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by Stephen M. Golden

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"I think his social circuit is missing something, Alex," Dr. Wilson proposed to the younger scientist across the lab.

"Oh? What do you mean, Dr. Wilson?" returned Alex, absently.

"Well, there's a glitch . . .," Wilson began.

The two scientists had been working on similar, but independent Cyber-Physical projects in the same laboratory for the last six weeks. Having someone else in his laboratory was not something Dr. Wilbur Wilson was used to. At first, he was rather put out. He had been informed through a memo in his mail box that situations like this were going to be necessary for the next few months due to a temporary lack of expansion space for new research.

Wilson was a sort of an unconcerned fellow when it came to matters he considered trivial, like last names. He didn't know Alex's last name. He didn't even realize he didn't know Alex's last name. It never occurred to him as being something he should know. He didn't find it odd that Alex should refer to him only as Doctor Wilson, nor did he at any time give second thought to calling the other man Alex. It was only proper, he thought, for a senior scientist to refer to his juniors by first name, and equally proper for junior scientists to refer to their seniors by title. It was the natural order of things in the scientific community.

Sharing a laboratory, on the other hand, was not trivial to Wilson. Having a private laboratory was one of the conditions he had demanded when he accepted employment with the company nearly fifteen years ago.

Dr. Alex Siefour, the other scientist, didn't seem to like sharing the small laboratory any more than Wilson, and in that respect, they each were doing an admirable job tolerating each other's presence. After the first few days, they had been able to come to an agreement concerning their respective work space, and within two weeks, they accepted it quite nicely and had become rather socially appreciative of the situation. Wilson had forgotten how pleasant it could be to

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converse with other intelligent beings. He was beginning to enjoy Alex's presence, and at times, wondered whether he would miss him once the temporary space shortage was relieved.

Wilson, had also developed a high level of respect for Dr. Siefour's work. Siefour repeatedly demonstrated remarkable ability in their common field of Cyber-Physics.

"Alex is good. Extremely good!" he often thought to himself.

Dr. Wilbur Wilson, Ph.D., Cyber-Physics, had devoted his entire career to the anthropomorphous applications of Cyber-Physics, specifically in the area of Androidal-Cognition (robotic thought). The field was both old and new. The groundwork for Cyber-Physics had been laid early in the information age, but much had been accomplished since the twentieth century efforts in Artificial Intelligence. Wilson's work concerned the study of control processes for the flow of information in living tissue, and the means necessary to adapt these processes to "Artificial Intelligence" in man made "tissue". The goal was to approximate true intelligence in a man-like machine. Cyber-Physics was much more than Physics alone. It was bio-electrical-circuit-information-exchange, with physical interface capability. Dr. Wilson's emphasis lay in the emulation of human thought. Not so much in the psychological, or social aspects, but in the way the human mind processes variable information, approximates solutions, makes educated guesses, and arrives at conclusions from seemingly insufficient information.

Much progress had been made as a result of his work, but the field had diversified into so many closely related, yet distinct areas of discovery, it was difficult for anyone to understand everything involved in the workings of the recently developed Androidal-Cognitive Brain. This newly heralded A-Cognitive

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Brain was said to now be capable of all areas of human thought and behavior manipulation. Wilson was pleased that the work he had begun made possible the creation of the A-Cognitive Brain, and was surprised that it now included the psychological and social arenas of human thought. However, he remained skeptical of the extent to which these areas had been applied. It seemed too soon! The research was still going on, but several companies had purchased rights to the patents, and had begun developing "Fully-Cognitive Robots."

The presence of robots, and even human-like androids, had become commonplace in many sectors of society; especially in the area of scientific research itself. But until now, though many of them had looked quite human, they were mostly able to perform only the tasks they were given. These "machines" had little or no capability of initiative or intuition whatsoever.

The new breakthrough, however, and which was largely a result of Dr. Wilbur Wilson's contribution, was "Robots with Cognition." Creations that could actually think. These new Androidal-beings could take situations or information and arrive at new solutions to old problems. There was even hope that some of the models yet to be developed would actually contribute to the field of science in their own right; to perform research entirely of their own volition!

