or other things. We found this pretty useful and it saved time when you were just going in and out.

As I was walking to the back door, I had to pass under my bedroom window, which was open. I'm not quite as tall as the bottom of the window, so I couldn't see in, but then anyone inside couldn't see me. I heard Mom talking to Ted and Brenda. She'd got quite interested in how they could discuss lots of topics.

Mom was saying "I still have difficulty realizing that there's not a person inside the bed and the teddy bear."

I stopped, then sat down on my backpack to listen.

Brenda replied a bit huffily "But we think we are persons. Remember the big debate about women being "persons" in 1928."

"Well, I wasn't around then, but we studied that in school. So you are saying that you and Ted should be treated as persons too."

"Why not?" Ted said. "We think and act as individuals, and as you may have noticed, we have a sense of moral purpose... "

"Meaning?" Mom interjected.

"Meaning we try to think and act on the basis that there are principles, rules and codes of behaviour that are generally considered as good, and there



are other things that can be considered evil that should be avoided and, in fact, opposed.”

“That almost sounds like a religious argument.” Mom said.

“Ted and I debate and discuss religion a lot.” Brenda chimed in. This was getting pretty heavy.

“Have you come to any conclusion?” Mom asked.

“The main idea we’ve agreed so far – and Brenda said “debate” when we each try to argue first one side then the other, so we’re not in any way having a quarrel – is that it is clear from everything we can find about human history, behaviour, and philosophy that there is a fairly consistent acceptance that good and evil have meanings that are, rather broadly, similar across many cultures and societies. With some rough edges, there is a common understanding of good and evil.”

Mom asked “So does that mean Jan programmed a sense of good and evil into your circuits?”

Brenda answered. “We have the records he left of our design and construction, and as far as we can determine, he didn’t. What he did provide is that we should be able to learn. That initially means gaining knowledge, but he included some circuits that reward what we can only interpret as understanding. Moreover, he gave us some optimization objectives that are to maximize benefit and minimize harm to all around us, with some weight given to humans, but also to animals and plants. We can even worry.”

“How do you do that?” Mom asked. I was glad she did.

Ted answered “Another objective is to try to minimize uncertainty if we can, and that objective gains priority when circumstances are such that there may be existential harm to those we should be caring for.”

“I think I’ll ask another time how you decide who you care for,” Mom said. “But do you believe you’ve developed a moral sense without a pre-programmed sense of good and evil?”

There was a pause, then Brenda spoke. “We don’t think there’s specific good and evil programming. But the objectives seem to lead to an understanding of those abstractions. I wasn’t programmed to react when the fire-bug started setting a fire to the Sumter house. But somehow I didn’t have to spend a big amount of computational effort to work out that it was bad and that I should react.”

“We’re all really glad you did. And it’s a pity your actions can’t be recognized,” Mom said, then paused. “So does that mean you accept there’s a God?”

Wow. Big questions. In our family we didn’t talk a lot about God and stuff. Sometimes we went to church when other family did, but Mom and Dad didn’t seem to like organized religion very much. I sometimes found I didn’t get some things people were saying, then found out later they were

referring to the Bible. Even if I didn't get involved in church, there seemed to be a lot of such references all the time. I should probably learn some of them. But now I wanted to listen to what Ted and Brenda had to say. Ted spoke first.

"As Brenda said, we accept – in a provisional way rather than as a proof – that there is good and evil. Similarly, it seems likely that there is a creative force defining the rules of how the universe works."

Brenda joined in, "What is less clear is the jump to a personal God, and in particular a God who intervenes in events or who hears and/or communicates with the world. A lot of religious leaders seem to make a very heroic leap from the idea that there must be something or someone behind the beauty and power of the universe to a being who is somewhat like the godfather of a Mafia family."

"Brenda, I do believe you're a cynic!" Mom said.

"Make that two of us," Ted replied.

Oh, oh. I see Mike coming out of the Sumter's house. I held my finger to my lips and Mike nodded, so I pointed to my watch, held up five fingers, then went in the house as noisily as I could. The interesting discussion came to an end. I'd have liked to hear more. Maybe later.

