Steamscapes

Gearsmith's Guide

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Steamscapes: Gearsmith's Guide

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Using This Book

This book is intended as a supplement to the Steamscapes setting books—particularly North America and Asia—which introduced the world of Steamscapes and the Gearsmith profession. Steamscapes is a licensed Savage Worlds setting, so the rules presented here are compatible with other Savage Worlds settings as well as the core *Savage Worlds Deluxe* rules. However, the Gearsmith profession is highly specialized and may be somewhat difficult to incorporate piecemeal. The rules detailed in Chapter 3 offer even more specialization, and they are intended to be added onto the original Gearsmith rules as outlined in *Steamscapes: North America*.

This book also contains background information about the education and training of gearsmiths (Chapter 4), and about the laws and customs affecting the lives of gearsmiths and automatons throughout the world (Chapter 5). It then closes with a philosophical discussion on the personhood of automatons from three different perspectives (Chapter 6).

All of the rules in this book are considered optional for the Steamscapes setting. They are presented as additional flavor for gearsmiths in terms of automaton companions and other clockwork devices, and also to offer more variety to the profession at higher levels of play. We hope you enjoy this book, and if it is your first look at the world of Steamscapes, please check out the free downloadable adventures and GM screens at Studio 2 and DriveThruRPG!

On the Suspension of Disbelief

In the world of Steamscapes, automatons represent the greatest stretch of our technological imagination. While they may be based on several branches of science that could have and did exist at the time, our modern understanding of artificial intelligence leads us to understand that its computational requirements are unlikely to be met by a physical computer. No matter how much we imagine gears can be miniaturized, they cannot compare to modern microprocessing that is only now beginning to approach true autonomous thought.

Your approach to automatons within your game may depend in part on how far you and your players are willing to suspend your disbelief. If you wish them to

lean more towards realism, then perhaps they are not truly intelligent—they merely present themselves that way within carefully controlled situations. If this is the case, they should probably not be allowed to be characters themselves, and much of the work of their accompanying gearsmiths should involve anticipating what sort of situations may be coming next.

If, on the other hand, you wish to embrace the wild technology side of steampunk, then let automatons be fully independent and intelligent. Perhaps few gearsmiths understand why the components they use combine to make something greater than the sum of the parts. But, after all, scientists at the time did not fully understand how the human brain worked either. It may be that the quest for artificial intelligence becomes an important path to our own sense of mind.

The Cologne Project

[Steamscapes: North America and this book make several references to the origin of humanoid automatons—the Cologne Project. Because this development was so pivotal to the world of Steamscapes, some additional information may be useful. The following is a brief historical account of that project:]

As has been mentioned in previous volumes, Prime Minister Lord Aberdeen recruited Charles Babbage and Augusta Ada King, Countess of Lovelace in 1858 to begin developing military automatons. Lovelace brought in Michael Faraday to help with difficulties of power supply, and Faraday then also developed critical advances in optics. However, it was the Prussian scientists that enabled the miniaturization that allowed for automaton soldiers. Aberdeen hired Manchester-based engineer Carl Friedrich Beyer (known as Charles to the English), who engaged in a quiet recruitment campaign that included a promising young engineer named Franz Reuleaux.

Reuleaux's theories on kinematic chains were essential to both the development of a smaller decision engine and the incorporation of fully functional limbs and joints. He also designed the shorthand that would be used to communicate component designs when it came time to manufacture. Beyer, who was himself a master draftsman, used this shorthand to draw up blueprints to create an assembly line for the first wave of soldiers. The group then set up a workshop in Cologne in 1860 with the help of Ferdinand Shichau, a Prussian engineer with extensive manufacturing expertise. This workshop in Cologne spent almost three years producing the soldiers that became known to the world as Meade's Mechnicals. Many of those soldiers are now living as private citizens in the American Consolidated Union.

News about the Cologne Project could not remain secret following the deployment of Meade's Mechanicals. Some of the Prussian designers spent time in America during the Civil War training apprentices to maintain the automatons, and those apprentices went on to develop workshops of their own in North America even as the Prussians were returning home. Meanwhile, the Countess herself began teaching and training students in London. From its origin in those three geographic centers, the automation explosion now reaches every corner of the world.

Japanese Automation

It would be, however, a mistake to imply that the framework for automation did not exist anywhere until it was brought about by the Cologne Project. As has been mentioned in previous volumes, Takeda Omi of Japan created the *butai karakuri* (automaton theatre) in the middle 1600s. In the following centuries, both Japan and China developed a small but pervasive interest in clockwork devices, refining them towards ever more intricate tasks.

The introduction of electricity provided an opportunity for more versatile and powerful creations. Hiraga Gennai in particular was responsible for using electricity to expand the possibilities of the *karakuri*, and his work was nearly simultaneous with the earlier projects that Babbage and Lovelace constructed for the Fitch & Fulton Steam Company.

Once Lovelace's more intricate programming theories became public, Tanaka Hisashige had them translated into Japanese so that he could incorporate them into his work. Soon he was creating Japanese automatons (known as *oni*) that were just as capable as those being produced in Europe and America.

Although Tanaka constructed his decision engines from Lovelace's designs, the overall structure of his *oni* remained similar to the old *karakuri*. This distinction remains a part of Japanese automation, resulting in devices whose movements are based on different internal workings than those of Western automatons. Although gearsmiths from around the world are generally aware of these variations in design principles, it takes most engineers some time and effort to transition between the two. Most gearsmiths prefer to work almost entirely in one mode or the other.

Chapter 2

The Dollmaker's Daughter

By Alyson Grauer

Tamiko was so close to finishing her work. Aching and tired, she paused and closed her eyes. She inhaled deeply through her nose and exhaled through parted lips. There were birds and crickets outside the workshop's open window, and the trickle of water from the fountain in the garden. It was evening now, and a warm summer breeze danced across her face.

Everything in its place. Every movement with purpose. Every detail with intent.

