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**SILICON**

**JUNGLE**

SHUMEET BALUJA

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**THE  
SILICON  
JUNGLE**

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A Novel of Deception,  
Power, and Internet Intrigue

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The characters, companies,  
and numbers are not real.

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Don't worry.

In nature we never see anything isolated, but everything in connection with something else which is before it, beside it, under it and over it.

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Johann Wolfgang von Goethe

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# Preface

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An interviewer once asked what the most interesting anecdotes and trends were that we'd uncovered with the data mining and user profiling system we had created. Fortunately, despite the meager amount of data we had at that time, there was still a tremendous amount of interesting material to draw upon. The discoveries about users and their online habits were always entertaining, sometimes awe-inspiring, and occasionally horrifying. Additionally, the process to uncover the findings was often illuminating in itself: equal parts technology, intuition, and black magic. There was certainly plenty of fodder for discussion. The interview, to this point, was going well.

The follow-up question by the same interviewer was what would happen if all of this information about our users was accidentally released and fell into the wrong hands? Silence. It was early in the Internet years, and everything was moving too fast—who had time to think about such things?

Almost a decade later, we find ourselves asking the same questions, still looking for answers. Now companies routinely watch and record our actions—while in grocery stores, online, or in shopping malls with our families. We trust these companies because they provide safety and convenience, and to not trust them would require too much effort. But the seemingly inconsequential bits of information we so readily surrender every day can be meticulously pieced together into a rich mosaic that reveals more about our habits, goals, and secret desires than we would dare share with even our closest friends.

In a post-9/11 world, perhaps it is not surprising that we are willing to reconsider how much privacy we are willing to forgo. It is important to remind ourselves that the technology, policies, and sheer enormity of the amount of personal data amassed about all of us is new. It's breathtaking. It's unexpected. All of us, those who are being watched and those who are watching us, are, quite literally, in uncharted territory. To address this, some organizations have adopted or created policies that mandate how all of this new sensitive information should be handled and who should be granted access to the information. But few organizations regulate how and what information will be merged together, what disparate bits of our lives will be combined to reveal the ever-finer details of who we are. Such decisions are often left to young, inexperienced employees. In the end, our faith must reside in *each* of the individuals that comprise the companies we implicitly trust—we must believe they will have the wisdom and courage to make the right decisions about topics that did not exist just a few years ago.

*The Silicon Jungle* examines what happens when the brilliance, immaturity, and unbridled enthusiasm of an intern, Stephen, is mixed with unfettered access to people's most private thoughts and actions. Stephen's blind idealism and overwhelming desire to impress render him oblivious to the severe consequences of his actions and make him an easy mark for those willing to exploit his naivety. The setting, a ubiquitous Internet company located in Silicon Valley, is chosen not only for the steady stream of innovative technology that consistently emanates from the area, but also for the prevalent maniacal pursuit of scientific immortality, "the next big thing," and, of course, unmatched material excesses.

A question that I am often asked is how much of this book is real. *This book is a work of fiction*. The events are fictional. The technology and science described are based in reality. The people are fictional. Their temptations are not. The justifications offered for the intrusions on people's private

are fictional. The ability, brains, and computational power to do so are not. Importantly, as to whether the companies described are real and whether any single company holds enough data to do all that described in this book, this I can answer definitively: The companies are not real. As far as I know, no single company holds all of the data described herein.

Like the meatpacking industry in Upton Sinclair's *The Jungle*, a new, rapidly burgeoning industry is laid open for your investigation. For anyone willing to peek behind the sleek streamlined services and offerings we take for granted on the Internet, a profound conflict will be uncovered between the intellect of the scientists and their latest inventions, and the very human limitations and frailties of the people who handle, consume, and trust the technology daily. I hope you will find the science and the possible discoveries truly exciting—the insights unearthed by large-scale data mining initiatives provide an understanding into individuals and groups of people that, prior to the last few years, was impossible. How this newfound ability is used is where trouble can begin.

Perhaps all of this leads us to a conclusion that we already intrinsically know: It's not technology or a newfound ability that should be labeled "good" or "bad," it's what we choose to do with the ability. Science and technology innovation will, and absolutely must, progress. It is up to the creators of new technologies to open our eyes to not only the mechanics of what can be done and how to do it, but also the limitations and dangers, as well as the beauty and excitement, of their creations.

I have encountered few places in the world that are using technology more effectively, directly, and for a more worthy cause than the *National Center for Missing and Exploited Children (NCMEC)*. Their efforts to rescue children and stop the spread of violent and hateful images exploiting children are exemplary. I am humbled and amazed at the work they do. For this reason, I am proud to support NCMEC and other non-profit organizations that espouse the use of technology to explicitly make the world a better place.

Peace,

Shumeet Baluja, Ph.D.

P.S. A note to my former interns: No, this book is *not* about you.

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**SILICON**

**JUNGLE**

*August 28, 2009. Present Day.*

“Is that your friend on TV, *baba*?”

He glanced up from the game they were playing to look at the news report flashing on the TV screen. He caught a glimpse of Sebastin’s face before it disappeared. It never ceased to astound him that his son, Adam, only six years old, could play checkers so well while paying such close attention to all that was going on around him.