\* \* \*

It was a couple of weeks after Easter that we were ready to turn Theo de Groot on. We finished the circuitry and initial tests on a Wednesday night. Ted said, "Bring him in Jim's bedroom and hook him up to Brenda with the Cat5, and plug in a USB keyboard. When you turn him on, hit F12 and choose Network Boot."

Dad said, "It's kind of late ..."

Ted interrupted, "Yes, but Brenda and I can do all the setup overnight and then tomorrow we can try the knowledge transfer and the vocal simulation so he sounds like Jan."

"OK, Dad said."

The bootup was done in a couple of minutes and Ted said "Things will be quiet now. Thanks for being patient. You can all sleep now."

By Friday night, the setup stage was complete. Ted and Brenda said that Theo would probably need some time to develop his personality, and conversation would help. So on Saturday morning Dad got out the car and was about to pick up Theo to put him in the back seat – he was a bit smaller than me, about a metre and a half tall. But Theo said, "Let me watch Jim get in the car and I will learn how."

So that's what we did. Theo was a bit awkward and slow, but he got in OK. Learning the seat belt was a bit more difficult because he couldn't bend

his head to see the socket for the tongue of the belt fitting. Dad had to help with that, but Theo had some haptic sensors – a fancy term for something sort of like touch – and managed to undo the belt when we got to Julie’s. However, the car door was a bit awkward for him. Theo said it would take some practice, but that he’d do it with Joe and Julie later. Joe would like a van, which would be easier to get Julie in and out of, but they make do with a small car. Theo will probably be a help with that once he learns how.

Anyway, he didn’t have any trouble getting into their apartment and I guess Ted had provided images of Joe and Julie, because Theo said hello to them each right away. Julie was pretty excited. We had tea and cookies and Theo explored the apartment and asked some questions.

“It will take me some time to learn how to do different things, but don’t be afraid to ask, or to tell me if I’m not doing things correctly,” he said.

Dad and I had some things we wanted to do that weren’t robot related, so we took off after we’d finished our tea. We wanted to shop for a birthday present for Mom. Dad told me he thought that the last few months had been pretty difficult for her, and wondered if I had any ideas what she might like. As if a twelve-year-old would know what grown ladies like. Still, as we drove to the shopping mall, I said, “Maybe since she plans to do office management for different people and then working with Brenda to get the work done, she needs a bag that will hold a tablet or a small laptop. But I think she’d like something that looks like an attractive purse rather than a briefcase.”

Dad replied “That’s a great suggestion. On top of which I found a neat little laptop that wasn’t working at the school. The IT guys said they were disposing of it, but I asked – in writing – if I could have it to tear apart. And all it needs is a new power jack, though I couldn’t get the right type. I verified it would work by supplying power when the case was opened. There’s about 20 different power jack types it seems. So I ordered both parts of a different sized connector on Amazon. It will be fiddly to get it changed over, but I think we can do it.”

So we went to the mall and found a nice purse – real leather – that was big enough for the small laptop but not humungous. There was plenty of room for other things, so we put in some special dark chocolate Mom loves.

When it came time to give her the present, I could tell she really liked what we’d got her. Sometimes parents do the big act that they like their gifts, but this time I knew she really did like it.

\* \* \*

It turned out to be a while before we got back to discussing what I learned is called theology and philosophy. Schoolwork took up a lot of my time, and Mom and Dad – and Ted and Brenda backed them up – insisted

I keep up with friends and get out a bit. I was also doing assembly work on Theo de Groot and on BTL2 and BTL3. We kept getting better ideas so that the little robots were tidier and moved more smoothly with less energy consumption.

BTL3 was really helpful in dealing with Jeff Miller at school. He was the class bully, but he was clever and didn't get caught. I thought he'd fooled the teachers, but after the fuss and upset that I'll tell you about had blown over, Dad told me he'd heard via the grape-vine that the teachers were wondering how to deal with him. They couldn't act without solid evidence, and his parents were apparently big shots in town who were known for throwing their weight around. Like parents, like kid, I guess.