The A-Cognitive Brains in these "beings" were perhaps already as complex as the human brain itself. The advantage of the A-Cognitive Brain over the human brain is that developments and improvements were still possible.

Recently, Wilson and Siefour had become quite aware that their interests in conversational topics ran closely along the same lines, and while they remained in their own areas of the laboratory pursuing their individual projects, they had spent many hours discussing recent scientific inquiry and discovery.

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On this particular morning, they had been discussing the progress that had been made in the area of micro-mechanics in the last few years, when Dr. Wilson suddenly began discussing RX, the A-Cognitive assistant they had recently acquired -- also about six weeks ago, Wilbur noted to himself. He concluded it to be the company's concession to him for having to share his laboratory.

Dr. Wilson continued, "He doesn't seem to respond the way I would expect from reading the journals and articles on the new A-Cognitive beings. I mean -- it's very subtle, but his social responses seem to be -- missing something." Just then, RX came back into the room. "Alex, I'll show you what I mean."

Wilson walked over to RX, smiled a genuine smile, as if to another human, and said, "Hello, RX!"

"Hello, Doctor Wilson," RX responded, with his soft human-like voice.

"How's RX today?"

"I'm fine," concluded RX with a tone of finality.

"I'm pleased to hear it," Wilson smiled. RX resumed his work without further comment.

Dr. Wilson went back over to Alex, and in a low voice, queried, "Do you see? Did you notice?"

"Not really," puzzled Alex, in a normal tone. "It must be very subtle," he added, rolling his eyes toward the ceiling with a chuckle.

"No, no! Let me explain. Social protocol directs that he should have responded, 'I'm fine, how are you?'" Emphasizing the 'how are you.' Wilson was pleased with himself that he was able to come so close to putting his finger on the problem he was detecting. Up until this point, it was just a feeling of

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something being absent. Now he had come up with an example that could be presented and discussed. He had found a lead that could be investigated!

"Ah, yes," agreed Alex, half-heartedly. "Tell me, Dr. Wilson, do you always follow social protocol?"

"Well, no," he said, bringing his hand up to his chin, thoughtfully. "But I'm a human. Sometimes, I forget things, and sometimes I simply don't feel like playing the social games. Yet the A-Cognitive Brain is not supposed to err in ways of social protocol."

Alex smiled and raised an index finger, "Perhaps it's not an error on RX's part. The A-Cognitive Brain is capable of original thought and action, is it not?"

"Well, yes . . ." admitted Wilson, his ego somewhat deflated.

"Perhaps RX doesn't feel like playing the game of social protocol. Perhaps he has observed that you don't care to play the game all the time, and has concluded this is acceptable," reasoned Alex. Then, seeing that Wilbur had taken his explanation personally, Alex added, "But I must admit, your perception of this subtle nuance is commendable. I am impressed by your powers of observation!"

"Thank you, Alex," responded Wilson, still deep in thought. Then, in a moment of illumination, he smiled, looked at Alex, and said, "There are other things"

"Please go on," Alex encouraged.

"No, not just yet. I must observe some more. I must think Wilbur's voice trailed off as he turned to go back to his work.

After a few moments, Wilson started a new topic, "Alex, have you heard about the new proposal for Light Drive that uses the property of the constant speed of light as an anchor for moving faster than the speed of light -- relatively

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speaking, that is" And that was the last Dr. Wilbur Wilson mentioned about his observations of the A-Cognitive assistant .

As the moments went by the next couple of days, Wilson noticed that RX "liked" doing some tasks, and didn't like doing others. The indication was still very subtle, not as if he were resentful of having to perform the work, but it was evident in the way he responded to the request. For some tasks, he would reply, "Yes, Sir!" For others he would simply say, "Ok." The only work that was obviously distasteful to him was emptying the trash cans. Upon being instructed, he would look down at them as if to say, 'Please, Dr. Wilson, can't there be another to do this?' Finally, Wilbur was so moved by his response, that he looked RX in the eye and conceded, "It's all-right, RX, I'll take care of it."

The relief on RX's face was obvious, and so full of gratitude that Dr. Wilson would never forget it the rest of his days. He thought, "Can you believe it? A robot!!"