“How do you know about him, Adam?”

“I heard you talking to *ummi* yesterday,” Adam replied with a mischievous grin. “You said you were going to see him.”

“You’re too clever, Adam. Yes, Sebastin was my very good friend. He answered our prayers.”

“What did he do?”

“He found our lost brothers. He found 5,000 of our lost brothers,” he responded. As he said the number aloud for the first time, he was overwhelmed again with his good fortune.

“Were they *really* lost?” Adam questioned with sincere concern.

He smiled as he reached over to Adam and pulled him into his arms. “Yes. They were *really* lost. They were so lost that they did not even know how lost they were. Can you imagine that?” With a flourish of his hand and a warm smile for his son, he said, “Now we can find them again.”

But Adam still looked worried. At six, worry was not hard to see; the child’s brow furrowed deeply and his face became unmistakably sad. “The TV says that he died today.”

He looked proudly at his son. He was always listening, always absorbing.

Adam stared down at his hands in his lap, and picked at his fingernails, a habit since birth. “Am I sad, *baba*?”

“Why, Adam? Why would that make me sad? It is God’s will. Why would I be sad that God has decided that it be so.” It pained him a great deal to use the word “God” with his son; everyone in his family had questioned his decision. But he had made it, and so it stood. He, too, would have liked to call God by His proper name, but it would be easier for Adam to grow up in America this way.

“*Baba*, did he know he was going to die?”

Thinking back to less than twelve hours earlier, concentrating on the still vivid memories of the few minutes in which the inevitability of his actions must have been apparent to Sebastin as well, he replied, “I believe he did, Adam.”

“I thought so.”

It amazed him how his son could say such things. “Now, let’s turn off the TV and finish playing,” he said as he freed Adam from his arms. “You are growing older, Adam. You know so much. This time, take care. I may not let you win.”

*January, 2009.*

“Stephen, report to Allison’s office immediately,” the intercom blared. Stephen automatically walked past the all-natural sodas, recycled paper products, and the latest lawn and composting supplies toward the back of the store. GreeneSmart, Silicon Valley’s humungous and freshly rebranded “Earth-aware all green” answer to large retailers like Walmart and Target, was about to open its shopping doors for the day. When it did, for Stephen, it would be more of the same—rushing to respond to the countless calls for computer, e-mail, printer, network, fax, and telephone support from every corner of the building.

He instinctively made his way to the door marked “Employees Only.” Crossing that threshold, the cold floors of the showroom were replaced with carpet that felt good under his feet. Hours of standing every day made him thankful for even the cheap stain-worn industrial carpet that had been laid years ago. He stopped at the open door to the inner HR office marked “Allison Glace” and walked in.

“Good morning, Mrs. Glace. What’s going on?” He sounded like a child when he spoke, and Allison knew it. He’d been doing that ever since he left SteelXchange.

“The usual. My keyboard isn’t working again,” Allison replied.

Stephen knew the problem before he began his investigation, and he strongly suspected she knew what the problem was, too. At least two or three times a month, Allison accidentally kicked the keyboard cable out from the back of the computer when she took off her shoes. The effect was that the computer stopped responding to any of her typing. It was an easy enough fix, and he’d told Allison numerous times how to plug the cable back in, but here he was back in the office again.

He crawled under the oversized particle board desk that Allison had managed to obtain for herself (by saying HR must exude a good image if they were to make the best hires). He lay down on his back and scooted toward the rear of the desk. This wasn’t even close to the work he was doing at SteelXchange, but it wasn’t nearly as bad as some calls he’d endured the past two and a half years.

“We have to strike while the iron is hot!” Stephen’s roommate, Arthur, implored. “This is a once in a lifetime opportunity. We do it now or someone else will,” he continued urgently. “You’re crazy,” Stephen replied unconvincingly the first few times. But within three weeks, Stephen gave up completing his Ph.D. a year before he expected to finish. In exchange for a piece of paper that would proclaim him a doctor of computer science, he and Arthur founded their first company, Pittsburgh Steel Exchange. It was a company whose mission statement was primarily a number of invogue buzzwords strung together in a single wonderfully captivating sentence. It was 2004, the second coming of the dot-com craze was nothing less than a certainty. To not partake in the euphoria, especially after having cowardly shunned the first Internet boom in 1999, would have been regretted for eternity. Leaving the Ph.D. program was hard, but technically Stephen was still classified as ABD (All But Dissertation) at Carnegie Mellon University in Pittsburgh, Pennsylvania. Realistically, as far as completing his Ph.D. was concerned, he might as well as have been classified as DOA.

Instead of just plugging the keyboard cable back in and being done with it, he lay there a few minutes, savoring the time he wasn’t in GreeneSmart’s loud showroom. By now, the doors would have opened, and the early shoppers would be swarming the store.