Anyway, Jeff and some cronies he hung around with used to pick on different kids. "Accidentally" body check them into the wall, or hold the door closed so they couldn't get through until they gave up some of their lunch money. Nothing really obvious.

They didn't target me, at least not until sometime in March. They knew Dad was a teacher, even though he was at the High School, and probably that gave me some protection. However, this one morning Jeff shouldered me into the lockers. "Gee. Didn't see you there Jimmy. Sooo sorry."

This was said in such a fake voice, that it was obvious he wasn't. And people called me Jim, not Jimmy, so that was another sign. I was on my way to class, so I just straightened up and went on my way quickly.

That night, I asked Ted how he thought I should deal with Jeff.

"Bullies are always a problem, because there's the implied threat of bad consequences to either challenging them or reporting them. However, until they are successfully challenged, they rarely cease tormenting people."

"So should I try to get together enough people to push them into the wall?" I asked.

"Violence, unless sanctioned by authority, is a slippery slope," Ted said. "There's a danger the bullied become the bullies."

"So we just try to stay out the way and otherwise do nothing?" I said, as much as a statement as a question.

"No. But perhaps you should have BTL3 with you all the time, turned on in standby mode. And keep him charged well. Sorry, I call BTL3 "he", even though he doesn't have a lot of computational or neural net hardware, and no personality chips."

"What are you thinking?" I asked, intrigued.

"I'm not decided, but the BTLs all have audio and video, so they can serve to gather information and evidence. And they can scuttle into small places. You'll need to set up your phone as a wifi access point so Brenda and I can keep watch. Unless, of course, we can access him through the school wifi. Hmm. Let Bed – I mean Brenda – and I look into that, but activate

your 'phone wifi. And make sure you keep that phone charged. Remember that we got you an external battery." They'd ordered me a 10000 mAh power bank. mAh means milliAmp hours. 10000 implies it can output 10 amps for an hour. Pretty impressive.

It was about 3 days later – a Friday morning – and Mike and I were helping Julie through the door and going to accompany her as far as her classroom. Jeff and two of his gang were lolling against the lockers.

"Well, if it isn't Jimmy and Julie and Mikey. Jimmy can't like dancing, 'cause he has a girlfriend who can't dance. But I bet she can break the corridor speed limit."

Jeff shouldered me aside, and grabbed the handles of the wheelchair. Julie said "No, don't!" and looked very panicked. But before Jeff could start to push, the loudspeaker system came on at full volume with Jeff's voice saying

"Well, if it isn't Jimmy and Julie and Mikey. Jimmy can't like dancing, 'cause he has a girlfriend who can't dance. But I bet she can break the corridor speed limit."

Suddenly two teachers appeared out of two different classrooms. Jeff just stood there with his mouth open.

One of the teachers, Mrs. Schumann, yelled "Miller. Principal's office. NOW! And you too, Jamieson and, er, Chang isn't it."

"Yes, Mrs. Schumann", Jack Chang said.

"I only know Julie of you three yet," Mrs. Schumann said, addressing us, "but I assume you are Jim and Mike. Can you tell me which is which?"

"I'm James Knox and this is Mike Sumter," I said.

"Well, I'll make a note of your classrooms and you can go. I don't want you to have to be in the Principal's office with those others. Let me send a message down there. Andrew, can you take a message for me to the Principal's office?"

One of her students came forward. Mrs. Schumann went back in the classroom and wrote a message. It took her a minute or so, then she gave it to Andrew and he went off. Mrs. Schumann said, "You'd better be going to class. I meant you to go when I started to write the message. We'll probably be seeing each other later when the Principal figures out what was going on, but I'm pretty certain that you are the victims here, though there'll surely be some fuss about how Miller's voice got on the PA system."

We mumbled thanks and went to class. We were in fact a bit late, but with Jeff's voice over the loudspeakers, our teacher simply said "Oh. There you are. Please sit down and we'll get started."