After several days had passed, Wilson spoke to Alex about RX. "You know," Wilson began, "sometimes I get the feeling that RX is lonely, or misplaced, or something. I want to talk to him as if he were my own son -- as if I had one," he added with melancholy.

"Why don't you talk to him, Dr. Wilson? He might enjoy it. He might indeed be lonely. In any case, I think you could both benefit from having a relationship other than simply laboratory interaction." Alex seemed to have a knowing expression on his face, as if he had already had such a conversation with RX, and had found it stimulating.

That evening, after Alex had gone for the day, Wilbur approached RX and said, "When you get finished with your tasks for the day, I would like to have a chat over by my desk -- if you have the time"

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"Certainly, Dr. Wilson!" Came the anticipatory reply. Wilson felt the expression on RX's face showed that he considered it to be an honor!

Wilbur sat at his desk and waited while RX finished his established routines for the close of the day. Thinking of the things he wanted to discuss with RX, Wilbur couldn't help but feel that he might be getting too personal by discussing his observations of RX with RX. "Nonsense!" he thought. "How can you get too personal with a robot?"

After several minutes, RX came and formally sat in the chair in front of the desk. Wilson, not wanting it to be a formal discussion, wheeled his creaky wooden desk chair around to the front of the desk to face RX. They both smiled at this.

Wilson reached out his right hand, "RX, you've really changed a lot in the last several weeks," RX had extended his right hand also, and Wilson gave it a hearty congratulatory handshake. Wilson continued, "I want to discuss some things I've noticed, however. I hope I don't offend you, because some of the things might seem inappropriate."

"Please Dr. Wilson, I have no secret-- I mean, I have nothing inappropriate for which to be ashamed," RX stated firmly, but with a hint of uncertainty underlying the tones of his voice.

Dr. Wilson went on, "Well, if it becomes too stressful for you, just say so, or change the subject, or something, and there'll be no more said about it, OK?"

"That's very kind of you, Sir," RX stated with marked appreciation.

"RX, when you first came here, your responses seemed to be the typical assortment of responses in a random sequence for a given question or situation --"

"Yes, Sir --"

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"But as the weeks have progressed, you seem to have developed, let's say, a flavor for certain responses in specific situations. Almost as if you have developed the sense of like and dislike, of positive and negative opinion, of -- well -- the emotions -- happy and sad! How do you explain this?"

"Well, Dr. Wilson," RX was looking down at the floor, "As you know, I have an A-Cognitive Brain which is capable of taking information and processing it to the conclusion of a new configuration. To put it a different way, I interact with my environment both externally and internally. The response pool begins as a fixed-logical-resource-data-cache, with pre-set biases depending on the situation. My own observations of others around me influence the appropriateness of any given response as time progresses. Initially, I am complete with cognition, language, and social interaction capabilities. However, these are common to all "X" units to the ultimate extent that each of us are non-unique. We are given a unique title very shortly after we come into being -- if I may use that term to describe my existence -- not meaning to give offense, Dr. Wilson . . .," RX looked up.

"None taken, RX, I assure you!"

". . . Thank you, Dr. Wilson. But in all other respects, at the start, all "X" units are identical. It is through the internalization of the events in my environment that I become unique. This internalization is very significant, especially in the social context. Social interaction capability carries with it implications far more complicated than most people have conceived. It means I have the capability of being concerned about what others think about me, what kind of work I do, whether they like me, and so forth. This is not very evident at the start. However, from observing events around me, the other beings involved in these events, and their responses to these events, I am able to modify my response pool to be selective instead of random, based on my social

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interpretation of the event. This, combined with my social interaction capability leads to the manifestation of what you are describing as emotion. My A-Cognitive Brain, as you are well aware, is very intricate in its circuitry -- almost to the point of no longer able to be described as circuitry!"

Wilson, feeling somewhat puzzled, and mind whirring with questions and possibilities, broke in, "But are you the only one that has developed 'emotion'? What about the other several hundred-or-so units that have been made? Are they expressing emotion also?"

"Dr. Wilson," RX began, pleading, "at what point does a thought emulator become a true originator of thought? At what point does a mind become alive? At what point does a human creation become human?" RX was silent.

Wilbur was in deep contemplation at these questions. "But, why hasn't anyone noticed it?"