“Stephen, do you mind if I talk to you while you’re down there fixing my computer again?” Allison asked in her motherly tone. It was a voice that could too easily comfort him to sleep if he wasn’t careful. “I was thinking, while you’re in here, we could talk about your career development. You know you were supposed to have your review meeting with your manager last month. Now he’s gone on

vacation and asked me to do it for him.” Stephen had been avoiding the meeting as best he could. ~~Another review would mark another six months at GreeneSmart. He didn’t want to think about~~ much time passing, but now he might be trapped. Perhaps she had planned it this way.

Arthur was standing on top of the mahogany conference table in front of the projection screen passionately urging, “You have to understand, we have an intimate knowledge of steel. We live in Pittsburgh. Steel runs in our veins.” Stephen stood, too, though not on top of any tables, “Combine this with the world’s best computer science talent at CMU, and it’s going to be an unstoppable startup.” The dog-and-pony show was airtight—the theatrics well rehearsed. This was their seventh meeting with top-tier venture capitalists, VCs, in Silicon Valley to fund their idea. Pittsburgh Steel Exchange proposed selling steel through an open auction, much like how eBay works today. And what had made all this possible? Simply, the Internet. It was declared brilliant, and they wound up with promises for more money than any graduate student knew what to do with.

Stephen plugged the cable back into the computer, no point in delaying the fix. He didn’t bother to get up. If the career talk must happen, he would do his best to make sure he didn’t participate more than he needed to.

“You’re hired!” Stephen and Arthur had said thirty times in as many days. Flush with money, Pittsburgh Steel Exchange hired its core team without delay. “Thirty people? You’ve outgrown Pittsburgh,” the VCs warned. “It’s time to move to California. We’re going to help you make it to the next level.” The next level? That sounded promising. “And, what’s with the name? We thought you guys knew the Internet,” the VCs admonished. With thirty-two people in the company (all who eagerly relocated to the West Coast with their own visions of “the next level”), what had originally started as Pittsburgh Steel Exchange was reborn in Palo Alto, California, as SteelXchange.com.

“Why are you here? Don’t get me wrong; we all love having you here. But it’s been more than two and a half years now. Isn’t it time you found something better to do? If you don’t mind me saying so, Stephen, it’s like you’ve given up, and that’s ridiculous. Stop wasting your time here.” Allison was the first HR person to be this honest.

2:10 a.m., nearby at the gas station food counter, while having coffee with a side of hotdogs that had been turning on the cooker long enough to be packaged as Slim-Jims: “This will be the last of our nightly food runs,” Stephen began somberly once they were all seated. “I wanted you all to be the first to know. The rest of our promised funding is being withdrawn. We’re closing down Steel-Xchange in two weeks. I’m announcing it officially tomorrow.” He noticed a few surprised expressions, but most had already suspected. Six months after they moved to California, the dot-com bubble burst, and the consequences to SteelXchange.com were clear. “I’m going to help all of you find jobs. I promise. I’ll make it right. It’s not your fault, any of you. We did the best we could. I should have known better.”

The brutality with which the funding was taken away even exceeded the excitement with which it had been given—the backrooms, cigars, and dignified single malt scotches that were de rigueur for closing the deals where steel was bought, sold, and traded were working perfectly fine, thank you. And, despite the repeated and loud cries of “lack of efficiency” and “backwardness” and much worse name-calling from the technologists in California, the steel titans seemed little fazed, if they heard the cries at all.

Stephen turned his head, imperceptibly sighed, and waited. All he could see, from his vantage point under the large desk, was the bottom of Allison’s grey skirt and her exposed calves as she rose from her chair to pace the office. He couldn’t see her face, and she couldn’t see his either. “There are so many companies around here that would hire you in a second. I think you could be part of something really big, who knows? I’m saying this to you as a friend, you know, and not as HR. As a manager, and as HR, of course I want you to stay here. But, come on Stephen, you and I both know you should be doing something else.”

“What am I going to do now? I followed you and Arthur out here from Pittsburgh. I thought you guys were on to something. What happened?” a woman, mother of two and Pittsburgh Steel Exchange’s fourth employee, asked. Stephen stammered out the now all too familiar consolatory words, “Give me your resume and I’ll work with you on it until we find something for you. I’m sorry. I’m just really sorry for all of this. Go home and tell your family that it’ll be okay. I’ll find you something.” Another heap of worries to add to his own. SteelXchange.com had seventy employees when the news came of its closing.

He resumed his long list of calls to every VC and colleague he had met in the last six months. He began the conversations with “I need a personal favor,” anything to help his team. They were, after all, his responsibility. It would have been nice if Arthur had made some of the phone calls, too. But Arthur had departed immediately, disassociating himself from the failure that was Steel Xchange. No black marks on his resumé.

Allison continued on, but his attention was long gone. He was watching her legs as she paced around the room. She didn't have her shoes on, and he felt sorry she had to walk on such a dingy, disgusting, old carpet. He followed her legs as they moved back and forth across the office. Her voice was gentle. He wasn't sure what her words were, but he was positive he'd heard this conversation before. He knew it by heart.

He watched her. The anklets she was wearing on both legs—he'd never noticed them before. If she stopped speaking at just the right moment when her legs happened to touch, he could just barely make out the sounds of the anklets as they softly rubbed against each other. At every step, he held his breath for that extra little bit of silence, and listened for the quiet chimes again.