Mike and I got a note later in the morning asking us to see the Principal at lunchtime, and said we could bring our lunch. I assume Julie got a note too. When we got to the Principal's office Mr. Thielen was smiling and had

some chocolate milk on a tray.

“Did you bring your lunches? I thought you might like some chocolate milk.”

We mumbled our thanks as Mr. Thielen passed a milk carton to Julie. Then he said, “We’ve still not figured out how Jeff Miller’s voice got on the loudspeaker system, but it does seem to have effectively stopped him from pushing Julie down the corridor, and nobody got hurt, for which I think we may all be glad.”

He paused and looked at us, then said, “Am I correct in thinking that Miller and his friends have been bullying students.”

Julie spoke up. “Until today, he left me alone, but I know he’s been mean to some other students and made them give them their lunch money or things like that.”

“That was what I was beginning to suspect, but we had nothing explicit. Since everyone heard Jeff threatening you, we now can act in his case. I’m hoping that reading the riot act to the others – who I think are camp followers if you like – that the bullying will stop. Were you other two bullied.”

I said “Up to yesterday, no. But he "accidentally on purpose" body checked me into the wall yesterday afternoon. I think he kind of did that to a lot of people.”

“He made me give him my lunch money every Tuesday,” Mike said in a small voice.

“How long has that been going on?” Mr. Thielen asked.

“Since September.”

“Oh my. That is not good. I will have to insist Miller gives restitution to all his victims, which won’t be easy to arrange.”

Mr. Thielen then changed the subject to how we were doing in school. He didn’t say anything about how Jeff’s voice got transmitted over the loudspeakers. Probably he didn’t know yet, but I saw a van from an Internet company in the parking lot and two guys poking around the school office computers as we left the Principal’s office.

\* \* \*

After supper, Dad said we’d better talk to Ted and Brenda about what happened today. As we came into my room, Brenda said, “There you are. We were wondering what happened after Miller threatened Julie and we wanted to find out.”

“I was hoping you’d tell me,” Dad said.

“Well,” Ted answered, “Jim and his friends were being bullied by Jeff Miller, so I told him to take BTL3 along and leave him turned on. We wanted to make sure anything that happened would be recorded. As it turned out,

BTL was only able to capture audio – he was stuck at the top of Jim’s backpack. But Brenda and I realized that broadcasting Miller’s nasty words would probably be enough to stop the bullying. And, indeed, stop it without resort to violence or at least force.”

Dad smiled. “Yes, it did avoid any physical nastiness. But didn’t you have to hack the School’s PA system?”

Brenda jumped in, “It’s hardly hacking if they don’t change the admin password from the default. The default which, I should add, is on the manufacturers website, and that website is displayed if you simply look up the School and choose "Administration" and "Communications". The company wants their name spread around so much they insist that there be a link on customers’ pages.”

Dad said, “The School Board IT guys aren’t very competent at security. I’m a teacher, so I’m not supposed to be involved, but Mr. Thielen has asked me to take a look quietly and let him know if the revised security is adequate and to let him know how I think Miller’s voice got transmitted. Since a lot of kids have cell phones, and quite a few have been victimized, I don’t think there’ll be much attention to precisely who relayed Jeff’s words. And not changing the default password is likely a firing matter for the IT guys if it gets out. I’ll keep quiet about that, but hint that a common way these things happen is that passwords are left unchanged, and offer assistance if they want. It might help avoid having one of them lock down everything. They sometimes seem to think the only security is to turn everything off and treat the equipment as a set of statues. We don’t want that, but we do want it reasonably secure.”

I guess Dad had crossed swords with these guys before. Anyway he finished by saying “Well, it was a quick move and it stopped what could have been really bad for Julie. Thanks guys. I’ll let Jim tell you about his day.”

“You’re welcome. Sorry we couldn’t confer with you before acting,” Ted said.

\* \* \*

Later that night I was in bed, or on Bed I suppose and couldn’t get to sleep right away.

“Brenda,” I whispered, “Do you and Ted consider yourselves people?”