Tamiko opened her eyes and reached for a pair of tiny forceps with a smooth, steady gesture. She squeezed them gently, lifting them to pick up the last of many tiny gears from an open box, eyeing it to make sure it was the right size. With great care, she reached the gear into the casing, seeking the opening where it belonged. After a moment she found the spot and used the forceps to nestle the cog inside, pressing with gentle firmness until a soft click was heard. Tamiko then traded the forceps for a tiny screwdriver. After a few delicate twists, she felt the screw squeeze into place just so. At last, she carefully closed the hatch to encase the tiny gears and slid the locking mechanism shut with a nudge of her screwdriver.

Everything in its place, Tamiko thought, feeling the heady rush of finally finishing the project. She turned the carefully crafted metal casing over, and now that the last cogs were in place, the little device took its final shape.

Tamiko turned the small brass winding key on one side of the finished project, twisting it several times, then released it on the tabletop.

The clockwork bluebird hopped forward, once, twice, three times. It gave a soft whistle, opened its wings as though stretching from having been stagnant so long. Then it closed them, settling its pinions against its back like a real bird.

Tamiko smiled rose from her stool, stretching her aching back from being at work so many hours, and carried the metal bluebird down the corridor into the next room where Asuka lay propped up in bed.

"Taking a break?" Her mother did not look up from her book right away.

Tamiko knelt at the bedside excitedly. "No, Haha. I've finished the bluebird."

"Oh, you have?" Her mother looked over the tops of her dingy spectacles, eyes lit with interest, and inhaled excitedly as Tamiko opened her hands to show the bird. The breath she drew cracked midway, erupting into a rattling series of coughs that racked her body.

Tamiko set the bird down immediately and reached for her mother's shoulders, steadying her. "Haha! I'm sorry—should I fetch your tea?"

Her mother coughed, shaking her head, and then began to breathe more normally. "No," she muttered, clearing her throat. "No, no. I want to see the finished product."

Tamiko picked up the bird, turning it this way and that so her mother could see all of its angles, the glittering hand painted eyes, the carefully hand-etched feathers.

"Ah, Tamiko-chan, he is very lovely…and his voice?"

Tamiko turned the bird's key a half notch. "Now sing!"

Obediently, the bluebird opened its brass beak and trilled a lovely, rollicking melody. The melody repeated once, and then the bird stopped singing. Tamiko picked it up again, twisting the winding key back the reverse direction. Tamiko's mother smiled widely, clapping her hands together.

"Beautiful. Beautiful, my daughter! You've done very well." She coughed again, the dry sound reaching way down through her chest. Asuka shut her eyes against it, and Tamiko set the bird down, leaning closer.

"Haha, do you need anything? Are you comfortable?"

Her mother tutted, leaning her head back on the stack of pillows. "I am fine, Tamiko-chan. You worry too much about me."

"But you are my mother. What kind of daughter would I be without a worry for your comfort?"

Tamiko's mother, Asuka, reached out and touched her daughter's smooth cheek. "You are a good girl. You've never let me down, Tamiko-chan, and you never will. I have faith. Now go put that bluebird in the finest cage we have."

"Hai!" Tamiko stood and hurried out of the room before the blush of her pride showed too much on her cheeks. Down the corridor and to the right was the shop front she and her mother shared, a pleasant room with many shelves filled with exquisite craftsmanship and finely made artwork.

Tamiko's mother was a toymaker, as her father had been before her. Now Tamiko was eighteen and doing the best she could to follow in her mother's footsteps. It was joyful work, but it was long hours of excruciating detail and careful precision. These were not just any toys, after all. These were the finest articulated dolls and mechanical figures of all kinds—men, women, horses, dragons, pigs, even fish that swam in water and birds that sang, like the bluebird. These were no baby's dolls, these were thoughtful, exquisitely assembled automata which adorned the houses of the wealthy and upper class throughout Japan. These were the Hatsu automata, named for Tamiko's family who had made them for the last few decades.

Tamiko carried the bluebird to the silver birdcage on a pedestal display at the center of the shop, which was dark and closed up for the evening already.

He'll sell for certain, she thought, lovingly placing him on a perch in the cage. His tiny claws gripped obediently as she released him, and positioned him just so. Soon everyone will want for a Hatsu singing bird. She closed the cage door and looked around the shop.

It had been a quiet few months. No longer did people pour into the shop to find the latest invention. No more did children press their noses to the glass window of the storefront each Saturday to see a new display. Everything seemed to slow to a halt when her mother had gotten sick, and Tamiko had done everything in her power to keep life moving at an appropriate pace.

There was a knock at the shop door. Tamiko jumped, startled nearly out of her yukata. The window was masked with a curtain, and it was too dark to see who stood at the shop door.

"Did you hear something?" Asuka's voice carried down the hall.

"S-someone at the door," Tamiko squeaked. The knock came again.

"Go and answer it," Asuka ordered. "I'm getting up."

"Haha, no, you need to rest!"

"Answer the door, daughter."

Tamiko felt a tendril of fear creep into her chest and take root there. She did not like that whoever it was decided to visit them after hours, and she did not like that her mother was getting out of bed. But her mother had given an order—and she would obey.

Tamiko went to the door with great apprehension, her stockinged feet silent on the wood floor. She hesitated, then drew a careful breath and opened the door.

A man in a hat stood on the doorstep. He blinked at her in surprise, his lips parted as though about to speak. He was young, and handsome in spite of a pink

scar that ran along his left cheek. Tamiko was not sure what she had suspected but he was not the most menacing of figures. Tamiko lowered her gaze respectfully. There was a brief pause, and Asuka appeared in the doorway at the back of the shop.

"Good evening to you," the man said, bowing respectfully as he recognized Tamiko's mother. "May I speak to your husband?"

"My husband is not here," Asuka said calmly.

My father has been dead for years, Tamiko thought. Everyone in town knows that. Tamiko felt her heart tighten as her mother moved gracefully across the shop to the front door.

"Ah, forgive me. Perhaps your son, or your brother?"