She spoke for a few more minutes; eventually it occurred to him that he'd been under the desk for too long. He clumsily maneuvered to sit up in his little space. Finally peering out of his makeshift cubby, he found Allison's face looking back from only a few inches away.

“Hey,” she said in a surprised voice, “I thought that you had fallen asleep on me. Tell me you heard at least some of what I said.”

“Yeah, I did. Thanks, Mrs. Glace,” he replied quietly. “You're right. It's a lot to think about. You know that I really do enjoy it here, but I'll think about it. Promise I will.”

Allison only half smiled back at him. He suspected she would do the same to her son. “Okay, but *really* think about it, Stephen. Life's too short, you know.”

“Don't worry about me, Stephen. I've already found a job,” said Ryan, one of Arthur's assistants and a friend to everyone in the company. “GreeneSmart was hiring, and I accepted a job there this morning. You should visit sometime. The café has better food than those gas stations you keep going to,” he said, trying to cheer up Stephen.

Stephen did visit Ryan—two days after SteelXchange closed permanently. Stephen ran into the head of tech-support at the store, a meeting he was sure Ryan had arranged. “So, you're Stephen? Ryan has told me so much about you; you're the tech whiz-kid. We could really use you—our PCs and fax machines are a mess. Think you can help us out?” The man was as welcoming as could be. It wasn't remotely similar to the type of work Stephen did, though he was certain Ryan had the best intentions. A lack of a backup plan, the need to get some rest from thinking about what he had done to twenty-one people, or simply the desire to be with a friend for a few weeks while he figured things out—whatever the reason, Stephen accepted a part-time job working directly for the head of tech support at GreeneSmart. Two and a half years later, Ryan had long since left and Arthur had returned to graduate school. Stephen was coasting, working full-time at GreeneSmart.

The conversation was at an end. Stephen sprang up, perhaps a bit too quickly since Allison had hastily step out of his way. He thought about giving her a hug; it was good to know someone cared about him. He hoped he had been like this with his employees, too, but perhaps those were different times.

Seventy people had trusted him. For forty-nine of those seventy, he had found employment. But for the remaining twenty-one, the wreckage of the dot-coms around him was less forgiving—a fact Stephen could not forget. Weeks after SteelXchange's closing, the calls started coming in: “Are you okay?” they all wondered. With tempers soothed, his former team remembered to inquire about how he had fared. Four weeks after the debacle, not a single person, not even those who had returned to Pittsburgh poorer and more in debt than they ever had been, blamed Stephen.

Instead of confiding any of this, or even just giving Allison the hug he had so wanted to, he awkwardly mumbled an excuse for his too-quick rise, and stumbled out the door.

# -ANTHROPOLOGISTS IN THE MIDST-

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*March, 2005.*

Molly Byrne, age twenty-three, Cameroon, Africa. Seven months of applications and three months of training—yet, what the Peace Corps training had least prepared her for was simply feeling overwhelmingly isolated. Forty-two days into her assignment in Cameroon, and friends were still hard to find. The only person who treated her like anything but a novelty item was Sandrine, a beautiful fourteen-year-old girl with eyes that no National Geographic magazine cover could ever do justice. Sandrine had befriended her on her first day. Sandrine and her one-year-old son, Francis, were as close to friends as Molly had.

## From Molly's Cameroon Diary:

Day 42: Sandrine is now officially the only one who hasn't yet begged to see my cell phone or my stash of cigarette cartons that I keep for trading. Had I known, I would have brought plenty more—and Froot Loops, everybody loves Froot Loops here. I buy them at every chance. I try to teach Sandrine English, and she tries her hardest to keep me from embarrassing myself too much. fourteen years old, with a kid, and she's teaching me how to survive here . . . Life here is like living under a microscope. Everybody is watching me constantly. There is no break; I can't just go home to wind down. My host family is just as fascinated with me as I am with them. Everything I do is watched and reported on; the village knows my every action and seemingly my every thought, too. I should probably be . . .

Molly had wanted to write more that morning, but when the stabbing pain close to her shoulder was enough to make her cry out loud and writhe on the filthy floor in agony, she had needed to stop.



“You are from America?” the doctor asked as he put his hands on her neck from behind, pressing his dark fingers deeply into her white skin. He already knew she was from America; everybody there knew she was.

“Yes,” Molly replied. Say as little as possible. To talk more would only provide further interaction to misconstrue.

“Take off your shirt,” the doctor said. “For your heart,” he offered as an explanation. He took a step back and nodded approvingly as she pulled her shirt up. He looked disappointed when she didn't take it off completely.

The doctor was an old man with cold hands that trembled as he laid his stethoscope on her chest. He listened for a long minute, then moved in closer to her. She could feel his breath too close to her body. She stared at the bald spot on his head, hoping he would just once dare to look up at her face. He would understand what her expression was saying, that she knew what he was doing—and that she wasn't going to let it go any further. But he never looked up, he kept his gaze low.

She didn't need to be here, she thought to herself. The pain had subsided by the time she made it to the doctor's office. But Sandrine had insisted she should go inside to see the doctor anyway. He was a good man; he would know for sure if everything was okay, Sandrine promised.