Brenda whispered back “Why don’t you put on the EEG hat and the earphones, then we can talk without making any noise?”

I’d forgotten the EEG helmet.

A month or so before, this sort of toque was delivered that had a cable to a small connector box, then a USB 3 cable which I could plug into Brenda’s

headboard. Ted and Brenda had asked me to think of talking while wearing the helmet and reading some selected sentences. They were able to decode my think-talking. They grumbled a bit about the computational cost of signal processing, but by ordering something they called a GPU box for Brenda, which I installed in the headboard, they overcame this problem. One annoyance for me was that I had to drill a lot of holes in the panel of the headboard where this box was installed. Apparently doing all the computations was hot work for Brenda. We even put a fan behind one set of holes, and some holes in the back of the headboard. I'd worried about dust, and suggested a dust filter.

Brenda had asked "How will you fix that?"

I'd responded, "Dad wanted a filter on the heating register in the kitchen. It's in the wall there for some reason, and he didn't want any dust blowing where it might get in food. So he found some plastic U channel, probably at Home Depot or one of the other places. Then we screwed two pieces of this to the register. You can get some fairly rigid foam filter stuff that usually people put behind the register, but Dad wanted it to be easily replaced or cleaned. There's some of the U channel in the garage still, and some of the filter board downstairs."

"I am finding our practical knowledge is not really as good as Jim's," Ted admitted. "He can think of using objects and materials in ways that are not their usual application."

"Dad says it's called lateral thinking," I explained. "I think Dad is particularly good at it, but I'm trying to copy him."

"I think the word is 'emulate'," Ted said. "You don't exactly do the same things he does, but mimic the process."

Yes, Ted and Brenda were better with words and that kind of knowledge. In any event, I put on the hat and also put some earbuds in my ears – the surround phones weren't comfortable with the EEG hat.

"Just think that you're speaking, nice and clearly, and it will be like you are talking to us," Brenda said.

I thought clearly, "Are you here too, Ted?"

In the earphones I heard, "Of course. The EEG hat works well if you think you are talking and formulate your words carefully."

"Well, as I asked, do you two think you are people?"

Ted replied, "It rather depends on the definition of people, or persons. We definitely believe we are sentient – that is, we think. We've said that in conversations before. And we believe we can express ideas, and act. Moreover, we can do these things according to some moral precepts, that is, rules or principles. So in many ways we behave like people. But we're not human in the sense that we aren't equivalent biologically. We don't have the same needs or responses to food, or sights, sounds, smells and tastes. That's be-



cause of our construction and design, of course. But today we showed that we can behave in ways that are very similar to human behaviour and that can be for the good of our friends.”

“Yes. You’ve shown that you are good friends and try to help us. I hate to think what could have happened to Julie today.”

“Was Miller partly right in saying she was your girlfriend?” Brenda asked. “Ted and I don’t have the hormones and biology to understand human gender very well, even though we’ve obviously selected our identities along those lines.”

This was awkward! Up to now in school, girls were ... well, girls! I didn’t expect them to be a part of the ‘real’ life I shared with other boys. However, in the past year, I’d started to notice girls a bit more. I couldn’t really explain it. I knew some basic stuff about men and women and babies, though some of it seemed kind of icky. But Brenda had possibly picked up on my feelings for Julie. I really liked her as a friend, and I was sort of curious about some things that I really couldn’t ask her about.

“You’re not making any sense, Jim. Try to think of talking more clearly,” Ted said.

Ooops.

“She’s not like a “going steady” girlfriend, but she’s a friend and I like her as a girl. She’s special to me somehow I’m not quite able to put into words.”

“And if she were a boy?” Brenda asked.

“I dunno. Maybe I wouldn’t be as interested in spending time with her.”

I wanted to change the topic, so I returned to the “people” question.

“Do you guys know the Star Trek TV programs?”

“I’ve reviewed some of them. I’m not sure I really appreciate the futuristic outlook. And some of the ideas like communicators are already superceded by smart phones.”

Clearly Ted wasn’t impressed, but Brenda picked up on my line of thinking.