"I have no son, and my brother lives very far to the south." Asuka reached the doorway and bowed to the visitor. He bowed in return. "I am the head of household. What can I do for you this evening?"

"Pardon me. I meant no disrespect. Are you Hatsu Asuka, the famous toymaker?"

"Famous is a relative term," Asuka mused. "But that is my name."

Tamiko saw the young man look quizzically at her mother; her mother's eyes held a smile.

"I have traveled far to see you, Hatsu-san. My name is Ishida Kenji. I have a business proposition for you."

"Really," Asuka said with a tilt of her head. "How interesting. Do come in—there is a place to sit just through the back."

The visitor bowed again. "Thank you very much." He stepped through the doorway, and Tamiko closed it behind him gently. He removed his hat, and Tamiko saw his eyes widen as he noted the shop's many beautiful wares. Toys and automata of different kinds and sizes lined the shelves, gleaming and pristine. Mr. Ishida's eyes fell onto the just-placed bluebird.

"That's very kind of you. I must say I am very grateful for your hospitality," he remarked.

"It is my pleasure." Asuka offered him a seat on a stool in the back room of the shop. "Though I must say that I am unaccustomed to entertaining business proposals after hours."

"I apologize for the lateness of my arrival. My business with you came up rather urgently and I came as quickly as I could."

"It's all right. May I offer you some tea?"

Tamiko took the glance from her mother to indicate she was expected to boil the water for tea. She hurried to the kitchen to do so, but as she waited for the water, she knew she must be missing the meat of the conversation. She paced back and forth until the kettle was hot enough.

When she returned to serve the tea, her mother's kind, bemused face had become serious and thoughtful. Tamiko hesitated, startled to see her mother so grave, but Asuka gestured her closer.

"Tamiko," her mother said, "Mr. Ishida has a job for you."

Tamiko's heart skipped a beat. She stared at her mother, feeling a blush of uncertainty creep over her cheeks. "What kind of job?" she managed to whisper.

"A very important position with his father's company," Asuka said, studying her daughter's face. "Mr. Ishida's factory needs someone special. Someone with your skills."

Tamiko stole a glance at Mr. Ishida. He met her gaze, his expression hopeful.

"But Haha," Tamiko protested. "I couldn't go away from you. My place is here."

"It's a very important job," Mr. Ishida said. "Your delicate, steady hands and extraordinary attention to detail will help our company to complete a large number of orders. Our current workers have tried to do what is needed but they are not as refined as you are, I'm afraid. And we have tried to use machines to do the work, but they are not as precise. Without these final adjustments, our product does not… will not succeed. We are running out of time, and we are hopeful that you can make a difference."

Tamiko swallowed. "It sounds like a lot of work," she admitted. She was curious about what could be so important that he did not speak plainly of the product itself.

"You will receive comfortable lodging and anything else you may need to perform well. I assure you, you will be treated with great respect and the work will come easily to you, with the skills you've developed building these automata in your mother's shop."

"Who would take care of you?" Tamiko looked at her mother, half-ignoring Mr. Ishida's comment. "I couldn't possibly leave you. I can't."

"You can't, or you won't?" Asuka held her daughter's gaze, and Tamiko's heart fluttered in fear.

I am afraid to leave her alone, she thought. What if something happens while I'm gone?

"Will I be paid well?" she asked, turning to Mr. Ishida again. His eyebrows shot upwards in surprise. It was not a very polite question, but Tamiko pressed on in a calm voice. "My mother's medicine is not inexpensive. I'm sure you understand."

Mr. Ishida nodded sincerely. "I do, I do understand. And yes, your compensation will be extremely generous. You have my word that your mother's medicine will be paid for and delivered each month that you are gone."

"Is the position permanent or temporary?"

Mr. Ishida hesitated. "It is unclear at this time."

Tamiko didn't like that answer, but she did not say so. She looked at her mother. Asuka sat back on her seat, hands in her lap.

"It is your choice, my daughter," she said, her voice soft.

Tamiko nodded, feeling the weight of possibility; if the pay was as good as Mr. Ishida said, then perhaps she could afford better medical care for her mother. There was hope for a better recovery. The shop could be expanded. They might have a future.

"Mr. Ishida," Tamiko said, bowing to him, "I am honored for the opportunity and will do my best to perform to your father's expectations in the factory."

Mr. Ishida looked deeply relieved and smiled. "You don't know what this will mean to the company—and to the nation!" He bowed. "We will travel back to Tokyo tomorrow."

"So soon?" Tamiko was heartbroken.

"It is paramount that you begin working as soon as possible. Your craftsmanship is needed urgently to complete the current project on time."

Tamiko felt his desperation. Although she did not understand why she was needed so badly, she had already agreed to it. And it meant her mother might have a fighting chance to survive.

She left with Mr. Ishida the next morning, carrying with her a suitcase of clothing and personal items. They rode in a cart to the nearest train station, which

was a few hours away from Tamiko's village. The train carried them quickly to the north, where Mr. Ishida's family had their factory. They arrived at the factory mid-afternoon, and Mr. Ishida handed Tamiko off to a woman named Yuki.

"Thank you for your kindness, Mr. Ishida," Tamiko said, bowing.

Mr. Ishida beamed at her. "Thank you for agreeing to work with us. If you need anything at all, please don't hesitate to let me know." He bowed, and strode swiftly away.

Yuki looked Tamiko over with eyes that were hard and dull, her face as smooth and blank as a river stone. "I'll show you around," she said, and her voice was very tired.

The machines were so loud that Tamiko could only half-listen to Yuki as she pointed out different areas of the factory. She lost track of her own heartbeat amid the pounding of the assembly line conveyor belts. The people who worked at these machines did not look up as Tamiko passed them by. They worked hard in spite of the roaring engines and the grime that settled over everything in the room. Tamiko felt her own skin and hair begin to absorb the soot and dust from the machines, and she knew that the longer she stayed here the sooner her brightly colored yukata would be as gray and brown as the clothing of the workers around her.

This factory does not build toys, she reminded herself as uncertainty pulsed through her. There are many machines in this world, all of them built with care and intention—everything in its place.