His hand wandered lower. “Okay,” Molly said loudly enough to disturb whatever fantasy was building in his head.



“Of course, of course. Everything is fine. Do not worry. Come back tomorrow, and I can check again. ~~Maybe tomorrow, you bring a little gift?~~”

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Molly pulled down her shirt quickly, self-conscious and furious at once—but saying nothing. She was fuming enough to know better than to speak. Blurting out anything now would only mean that the rest of the village would know about it long before she made it back home.

She opened the door out of the doctor’s office without looking at him again. The room outside was overflowing with others waiting for his attention. Sandrine was, thankfully, standing by the door where she exited, ready to take her home.

“Sandrine, *comment ça va?*” the doctor called from inside his office as he spotted her through the open door. “You should come see me for a checkup,” he suggested, nodding his head upward in a smile. Before Sandrine could reply, Molly took her by the elbow and pulled her quickly from his office.

“He’s not a good doctor, Sandrine. Promise me you will find another,” Molly whispered as they were leaving the waiting room. She was only 14. God knows what he would do to her.

“He is Francis’s papa, Molly. He is a good man.”

Enough. Molly left Francis and Sandrine standing at the entrance of the building. Before there was time to reconsider, she strode into the doctor’s office, grabbed the first thing her hands could touch around, a half-filled heavy glass bottle, and swung it at the doctor. The woman on the examination table was yelling, the doctor’s face was bleeding where two teeth had burst their way through the nose, the dangling flesh of his cheek, and everyone in the waiting room was moving in for a closer look.

Seven months of applications, three months of training, and forty-two days in Cameroon. She was taken home before the week ended, having been deemed by the village, and the Peace Corps, to have “too intense a disposition to continue.”

February, 2009.

“Why do you need another computer again, Molly?” Trisha asked as she stepped into position behind the electronics center at GreeneSmart. “I’ve had mine for two years now, and it’s doing fine. If you ask me, there are plenty of other things to spend money on.”

“I know, I know. But it’s for my research project. Anyway, just let me know later today if you find something back here that I can afford. I need to get one quickly.” Molly scooted away to ensure she made it to her own station in the children’s clothing department before her manager appeared. “I’ve got to run now. You know which department to find me in, okay? And don’t forget, you promised to help me set it up when I get it.” Molly gave an appreciative smile to Trisha before disappearing behind the shelves of DVDs.

“Whatever,” Trisha muttered under her breath. In the three minutes before the store officially opened, Trisha checked their inventory, found a cheap computer for Molly, and had time to consider if she could convince Molly to spend her money more wisely. In the end, though, she decided it wasn’t worth the effort, and resigned herself to finding a way out of setting up the computer for Molly.

Forty seconds remained before the front doors were officially unlocked; the intercom was full of a game. “Stephen, report to electronics,” Trisha’s voice roared through GreeneSmart. For several months after Stephen first arrived, she had given him plenty of easy opportunities to ask her out. He was cute enough that she had even considered asking *him*. But she never did, and a good thing, too; he was far too quiet and shy.

Just like every other day, the first call came before the store opened. On the inside, Stephen thought, “What now?” On the outside, he happily declared, “Good morning, Trisha. What can I do for you?”

“Molly needs your help. She’s setting up her new computer tonight, and she wanted me to ask you if you had some time to help her?” He instantly agreed, as Trisha knew he would. What guy wouldn’t gladly do anything for Molly? Long brown hair, smarter than anyone else she knew, intense, and intensely pretty. More than pretty when she actually tried, Trisha thought. Some people have all the . . . , Trisha started, but the rest of the thought was too obvious to go on.

Trisha hurriedly called Molly on her cell phone the moment Stephen left, “I can’t make it tonight. But you know Stephen Thorpe? The tech-guy? He volunteered to help you with your computer. Before Molly could question her any further, Stephen anxiously showed up in the children’s clothing section to make the plans in person.



“All done!” Stephen happily exclaimed around 9:30 that evening. Molly’s new computer was ready to go. “You just need to type your password right here, and you’re all set.” Stephen stepped out of the way to let her reach the keyboard.

So far, they hadn’t spoken much. They had driven separately in their own cars to her apartment, and since then, he’d been busy with the new computer. Although they had talked a few times at the store, they were probably best described as acquaintances rather than friends.

Molly replied without moving, “Just use ‘mollocoddle.’ That’ll be good enough. I always use that. Stephen’s blank expression compelled her to spell it for him. “It means you’re taking good care of me,” she explained. Stephen finished typing it in, still a bit uncomfortable about Molly trusting him with her password.

“Thanks so much for setting this up for me. I’m sure it would have taken me days to figure it all out. I’m not really a tech person, as you’ve probably guessed by now.” Molly sat down in front of the monitor to take the computer for a test drive.