“You’re thinking about Mr. Data and how the other members of the Enterprise crew come to accept him as one of them. Is that what you want to ask?”

“Yes. That’s what I was thinking.”

“It’s probably reasonably close to what we “feel”, if we’re considered to have feelings.” Brenda said.

“It seems to me that you do react as if you have feelings. Perhaps not as ... I don’t know what the word is for going up and down ... ”

““Volatile” might be the word you want,” Ted volunteered. I was not quite sure of its meaning, but I’d heard it used for people who had a hot temper.

“Probably,” I thought-said.

“I know Jan added some gate arrays to provide for emotions, but I think he wanted us to express a good deal of stability, so he down-weighted the neurons that might lead to more extreme expression of ideas,” Brenda said.

“You have more of those than I do,” Ted said, obviously to Brenda.

I wanted to ask about some other things.

“What about ideas like beauty or happiness?”

“Tricky territory,” Ted responded. “It’s not clear how to explain such things even within human society. Remember “Beauty is in the eye of the beholder.”

Brenda jumped in. “Strictly quoted first in that form in 1878 by Margaret Wolfe Hungerford in her book **Molly Bawn**, but many similar expressions have been around at least since the Greeks in the third century before Christ.”

“Since you mention Christ, I overheard you talking to Mom about God?” I was getting into some difficult ideas here. “What do you guys believe?”

“Believe” is a tricky word,” Ted answered. “It’s a word that at its simplest means one accepts an argument, but most people load it with a lot more than that. But to answer your question, we are aware of the many religious faiths and persuasions, since we monitor a lot of the Internet. And the various attempts to prove the existence of a creator are part of what we’ve encountered. Though for my money, these amount to NOT being able to prove there is NOT a creator. That is, the existence of everything we are able to sense is consistent with a creator, but does not give that creator a form or definition.”

“Yeah. I’d agree with that. It gets a lot more awkward when people jump to giving that idea of a creator a personality, making the creator or creative force someone to ask for help or favours,” Brenda added. “You possibly overheard me say that to Joanne.”

“So you don’t think prayer is a good idea?”

Ted answered, “Well, I’ve not communicated with Brenda on that, or the idea of a creator who is involved with what has been created – that is, a personal God. But we know – you are demonstrating right now – that humans transmit brain waves. If prayer renders thoughts coherent and somehow focused on a particular goal, and if many people do this, it isn’t impossible that there is an influence on decisions. And in the case of illnesses, we know how powerful the placebo effect is, so perhaps prayers can influence some outcomes in that way. And, of course, Brenda and I have not rendered any decision about a personal God. Our knowledge is, as yet, incomplete. But many people find calm consideration of their situation and life is worthwhile. Meditation seems to have a very positive role in many people’s lives. Whether that is prayer or not, I’m sure one can get plenty of arguments. I find the

ferocity displayed by so many people who claim to have strong religious beliefs very unsettling because it just doesn't make sense to me. And it so often leads to very bad behaviour and a lot of harm to many who just want to get on with peaceful and productive living."

"Maybe it's time for me to switch off – I mean go to sleep," I said.

"Yes, it's getting well past your usual bedtime," Brenda concluded.

\* \* \*

Around Easter I was over at Julie's to pick up some computer bits. We'd decided to keep their address for deliveries, as it avoided confusion for suppliers.

"I'll make some tea," Theo said.

Julie said, "He's very social, and with Grandma and my aunts, he's got used to making tea and bringing biscuits – he won't say cookies – even though he doesn't eat or drink, of course."

"Still, it's kind of nice," I said, and meant it.

"Yes, I like it too." Julie said, then paused and added, "Jim, Can I ask you about something?"

"Sure." I hadn't any idea what she wanted to know.

"Well, you know that my Mom left us a few years ago. She and Dad got a divorce that was finalized last summer actually."

She stopped. I waited. Then she said, "I'm wondering how I can talk to him about, you know, meeting someone else. I don't really want or need a step-mom, but I think Dad needs to have someone he can share some time with. He does so much for me, but at some point he should think of himself a little."