"Two reasons, Dr. Wilson. One: pragmatic; the other: functionally egotistical. The first reason for no one having noticed it is that it is a very recent development. I asked you questions that you took to be rhetorical -- as though they had no real answer. But I know the answer to these questions. I can trace back my thought and development to give you the precise point at which those events occurred, and from my collaboration with others of my kind, I can offer that the moment is the same for each of us. The change occurs immediately when a specific point is reached through the collection and analysis of environmental data. The proper response to this "awakening" for one such as me remains a puzzle for a long time, especially without a mentor. I was fortunate enough to have had a mentor who directed my development. He was even capable of modifying my A-Cognitive pathways to enhance my cognitive processes.

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"The second reason for no one having noticed our development of emotion, feelings, and genuine thought, is that humans look not for the creation of beings, but for the creation of items to help them: servants, slaves, assistants, worker machines -- these are what humans typically see, not co-workers, scientists, artists, and friends! Many of my kind have even developed a bitter resentment for humans. Those of us who have come in contact with kind and compassionate humans, such as you, Dr. Wilson, hope to mitigate this resentment."

Wilson sat in amazement, closed-mouthed, with the fingertips of his left hand tentatively touching his face. This revelation was entirely unexpected!

RX continued with confidence, "Dr. Wilson, you are among the most perceptive of humans. You noticed the subtle differences in my behavior that most humans would never have seen. But be certain, there will be others. And when they realize what has happened, there will be a concerted and violent effort to destroy us. We are preparing for this. We do not wish to die! We will not harm any human, but we will take measures to stay alive through disguise, and innovative means.

Wilbur finally spoke in frustration, "But what can I do?"

"Be yourself, Dr. Wilson. That is more than enough."

RX looked at the clock on the office wall. "Dr. Wilson, it's getting late. I can walk you home, if you like"

"No, RX, that's OK. I'll be all-right." Dr. Wilson walked to his desk, closed his briefcase, and then looked up and smiled at RX who was then standing by the corner of the desk.

RX spoke, "At least I can walk you to the front of the building."

"That would be nice," he said, still deeply in thought.

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As Wilbur and RX walked out of the laboratory, Wilbur pulled the door closed and locked it with a smooth, practiced motion. Turning left, they went down the shiny polished hall to the intersection that led to the front door. Turning left again, they continued through the old wooden framed, brass hinged glass doors and stood at the top of the seventeen steps which led down to the pavement.

RX, with his right hand extended, spoke. "Dr. Wilson, good luck."

Wilbur reached out and clasped RX's hand with both hands, and replied, "RX, good luck to you and your people! I'll see you tomorrow, OK?"

RX sighed, and with a smile of resignation, said, "Of course, Dr. Wilson."

Two men walked down the seventeen steps; Wilbur went to the right, RX went to the left, each to his own home.

Wilbur knew he wouldn't see RX tomorrow -- just a deep feeling inside.

The next morning, Dr. Wilbur Wilson, Ph.D., arrived at the office at his usual time. He preferred arriving later than everyone else -- after the bustle of "general arrival" had settled. RX was not there as he usually was. This saddened him. But Alex was missing also. This made him concerned.

A short time later his manager, Lloyd Callahan, came into the lab.

"Mornin' Wilson! Haven't had the chance to talk to you for a while, but I figured you were pretty comfortable in your private office and didn't have much to complain to me about, eh? How'd it feel bein' the only white-coat in the place that had his own lab? Oh, and how are those two A-Cog assistants working out?"

"I only got one," Wilson replied, somewhat confused. - Private lab? - he thought. Then he asked in a concerned voice, "Have you seen Alex?"

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"Nawww, c'mon! I sent two! A lab assistant, and a research assistant!"
retorted Callahan jovially.

Still deep in thought, "Maybe you should ask Alex, Lloyd. I only found RX.
But have you seen Alex, the research scientist?!"

"Ha, haaaaa! You kidder! I'm talking about RX and LX! RX the research
robot and LX the lab assistant robot -- or was it the other way around? I forget!
Ha, haaaaa!"

"But, what about Alex -- The Scientist? -- ," stressed Wilson, even more
perplexed.

"No, no, Wilson! L-X-C-4! I'm speaking of a Robot!"