“Oh, there’s not much to it. It took so long just to get everything installed to protect it from viruses and all that good stuff. Just to make sure you’re safe.” The expression on Molly’s face revealed nothing; it was impossible to tell whether she was interested, bored, or just being patient. He continued on, uncertainly, “It’ll also keep your machine from being hacked into, and keep all your personal files and information private. Nobody should be able to break into it.” Just stop talking, she doesn’t care. Why am I saying this aloud? He was coming across like all the stereotypes he was trying his hardest to avoid.

But if she noticed his awkwardness, she was kind enough not to openly show it. “Thank you so much. I can’t believe how nice you’ve been. Tell me why you’re working at GreeneSmart if you can do all this so quickly? You should really be working somewhere else.”

“Mmm-hmm. I’ve heard that before.”

“You know, we *are* in the heart of Silicon Valley. Have you ever thought about working for a startup, or maybe working for Ubatoo? They’re always hiring, and from what I hear, they treat the employees pretty well, too—better than GreeneSmart, I’d imagine.”

“Thanks, but I don’t think that’s the right life for me. Setting up computers is one thing, but I think I’ll need quite a bit more than that to get a job there.”

“Don’t they have a contest for finding summer interns coming up?”

He looked at her surprised. “How did you—”

“How did I know?” she interrupted. “You mean besides the billboard advertisements they have all over town? It’s pretty hard to miss, even for an ass-backwards techno-phobe like me,” she said jokingly. Then, she recited the all-too-familiar billboard to him verbatim, “Got what it takes? Prove it. [InternSearch@Ubatoo.com](mailto:InternSearch@Ubatoo.com).”

It was true. The quote was plastered all over Silicon Valley and heard on radio and TV constantly. She grabbed his hand and led him to the window. “Besides, I see their billboard every day—it’s right there,” she said, letting go of his hand far sooner than he would have liked. “Their offices are only a couple of blocks away. Besides, I’m sure you’re just being modest; you’d get an offer no problem. All I’m going to say is that I think you should at least try it.”

Before Stephen could argue about how different the required skills were between setting up his computer and what it would take to get into Ubatoo, Molly had changed topics. “How about some dinner? I owe you that much. I can order some amazingly good sandwiches. They’re really much better than the hotdogs I see you stealing from Greene Smart’s café.”

Stephen was pretty certain Molly had reached her threshold for tech talk; he wasn’t about to press his luck talking any more about viruses, her new computer, or Ubatoo. He did, however, readily agree to dinner.



“Just make yourself at home,” Molly said as she went to order the food. “I’ll be right back.”

Stephen stood uncomfortably next to the computer he had set up, not sure what to do next. All he knew for certain was that he wanted to literally move *away* from the computer. Of all the images he wanted to leave in Molly's mind, him next to a computer, having just talked about hackers and firewalls, was lowest on his list.

So what should he do now? Considering the favor he had just done, he assumed it would be okay to sit down and turn on the TV. On the other hand, given the amount of time they had known each other, it was probably best not to make himself too comfortable yet. He shook his head side to side, a little embarrassed, and frankly displeased with himself for thinking about this so much. He decided on a compromise. He would sit on the sofa, but not turn on the TV. *Dare I eat a peach, too?* he recalled, a line he had read years ago. Why all this thought? It had been a long time since he'd paid this much attention to his actions, and it was not at all obvious that any of his actions were ever worth so much thought.

Having made the monumental decision to sit, he absentmindedly looked around the cluttered coffee table, and piled together a few Xeroxed pages that were fluttering in the breeze from the open windows. Underneath the glass table top, five stacks of Xeroxed pages revealed themselves—each reaching up, at least a foot, from the floor to the table.

He couldn't help but be intrigued. Anything even remotely academic was a souvenir from a life he knew years ago as a graduate student. From the headers of the photocopied articles, he could see they were from publications such as *The Journal of Political Science*, *Urban Affairs Review*, *International Journal of Middle East Studies*, and *Politics and Religion*. His next thoughts came as a bit of surprise to him: four years had passed since he had been a graduate student—and he missed it.

He remembered the pride and sense of accomplishment he had felt whenever an article he had written describing his latest research was accepted for publication into an academic journal. It was a testament to his discovery of something new, something that his peers, other scientists, found worth preserving and ensuring that future scientists had a chance to read about as well.

With these thoughts, though, also came the memories of what reality was for a graduate student. These fanciful ruminations were far from the day-to-day life of an academic. Reading volumes of academic papers and publishing regularly would simply be expected, not cherished. It would be little more than a concrete measure by which to confirm he wasn't simply wasting time.

Nonetheless, there remained a not-so-small twinge of jealousy in him as he surveyed the articles. With the same adoration that compelled some to covet and collect books, he looked at messy stacks of academic articles. Having them around was like having access to raw knowledge, waiting to be understood. Even if they were from fields outside his own line of study, it was reassuring that the world he had left behind still existed.

Dinner, and the hours of easy banter afterward, had been far more engaging than either could have anticipated. To start, Molly was a graduate student at Brown University in Anthropology and Political Science, doing part of her field work in Silicon Valley. How she wound up here he still didn't quite grasp, but there would be time for that later. That she was a graduate student immediately gave them a large set of shared experiences to draw from in their conversation. The fact they were both now at GreeneSmart provided even more fodder for the evening's exchanges. It wasn't until 5:30 in the morning that they decided to call it a night.