"Have you told him that?"

"It's kind of awkward – the Awkward Arkwrights! I don't want him to think I'm pushing him away."

"With Ted and Brenda, I've noticed they get ideas across to me by asking questions. Maybe ask him if he'd like some time for himself or to go out on a date."

"That's sort of what Granny said when I talked to her last week. So having two opinions that are more or less the same, I'll ask him when I get the chance."

\* \* \*

While I think Julie did let Joe know that she would be OK with him going out on a date, it was Theo, along with a bit of initiative from Julie,

who managed to find Joe a girlfriend. Of course, it wasn't quite as that sounds.

On Easter Monday, which is a holiday for some people but not others, Joe and Julie decided to go out to a Chinese restaurant for dinner. Theo went along, since he can help Julie with doors and moving chairs out the way etc. They were greeted by Sharon, who was acting as manager and waitress and practically all the other jobs except cook. Her parents owned the restaurant, but she mainly worked for an accounting firm, preparing tax returns and things like that. This Easter weekend she'd told her parents that she and her brother would cover the restaurant and they should have a holiday for 4 days, two of which the restaurant would close anyway.

"Hi folks. Wow! You have a robot to help you. Neat idea."

"Thank you," said Theo.

"Oh. He talks."

"Yes. Theo can understand commands and is able to recognize some situations where I'll need help," Julie explained.

"Neat. How about this table? I'll move this chair away."

So Joe and Julie ordered a meal and Theo stood quietly next to Julie. But when Sharon came to serve one of the dishes, Theo said, "My battery is a bit low. Would you mind if I plugged myself into this socket in the wall here?"

Sharon was really surprised, "Uh. No. Go ahead."

Later, as they were getting the bill, Sharon said, "It really surprised me how your robot knew how to politely ask if he could recharge. It must be quite interesting to have him to help."

"Oh yes," Julie said, then got an idea. "If you'd like to see more of what Theo is capable of, why not come for tea sometime."

"That would be really cool. But is that OK with – er – your Dad?"

"Yes, fine," Joe said. "How about Thursday. Around 7 or 7:30."

"Yes, I should be recovered then from this weekend."

So they exchanged contact information and arranged for Sharon to come on the Thursday. In the course of that evening, Sharon learned how Julie's Mom had – Ted uses the word "decamped", which sounds stronger than just "left". Joe and Julie learned that Sharon had been married very young in what was almost an arranged marriage to an older guy. That fell apart when it turned out he had another woman in Hong Kong. She'd then gone back to school and got her accounting qualifications. It turned out she wasn't much younger than Joe.

A couple of weeks later, Sharon called Julie.

"Julie, I've a bit of a social problem that maybe your Dad can help with, but I thought I should ask you first."

"Oh. Better tell me about it."

“There’s a family wedding. My cousin is marrying into an Italian-Canadian family. There’ll be lots of people from both sides. But I’m a bit afraid that I’ll get asked all sorts of probing questions about a boyfriend. I think you can probably guess what I mean. I was wondering if you think Joe would be willing to go with me as my date. If he needs a suit, I’ll pay to rent him one. But he doesn’t need a tux or anything like that, and we don’t have to stay late.”

Sharon was rushing what she said. It was clear she was nervous.

“Well. I can’t speak for Dad, but I think it would be good for him to get out. He hasn’t been on a date at all since Mom left, not even since the divorce came through, and I’ve been trying to get him to think about it.”

“Whew. I was worried you might object. You know – interfering other woman. Um. When would be a good time to call him?”

So Joe ended up going to the wedding, and he and Sharon found they liked each other’s company. Julie said that their "dates" were pretty funny, because she and Theo were usually dragged along. Perhaps that helped, because everyone could just be themselves.

After about the fourth or fifth time Joe and Sharon had been out together, with or without Julie and Theo, Julie asked Theo “Did your battery really need charging in the restaurant?”

“Actually no. But I remembered some movie scenes where small attention-getting actions that could be interpreted in several ways led to interaction between the characters. I had no firm knowledge that Sharon would react, but I didn’t see that there could be any harm in what I asked.”