Tamiko followed Yuki through a corridor into a quieter part of the factory. The roar of the big machines was now a distant thrumming that permeated the walls but was not bothersome. The lighting was better in this department as well, and the workers who were pushing carts of supplies and parts or examining them under bright lights with gloved hands even seemed cheerful. Tamiko wondered where her place was in all of this, but Yuki did not stop here.

Yuki brought her to another corridor, which ended with a door to a dark room. Tamiko followed her over the threshold, but recoiled immediately in fear.

The room was packed full of men, standing at attention in groups, their armored bodies powerful and perfectly still. There was a table at the center of the room with tools on it, and one of the men was lying prone on its surface.

What is this? Tamiko thought in confusion, backing up.

Yuki reached out and flicked a switch on the wall to enable the electric lighting, and Tamiko gave a little gasp and recoiled to the doorframe.

The men weren't wearing armor—they were made of metal. Their blank faces stared straight ahead, their bodies perfectly aligned, and their features less than human. Tamiko's breath came short and shallow as she gazed at the rows and rows of automata, her mind racing. These were not dolls, not toys, and certainly not art. It was clear from their armored bodies and the efficiency of their design that these automata were built for war.

"What are they?" Tamiko whispered.

"These are the oni," Yuki said, completely unaffected by the huge chamber full of lifeless metal bodies. "This is your workspace."

"My workspace?" Tamiko felt a surge of confusion.

Yuki nodded at the table. "Your first assignment."

"But what am I supposed to do?"

Yuki stared at her as though she had grown cow's horns. Then she shook her head in disbelief. "Your job, country girl," she said, and left the room. The door clanged shut behind her, echoing in the workroom.

Tamiko lingered for a moment, then moved towards the table, feeling the eyeless faces of the metal oni that faced her. The metal body on the table was like his brethren, still and silent. His head casing was partly open and unfinished, and a smattering of small parts lay on the table with a set of tools.

Born of the assembly line, she thought, lightly touching various joints and body plates. But it looks strong. Surprisingly strong.

Mr. Ishida's voice floated through her mind as she studied the open skull and the parts before her. Our current workers have tried to do what is needed but they are not as refined as you are, I'm afraid. And we have tried to use machines to do the work, but they are not as precise.

She sat down on the stool at the work table and drew a deep breath. It did not smell like home. She could not hear the birds in the garden, or the water in the fountain. She could not hear her mother in the next room. She did not feel at home here, nor comfortable, though she was grateful for the quiet of this spacious room. The noise of those machines had been unbearable. There was something so cold about it all, so heartless.

Mr. Ishida had said the company needed her skills. What skills? She thought helplessly. Her eyes fell to the work table and found that beneath the tiny mechanical pieces spread out on the surface was a blueprint of the inside of the oni's skull. She studied it a while, examining each part in turn.

The factory builds the bodies, she thought, finally understanding, and I must give them their minds.

If she could make them work, finalize the tiny details of their complex clockwork brains so that they could perform their duties… And if she could provide for her mother… You've never let me down, Tamiko-chan, and you never will, her mother's voice said.

Tamiko took another deep breath. She reached for the forceps and picked up the nearest part, a tiny cog which gleamed in the light.

"Everything in its place," she told the oni, and leaned forward, reaching the cog down into the cavity of the unfinished metal skull.

Hokusai Katsushika, "Swallow and Begonia and Strawberry Pie"

Chapter 3

New Rules

Building even a simplified automaton requires a large amount of time and materials. Gearsmith characters that wish to add new projects to their collection should plan on roleplaying at least some of the logistics involved in locating or purchasing parts and finding time and space to work on new devices. However, in game terms there is no specific mechanical restriction on the number of automatons a gearsmith may create. Ultimately, players and gamemasters should work together to figure out what feels both fun and reasonable.

Where automatons primarily interact with the rules is in the moment the players want to include them in the party. There are two ways gearsmiths can bring more automatons into play—as non-companion automatons or as additional companions. These two categories differ only in game mechanics, not in story flavor. There is no limit within the story on how a gearsmith may use automatons. The following rules merely govern how the automatons are handled in conflicts (particularly combat).

The term "companion" has a specific mechanical effect in Steamscapes, as it refers to the gearsmith's primary automaton. The companion automaton acts almost entirely as an independent character in its own right, with just a few restrictions. See *Steamscapes: North America* for full details.

Non-Companion Automatons

Most additional automatons a gearsmith creates will be non-companion automatons. These are created as starting characters based on their appropriate automaton template with no additional experience. They are considered Extras—they have one wound and no Wild Die. They can never gain Advances, and if they are Incapacitated in combat, they must succeed at Vigor rolls or be destroyed (although a gearsmith may be able to salvage and rebuild them).

Some automatons may be little more than single-purpose devices. A clockwork messenger pigeon, a self-propelled steamer trunk—these may simply be the trappings of your travels through the Steamscapes world. But eventually someone is going to decide to have that pigeon distract a sniper, or to have that trunk trample the train robbers. When that happens, just treat them as non-companion automatons. If they survive, they can go back to being devices.

New Gearsmith Professional Edge

Additional Companion

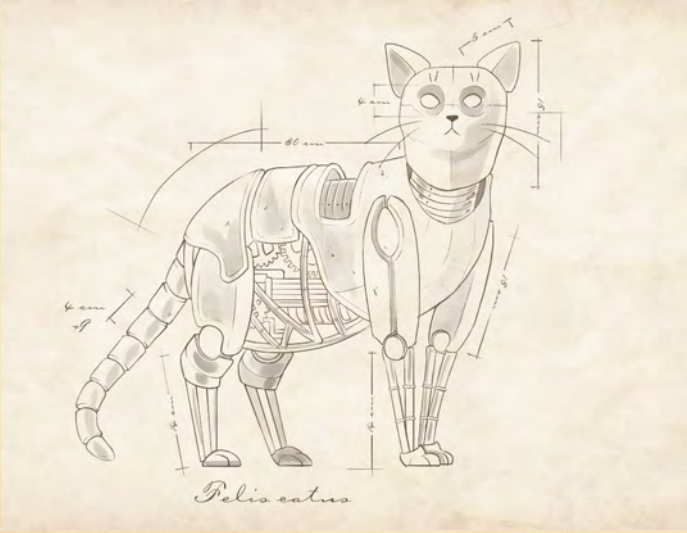
(once per rank, starting at Seasoned)

Upon purchasing this Edge, one of the gearsmith's non-companion automatons becomes permanently upgraded to companion. It is no longer an Extra, but now has a full set of wounds and the ability to gain Advances. All companion automatons gain Advances when the Gearsmith does, though companions added later will be at different Ranks. All automaton Advances are limited by the capabilities of the Gearsmith (see Steamscapes: North America).