Thankfully, the night hadn't turned out anything like Stephen had imagined it might a few hours earlier. As he was leaving in the early morning, she implored him, even before it should have rationally had any impact on him, to at least sign up for the intern contest at Ubatoo. She was more certain than ever, she said, that he was underselling himself at GreeneSmart and he could be doing s

much more.

But being an intern? Hadn't he just built up his own company, and managed a large team? He argued. No, she reminded him, what he had *just* done was waste two and a half years at GreeneSmart. His own company, she went on to state, was long gone. She certainly wasn't lacking in candor. In addition to the obvious realities she had pointed out, Molly also stated others he needed to hear. He had taken care of his employees better than anyone could have expected. He also needed to take care of himself.

However, in the six hours since Molly had first mentioned the Ubatoo prospect, the idea never left his mind, always rising up again in the few pauses between hours of conversations. Perhaps more pertinent was that, in the light of any budding new relationship, promises were all too easily made. Of course he had agreed to enter the contest; the only person who ever thought he might not was himself.

What Trisha could not have known just a few hours earlier, but would happily take credit for, was the instrumental role she had played in putting Stephen and Molly together, even if all she had really wanted was to avoid several hours of staring at a new computer in Molly's tiny apartment.

September, 2002.

In 2002, Atiq Asad would have described himself as a modest man. He was rapidly approaching tenured professorship in UC-Berkeley's Computer Science Department, his students were obtaining positions in the most highly regarded and prestigious academic institutions in the country, and his research in the emerging field of data mining was winning accolades and honors from his peers. There was good reason to be proud, though he would never talk about any of his accomplishments aloud for fear of being too boastful.

On average, Atiq received about one call per month from recruiters at startup companies in Silicon Valley that he had never heard of. To avoid common courtesy being mistaken as interest, he didn't normally bother responding in any way. But the latest company to contact him, *Ubatoo.com*, was not completely unfamiliar. When the recruiter called his cell phone for the third time, on a whim, he answered.

Within the first five minutes, he had already exhausted his patience, along with his usual cadre of excuses: "Really, I'm quite happy at Berkeley," or "I'm not in the market for a new career right now." It had been a mistake to answer the phone; the recruiter wasn't taking his not-so-subtle hints.

"Dr. Asad, just hear me out," the recruiter pleaded. "We've already assembled a stellar team of 40 people. We'd like you to come and create your own research group, as large or small as you like. We have to be honest with you, Dr. Asad—you have quite the reputation around here. At last count, five of our most senior scientists asked specifically that I recruit you. As far as they're concerned, you were on water."

"Like I said, I'm flattered. But I'd like to meet those five delusional scientists sometime. Personally, I'd be leery of anyone with such a high opinion of me," Atiq replied, trying to cover his impatience.

"Dr. Asad, what are you looking for? Freedom to do your own research? Brilliant peers to work with? Is it money? Whatever it takes to get you here, I'll try my hardest to make it happen."

The words could be enticing if he let them linger. Focus. "In nine months, if all goes well, I'll be granted tenure at Berkeley. I can't give up on years of work when I'm so close. Thank you once again. I really must go now."

"I don't suppose telling you the salary we're offering could sway you? Or maybe telling you that the number of Ubatoo's stock options we're granting you is more than I've ever seen before? How about if we keep this offer open for you even after you get tenure? That will give you some time to think about it, too."

"Okay. Let's talk again in nine months, after the tenure decision is behind me," Atiq agreed. Finally, a polite end to the conversation. Besides, in nine months, these shimmery words would have already tempted the receptive ears of their next hiring targets.

The recruiter didn't call again.

The trouble for Atiq was that Ubatoo had insinuated itself in his life from every direction. Whether he used Ubatoo's search engine for finding academic papers, or whether he used it to buy Christmas gifts for his wife and kids, Ubatoo had become the single destination for finding all things on the Web.

He was beginning to use their other services, too—e-mail and online credit cards, and occasional their instant messaging service to chat with his son and daughter, both of whom insisted this was the only sure way for them to communicate. With each flash of the Ubatoo logo, it was difficult not to imagine what the recruiter might have offered had he not been so quick to close the conversation.

Ten months after the initial phone call, and a month after the long awaited tenure had been bestowed, the recruiter returned in person, with five friends. “Dr. Asad,” the recruiter, and the only man wearing a tie, began, “As you requested many months ago, I’d like to introduce you to those five delusional scientists.”

Atiq scanned their faces—faces he vaguely recognized from a few years ago, when he had taught them as graduate students. They looked like they had never left Berkeley’s Soda Hall—worn-out jeans, faded t-shirts, scruffy faces, dirty hair, and the unmistakable aura of sleep deprivation. He reached out to warmly shake each of their hands and invited them into his office.

The small talk lasted only a moment before the recruiter steered the conversation back on track. “Have you given Ubatoo any more thought? Ubatoo has more than tripled in size since we last spoke and we need you as part of our team more than ever. The offer is still open.”