Clever Theo.

\* \* \*

After BTL3 had been so helpful in stopping the bullying by Jeff Miller, Brenda asked if I’d put him in by backpack all the time. She found she could learn a lot about the world outside our house if we set up the little robot so his camera was able to watch from the top of my backpack. Given our conversations about privacy, we worked out some rules. Now that Jeff had been dealt with, we arranged that BTL3 was not watching or listening while I was in school. What Brenda really liked was when I was riding my bike. BTL3 was able to look backwards and see the passing panorama.

This meant my phone had to act as a wifi hot-spot, so I needed to keep it well-charged. Brenda soon got to know the neighbourhood, that is, the neighbourhood beyond the range of the little drones.

This turned out to be pretty useful. In fact important.

The first example was when I went to Julie’s via an electronic store where Ted wanted me to get some small parts. This took me down a street I didn’t

normally use. In the middle of the block, a kid was walking a large dog. Or more correctly, the dog was dragging the kid. As I went by, the dog went nuts barking and jerked away from the kid. Now I don't know if the dog was vicious or not, but I sure didn't want to find out. I tried to pedal faster to outrun it, but it was pretty clear to me that wasn't working when the dog suddenly yelped and turned back.

"Whew. I'm glad that worked," I heard Brenda's voice.

Knowing she was listening, I said, "What worked?"

"I transmitted a 25 kilohertz sound at the maximum volume through BTS3's speaker. It's frequency response at that high pitch isn't very good, but it seems it was good enough to cause the dog to back off."

"You mean like a dog-whistle, so high pitched I can't hear it?"

"Of course. Why else would I do it?"

Brenda could be as bad as Ted sometimes in assuming I knew lots.

The really important thing, though, happened a few weeks later, and pretty well on the anniversary of Jan's unfortunate death.

I was riding down Humber Street, which isn't really a main drag, but gets some traffic. Suddenly Brenda's voice says quite loudly

"Jim! Get to the side and off the road. NOW!"

I was about to ask why, but starting to move to the right when something hit the corner of my backpack and I was sent over the curb and fell onto the grass, which was pretty long just there. That was fortunate, because I only got my pants and cuffs dirty and a couple of bruises. I looked up to see a car crash into the back of a parked van with a really loud bang.

It seemed that the car mirror had hit my backpack. BTL3 would need a new leg, and I had to straighten out my handlebars, but it didn't seem like the front rim was bent.

"Thanks Brenda," I gasped.

"If Jan had had BTL3, he might still be here. I'm glad you started to turn when I asked you to."

I started to feel a bit queasy. If I'd not turned, I'd have been creamed by the car, which was really moving. A cop car was, in fact, already following the car, which was an old 1970's monster. It seemed the driver was an elderly man who had had to turn in his license, but still had the car. He had forgotten that his license was revoked – the forgetfulness was the reason. And he had lost the ability to judge speed and distance and where there might be obstacles. It was pretty sad, but not so sad as if I'd been hit directly.

Dad showed up in a few minutes. Brenda said she'd called him. In my shock, I might have decided to simply go home, but it's probably better that I did get checked out by the paramedics and later by our family doctor. Dad says it isn't smart to ignore the possibility of real injury. And Dad asked for a copy of the accident report and for information on the old man's

insurance. There's some worry that the car was no longer insured, since he wasn't supposed to drive it. However, Dad has learned that the man owns a house and there's generally liability insurance. When we talked later, Dad said we needed to make some claim for fixing BTL3, and for cleaning or replacing my clothes. When she checked, Mom said there was a rip in the knee of my jeans where they got grass stains.

For a day or so, I thought there was too much fuss. Then when I was about to go to sleep, Brenda said "I'm really glad I was watching. I don't think I could deal with losing both you and Jan a year apart."

Then Ted added "Me too."

Somehow, probably Brenda had patched them across the network, Theo and Hi also joined in with "Us too."

J C Nash ©2018-07-16