The gearsmith and her companions remain limited by their single shared Wild Die. Only the gearsmith or one automaton may use the Wild Die in any given round, no matter how many times the gearsmith purchases the Additional Companion Edge.

New Automaton Templates

The following racial templates are intended for use only for companions and non-companion extras. They are not intended for automaton player characters. They are not necessarily balanced against the typical Savage Worlds race creation rules, but it is still best to restrict their starting Edges and Hindrances only to what is included in the racial template. Also, although the templates are designed as specific animals, they can easily be used as models for similar creations with only minor alterations. For instance, a cat may be built from the dog template by reducing the size to -2, removing the Built to Run bonus, and perhaps giving it a Climb rating.



Dog

Requires Leonardo's Legacy

Edges:

Construct – Automatons add +2 to recover from being Shaken, don't suffer from wound modifiers, and are immune to poison and disease. Automatons cannot heal naturally. To heal an automaton requires the Repair skill, which is used like the Healing skill but with no "Golden Hour." Automatons do not bleed out or otherwise die, though they can suffer injuries from incapacitation. All such injuries are considered permanent until repaired. Typically, these repairs require additional parts, since the original parts were lost to damage. Also, a result of "brain damage" on the injury table will be accompanied by significant loss of memory and personality that cannot be recovered. Mental and social abilities should be reduced or eliminated accordingly, at the GM's discretion.
Built to Run – The automaton gains the Fleet Footed Edge.
Built-in Weapons – The automaton has a Bite attack at Str+d6 and Claw attacks at Str+d4

Hindrances:

Clockwork Upgrades – After character creation, automatons may purchase skills as normal, but may only increase attributes and purchase edges with the help of a fully-equipped Gearsmith. The GM should make this an appropriately difficult process with regards to the time, skill, and resources required. Some edges may therefore be easier to acquire than others. (See the Gearsmith Edge Tree for guidelines.)
Gearsmith's Best Friend – Designed as a pet, this automaton has a Size of -1
Limited Programming – The automaton is too small for a large amount of memory storage or processing power. It has a maximum Smarts of d6.

Horse

Requires Reinforced Musculature

Edges:

Construct – As above.
Built for Speed – The automaton has a base Pace of 10 and rolls a d10 when running.
Sixteen Hands Tall – The automaton has a Size of +2.
Hooves of Steel – The automaton has a Kick attack at Str+d6.

Hindrances:

Clockwork Upgrades – As above.

Predictable Gait – The automaton is large and has difficulty changing direction quickly. It has Parry -1 and a Max Agility of d6. Also, Riding checks on an automaton horse are at +1 over even ground but -1 over broken ground.

Bird

Requires Leonardo's Legacy

Edges:

Construct – As above.
Built to Soar – The automaton may Fly at its normal Pace. (It may be slower on the ground.)
Built-in Weapons – The automaton has Beak and Claw attacks at Str+d4.

Hindrances:

Clockwork Upgrades – As above.
Streamlined Profile – The automaton has a Size of -2 and a maximum Strength of d6.
Limited Programming – As above.

Thinking Devices

Ambulatory steamer trunks, pianos that play themselves, liquor cabinets that pour for you—all of these things fall under the broad category of "Thinking Devices." They are not full automatons in that they tend to have a single purpose that is then improved through automation. They can never be a gearsmith's companion automaton, but then again they are rarely useful in combat.

Thinking devices are not built on an automaton template because they are little more than objects with personality. Players should feel free to be as creative as they like with such devices, and GMs should simply adjust the Mechanical Programming rolls to reflect the difficulty of what the gearsmith is designing. It may still be appropriate to require the gearsmith to have certain Edges—like Leonardo's Legacy for very small creations or Behemoth Engineering for very large ones—but otherwise there are no set restrictions for creating clockwork devices. This is what gearsmiths do, so they should be allowed to do it.