“Gentlemen, it’s wonderful to see you all again. I can’t possibly tell you how rewarding it is to have you all here like this, but I can’t give all of this up.” Atiq motioned toward the shelves of papers, books, and numerous framed award certificates haphazardly scattered amidst the mess. “I just received tenure. Let this old man enjoy it.” He did feel old, very old, in the presence of the five sitting in front of him.

The recruiter spoke before any of the others had a chance. “Dr. Asad, we would never ask you to give up your position here. Just work with us for a while and see if it’s a good fit. Keep your position as a Berkeley professor as long as you like. We’re willing to share your time.”

One of the five, the one in a crumpled old Berkeley t-shirt, stopped his furious typing on the laptop he never left home without and chimed in nervously, “Dr. Asad, listen. Don’t you want to see how well your research works in the real world? We’re facing all the same problems you studied and published about in dozens of your papers. This is what you’ve waited for; it’s no longer just speculation and theory to ponder and write about. It’s real. It’s tangible. We live, breathe, and swim in the data every day. More data than you can imagine.” He took a moment before continuing, his eyes wandering over the crowded shelves on all sides of the office.

As he started again, his gaze returned to resolutely focus on Atiq, “I know you use our search engine at least a dozen times each day and you use our e-mail constantly for sending personal messages. In fact, you checked it less than 45 minutes ago, just before you left your house to come here, right? I know you use our instant message service to talk to your kids, which I’m willing to bet was on their insistence. You probably talk to them more through instant messaging than you do any person considering the long hours you put in here. And last week, you used our credit card four times. This week, you’ve only used it once, yesterday . . . And that’s just what I found from a few minutes of poking around our data while you were talking. Think about what you could do with this information on all our users.”

The recruiter stepped a few feet forward and tentatively placed a thick sealed envelope on Atiq’s desk, marked only with his name, the ubiquitous Ubatoo logo, and the words, “Welcome Aboard.” The recruiter shifted his eyes from the envelope to Atiq, saying quietly, “I think we’ve probably said enough.”

No one moved—all awaiting Atiq’s response. He was subtly nodding his head up and down as he considered these five scientists, these kids, in front of him. He thought about the magnitude of what

they had stumbled upon, wondered if they possibly understood what they possessed, or even knew what they should do with it, or *could* do with it. Then his eyes too wandered over the piles of books and dusty awards that engulfed him. “You seem to know me pretty well,” he said as he reached one hand toward the envelope. “Tell me, have you figured out how to get all of your data to reveal what I am going to do now?” he asked with a smile, while deliberately smoothing a wrinkled corner of the waiting envelope.

The recruiter tried to step between Atiq and the scientists before any of them started talking again. But two of the five answered in perfect unison, as if this show had been perfectly choreographed just to deliver the final punch line: “Not yet. That’s what we need *you* for.”



September, 2008.

Walking into the Ubatoo office building in Palo Alto, the heart of Silicon Valley, was just as overwhelming for Atiq back in 2002 as it is for those who visit Ubatoo today. Immediately he had felt the palpable energy in the offices, the vibrant animated discussions transpiring in front of whiteboards brimming with more equations and Greek symbols than words, and the furious clicking of keyboards punctuated only by rapid excited exchanges. But most of all, what he sensed—as clearly as if his eyes saw it—was the raw focused brainpower at work.

Six years later, Atiq was a vice president at Ubatoo, a company that had grown its ranks to 12,000 employees. Although he still held his Berkeley professorship, the vast majority of his waking hours, as well as a few of his sleeping ones, were spent on Ubatoo’s sprawling grounds. Like Berkeley, there was no shortage of interesting and challenging problems to tackle. Unlike Berkeley, Ubatoo had the added thrill of allowing one’s work to affect the lives of literally hundreds of millions of people within minutes of its completion. Change one thing on the web site and immediately a large portion of the world’s population saw its effects.

Atiq’s data mining division specialized in finding trends and patterns in massive repositories of raw data. All the data Ubatoo collected from every site on the Web, as well as each of the enormous number of interactions that any one of its users had with Ubatoo, were analyzed by some portion of the data mining group’s computer programs. These programs ran all night and all day, every day, looking for patterns to better understand what the user was doing, what the user was trying to accomplish, and what Ubatoo could do to better serve the user’s needs. And for his success, Atiq had been rewarded beyond his most spectacular dreams. His rewards ensured that his children would be able to support their children and maybe even their grandchildren without worry. The recruiter’s exaggerations had proven true—the package, the people, and the work here were indeed extraordinary.

He thought about all of this today, in particular, since today was the day Xiao Ming, Ubatoo’s CEO, would officially reveal Atiq’s most ambitious initiative, *Touchpoints*, a project that had been over two years in the making. Atiq had waited patiently, and implored the rest of the Touchpoints team to be just as patient, until everything was completed before letting Xiao announce it to the rest of the company. Now, with the system’s first round of tests completed, he was comfortable with the accolades he knew his team would surely receive. And though his intention was never to seek praise, it was impossible to deny his own tiny desire to have his work recognized by his peers at Ubatoo. It was because of these thoughts that he wondered if he could still accurately describe himself as a modest man.



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