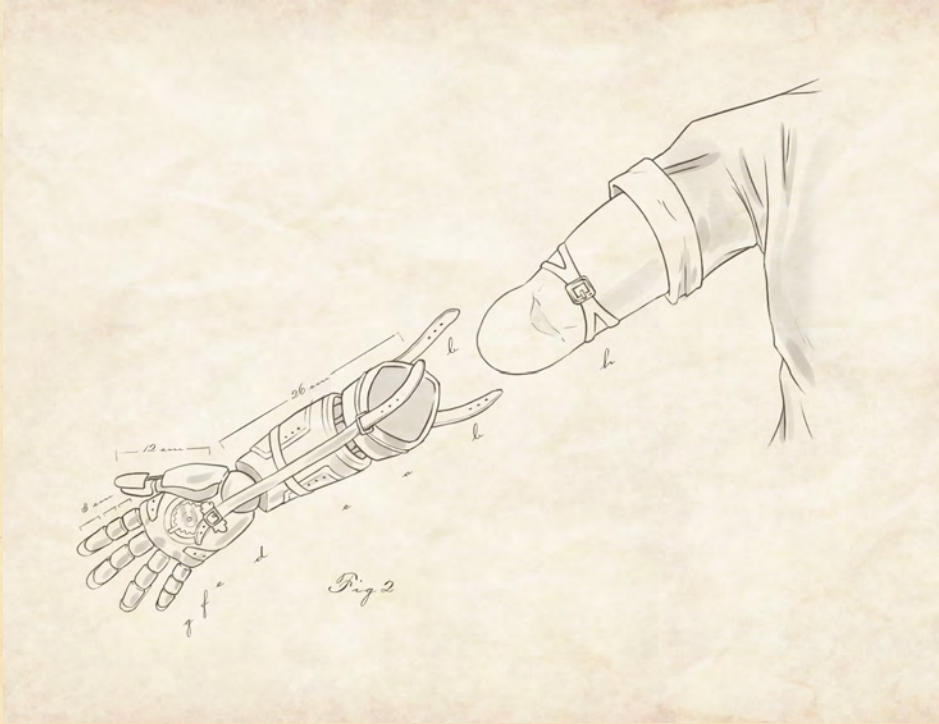
Prosthetics and Support Devices

Following the creation of fully functional artificial persons, many medical professionals started wondering how this technology might be applied to create only fully functional parts that could then be attached to live persons with missing limbs. Initially, the primary difficulty with this lay in the integration of mind and body. With both humans and automatons, the mind must first conceive before

the hand may act. But no direct interface could exist between the living brain and clockwork appendages.

It turned out that the solution could be found within the problem. Automatons carry some of the computation of physical functions within the limbs themselves. In essence, the arms and legs of an automaton "know" how to perform many basic tasks. Once surgeons understood this, all that remained was to devise a means for the patient to instruct the limb to perform such a task. This is done through the use of "gestures" that signal the individual's intentions to the artificial appendage. These must be developed on an individual basis, which makes the construction of an effective prosthetic a long and involved process for both the designer and the patient.

The first successful clockwork prosthetics emerged largely out of necessity among the railroad and mining industries of the Rocky Mountain Republic. Injured workers who were immigrants sought medical help from their own communities, and it so happened that some of the Chinese physicians they consulted supplemented their income with automaton repair work. This combined expertise remains rare, but as visible success stories become more widespread, so does interest in the techniques involved.



New Hybrid Apothecary Edge: Clockwork Prosthetics

Healing/Mechanical Programming

As with the hybrid edges listed in Steamscapes: Asia, the extent of what someone may accomplish with Clockwork Prosthetics is limited by the lower of the character's Healing or Mechanical Programming skill. Higher levels of both are required to build more complicated interfaces.

- **both at d4** – May create minimally functional support braces. Leg braces may negate the Lame Hindrance. Arm braces may negate the temporary wound penalties of shoulder or arm wounds.
- **both at d6** – May create basic replacement prosthetics. These may negate the One Leg and One Arm Hindrances, although the character's Pace is at -1 for prosthetic legs, and the character's Agility is at -1 for any task involving the prosthetic limb.
- **both at d8** – May create complex replacement prosthetics. Limbs behave essentially as part of the character with no penalty.
- **both at d10** – May create enhanced prosthetics and braces. Limbs and braces can be created to provide either +1 Strength or +1 Agility for tasks involving that limb (choose trait during construction).
- **both at d12** – May create prosthetics that provide additional powers, such as glide wings or hidden weaponry.

Alternate Gearsmith Advancement Rules

The design principles underlying the Gearsmith Edge Tree presented in Steamscapes: North America are very clear: force the player into a choice between advancing her own character or providing more options for her automaton companion. This and the shared Wild Die are intended to balance the distinct advantages inherent in playing essentially two characters simultaneously. These advantages may be even further increased through the new Additional Companion Edge listed above, so it remains essential to limit the growth of the gearsmith compared to other characters.

With that in mind, we suggest that the following rules be used only in very specific circumstances where that balance may become less of a concern. For instance, if your group is very small—perhaps just two or three players—then it may be preferable to allow more flexibility for your gearsmith character. We strongly recommend that you do not allow these advancement rules to be used if your group is larger than four or if there is more than one gearsmith in the party.

The alternate gearsmith advancement path is represented by the following four Edges:

Novice Gearsmith

Replaces the Gearsmith Profession Edge, but provides the same bonuses as that Edge. Allows access to the Mechanical Programming Skill and provides the first point for free.

Seasoned Gearsmith

requires Novice Gearsmith, Seasoned Rank, Mechanical Programming d6

Provides all bonuses from the Edges in the first column of the Gearsmith Edge Tree, specifically Well-Equipped, Basic Clockwork, and Basic Structural Engineering.

Veteran Gearsmith

requires Seasoned Gearsmith, Veteran Rank, Mechanical Programming d8

Provides all bonuses from the Edges in the second column of the Gearsmith Edge Tree, specifically Leonardo's Legacy, Combat Repairs, Advanced Structural Engineering, Hardened Exoskeleton, Complex Joints, Advanced Clockwork, Decision Engines, and Uncanny Humanity.

Heroic Gearsmith

requires Veteran Gearsmith, Heroic Rank, Mechanical Programming d10

Provides all bonuses from the Edges in the third column of the Gearsmith Edge Tree, specifically Reinforced Musculature, Behemoth Engineering, Flexibility, Masterwork Engineering, Miniaturized Processing, Social Programming, and Mechanical Intellect.

As you can see, this progression path leaves significant advancement space for a gearsmith to concentrate on other things while still allowing for full accomplishment by the Heroic Rank. However, it does mean that earlier advancement is somewhat slower, and it is more difficult for the gearsmith to specialize right away. So, for instance, a gearsmith using the traditional Edge Tree could achieve Masterwork Engineering by the beginning of Seasoned if that is her primary goal. The alternate advancement path balances its breadth and flexibility by sacrificing that early access to depth.

Chapter 4

The Education of the Gearsmith

In most parts of the world, gearsmithing remains largely an apprenticeship trade. Individual gearsmiths run small workshops where they can develop projects on their own timeline while training one or two apprentices. These workshops produce the bulk of the automatons and other thinking devices that are sold in Europe, Asia, and North America. Factory-style production facilities—with many gearsmiths working on a common design—exist only in Germany and Japan, and are solely dedicated to increasing those countries' military capacities. Companies in the American Consolidated Union have balked at developing similar facilities, largely because of the legal implications of mass-producing new potential citizens.

However, there are also a few institutions of higher-learning where an aspiring gearsmith might find instruction. At the time of this writing, there are only five universities throughout the world that employ faculty members who are knowledgeable not only in mechanical engineering but also in the finer points of mechanical programming. Because these programs are so rare, they tend to be highly selective. Graduates can expect to secure capital investment and an apprentice or two with nothing but a degree in mechanics.

Herzogliche Polytechnische Schule, Braunschweig

In 1862, as the first automatons of the Cologne Project were being tested, King George V of Hanover was eager to enter the modern era and compete technologically with Prussia and Switzerland. He converted the Collegium Carolinum in Braunschweig (Brunswick) into the Herzogliche Polytechnische Schule. As part of this conversion, the school abandoned instruction in business and the humanities and focused entirely on technical subjects. Over the next four years, the school developed a faculty of manufacturing engineering to rival the Eidgenössische Polytechnische Schule in Zurich.

After the German unification in 1866, many of the scientists who had worked on the Cologne Project were now able to lecture at Braunschweig. By 1868, the school had developed a department of mechanical programming, with existing engineering students eagerly transferring over. In the last four years, the school has grown substantially and now has the largest such program in the world. Resident faculty include Franz Reuleaux and Gustav Zeuner, both of whom had

secretly worked on the Cologne Project while ostensibly lecturing in Zurich and then returned to Germany following unification.

At this time, the Herzogliche Polytechnische Schule in Braunschweig primarily considers applicants who are citizens of Germany and its closest allies, particularly Italy and the United Kingdom. In addition, a small number of Turkish students have been accepted on a case-by-case basis. The HPS carefully monitors its current and former students to ensure none of them are selling technology to France, Austria, or Russia.

Teikoku Daigaku, Tokyo

The newest of the five, the Teikoku Daigaku ("Imperial University") was formed in 1871 through the amalgamation of several government schools for medicine, philosophy, and Western languages and sciences. In the University's first year, the sciences section has been greatly expanded to include instruction not only in mechanical programming but steam machinery and electrical engineering as well.

Teachers are both Japanese and foreign—mostly English and American—so students in the sciences are expected to learn English as part of their normal curriculum. However, the most notable lecturer is Tanaka Hisashige himself. He embodies and drives the spirit of the Teikoku Daigaku's mechanical design department. Following Tanaka-sama's leadership, students are beginning to produce pieces that are markedly different from European or American design—automatons that are elegant as well as functional.

Many of the students currently enrolled in the Teikoku Daigaku were previously students of the various government schools. New applications are being accepted, but competition is fierce and the testing rigorous. Also, as part of

the formalization of the school's imperial mandate, students are expected to work on projects benefitting the Meiji Empire even before they graduate. Just in the last year, the electrical engineering department has greatly increased telegraph coverage around Tokyo, with plans to expand the national network significantly in coming years.

University College, London

University College, a member of the University of London degree charter, boasts the oldest full program in mechanical programming, as well as one of the industry's most distinguished professors. Augusta Ada King, Countess of Lovelace, joined the faculty of University College in 1862 upon finishing her work with the Cologne Project. She was originally hired to teach advanced mathematics, but she quickly began to use her position to discuss much of her work in programming. In 1864, she founded the new Department of Automation within the School of Engineering.

Largely on the strength of the Countess's influence, University College opened its doors to women the following year. In 1867, the University of London received an additional charter allowing it to confer full degrees to women. Also, because University College is a secular institution, it does not discriminate among applicants on the basis of religion. However, at this time it remains very difficult for non-British citizens to attend University College. As such, the program remains slightly smaller than similar programs in Braunschweig and Philadelphia. Nevertheless, visiting gearsmiths eagerly crowd into the refectory for Professor Lovelace's occasional public "supper lectures."

University of Calcutta, Kolkata

The Republic of Bengal, along with the Republic of Sri Lanka, is one of the few examples of full democracy in Asia. Although the young nation has struggled to define itself economically in the years since it has thrown off the yoke of the East India Company, Bengal's position as a trade center has helped it rebuild some of the financial stability that was lost when it halted opium production. Kolkata itself acts as a key transport hub, with trains arriving from the west, airships from the north, and ocean-faring ships from all around the world.

Bengal is also in the midst of a cultural renaissance that has been characterized by a meeting of the modern and the traditional—a celebration of democratic egalitarianism as well as a resurgence of pre-colonial cultural identities. Hanging over this is the shadow of British occupation, an occupation that lasted so long that it became a tradition in itself. Many Bengali would prefer to keep what is useful of the colonial institutions rather than abandoning them entirely, and the University of Calcutta is an example of such an institution. Even the fact

that the name of the University did not follow the city through its recent name change speaks to the sometimes awkward dual traditions upon which the University is based.

The University's Department of Mechanics is small compared to corresponding programs at the other four universities, as interest in automation is still largely academic in southern Asia. With no military or industrial expansion driving an external need for automatons, the technology remains little more than a curiosity. However, the students entering the program take a broader, more international view. They see automation as the future for the world and therefore a future that Bengal is in an excellent position to join. In addition, the University of Calcutta has some of the most open admissions policies in the world, allowing both male and female applicants of all nations and religions. As news of the program grows beyond the region, we may see eager students from around the globe flocking to Kolkata.

University of Pennsylvania, Philadelphia

Penn, as it is affectionately known, was founded as an academy and a college by none other than Ben Franklin. A practical man, he saw education not as an end in itself but rather a tool that should be employed in the pursuit of specific goals. It was Ben Franklin's salon in the late 18th century that inspired the earliest collaborations that led to the world-changing Fitch & Fulton Steam Company, and several members of the salon advised or even joined the faculty of Penn when it became a full university in 1791. With Franklin's leadership, that new University of Pennsylvania quickly became a model of scientific learning and innovation.

Because of its long history of technological instruction, Penn was well-placed to adapt to the arrival of the entirely new field of Mechanical Programming. Within months of the first appearance of Meade's Mechanicals at Gettysburg, two professors traveled to London to visit with Professor Lovelace and discuss how they might provide a program similar to the one she was in the process of creating at University College. With her permission, they spent some time observing her program, and returned later that year to begin work on developing their own. In 1865, as the Civil War was coming to a close, the University of Pennsylvania held its first classes in mechanical programming. The Mechanic Arts faculty was made into a full Department in 1867 and conferred its first degrees just last year to the class of '71.

Penn is growing quickly, as is evidenced by its current migration to a new campus in West Philadelphia. Over the last decade, the University has been gradually opening its admission to include women, allowing each school to make that decision individually. The Department of Mechanic Arts was one of the first, and as a result has the most diverse student body of all the schools at present. (Although I am proud to say that my own Department of Agriculture, Mines, and Arts—from which the Department of Mechanic Arts was born—was also among the first group to admit women, it seems our subject matter has not been quite as broadly appealing as that of our young affiliate school.) It is on the strength of this diversification that the University of Pennsylvania overall has grown from attendance numbering in the dozens just twenty years ago to a population that soon may cross a thousand.

Chapter 5

Law and Custom: Automatons Around the World

Europe

Modern automatons originated in Prussia and then moved to England. Germany and the United Kingdom have embraced their use wholeheartedly. Unlike in North America, where automatons are often used for heavy labor, German and English automatons are typically employed as servants for the wealthy. Those that are not are mostly found in military deployments, carrying out unpleasant chores or maintaining watch through the night. In these two countries, automatons do not have the normal rights afforded to citizens. However, this is not because they are considered property but because they are considered lower class. There are no laws which prohibit full participation by automatons in either England or Germany, but traditional class divisions make their social position fairly static. Social mobility of automatons has yet to occur, but it may indeed be possible. Visiting automaton citizens from other countries are generally welcome, although they may be looked down upon by some members of society.

The Catholic countries of Europe—particularly France, Spain, Portugal, and Italy—follow the admonitions of Pope Pius IX and the Vatican Council to reject modernism in the form of thinking machines. Automatons are not welcome at all in those countries, whether as property or as independent traveler. Local laws specifically prohibit the use and manufacture of automatons.

Many of the other nations of Europe have stated their interest in acquiring automatons and the technology behind them, but their ability to do so has largely depended on their diplomatic relations with England and Germany. The Ottoman Empire, for example, has received a small number of non-military automatons as a gesture of good faith because of their assistance in the Crimea. As long as the current three-part alliance against Russia holds, the Turks can expect to see continued technological trade with both Germany and England. For Russia's part, hostility with Germany has not kept Tsar Alexander II from wanting automatons as well. He has taken advantage of his new friendship with the Qing Dynasty to send Russian scientists to study in Beijing. Chinese automaton design is quite different from European design, but the Tsar is more concerned with the results than he is with the methods. He also may be acquiring automatons of other designs on the black market.

North America

The Rocky Mountain Republic, Confederation of Texas, and American Consolidated Union contain some of the largest stockpiles of automaton technology in the world, rivaled in per capita usage only by Japan. All three employ automatons in both heavy and domestic labor, although the ACU tends to lean slightly more towards the domestic.

Automatons are considered property in both the RMR and the CT, and traveling automaton citizens from other countries are advised to carry papers with them at all times, lest they be considered runaways. Unscrupulous individuals have even been known to ignore citizenship papers and force lone automatons to work in mines or oil fields, so some automatons from the ACU are careful to travel with a human companion who can masquerade as an owner.

The ACU and Quebec are the only two countries in North America where automatons may enjoy the benefits of citizenship. In America, this citizenship is known as "declarative," in that an automaton may become a citizen by publicly stating his intention to act freely. In Quebec, citizenship is assumed for all automatons regardless of their ability to speak and act, though it is understood that some simpler machines may not engage fully in society.

Mexico, the Plains Tribal Federation, and many Caribbean island nations prohibit automatons entirely for religious or ideological reasons. In Mexico and the PTF in particular, it is extremely dangerous to travel with or as an automaton, as there are many groups that destroy automatons on sight. Some such groups even raid across borders—especially into Texas—to dismantle whatever technology they can find.

South and Central America

Because the vast majority of this region is Catholic, the papal prohibition against automaton use is very solidly in force. However, there is no direct political association with Texas or the American Consolidated Union, so the application of this prohibition is generally less violent than one might experience in Mexico. Nevertheless, caution is advised for any automaton travel in this area.

Interestingly, some government officials and other well-placed members of society have been known to employ automaton servants in spite of the prohibition. Doing so has become something of a status symbol in some countries. Of course, these automatons cannot be built or acquired legally, so they are typically purchased on an international black market.

Asia

There are no religious or ideological prohibitions against automatons in most of Asia, but there are also few laws protecting or regulating them. They are rare enough in most countries to be considered anomalies, so no one feels compelled to say anything about them one way or the other.

The prevalence of automatons in southern and southeast Asia can largely be linked to European influence. Kolkata and Singapore—cities with strong British influence—both feature significant automaton populations, while Viet Nam and the Philippines are almost completely devoid of them. Automatons are frequently the targets of both air and sea pirate attacks throughout the southeast coast of Asia—ships carrying automatons are advised to take extra precaution when traveling in this area. These pirates sell to dealers who move illegal automatons throughout the world, so this may be the source for the South American black market. It is also likely that Russia is purchasing at least some portion of these stolen automatons.

China produces its own automatons, though in a relatively small number. With human labor widely available, the Qing Dynasty has not seen much need for additional bodies. As a result, thinking machines remain more of a curiosity in China.

Japan, by contrast, has embraced the technology thoroughly and rapidly. The Meiji Empire quickly incorporated automatons into its military and built the most effective fighting automatons in the world: the oni-ni-kanabo. Not only that, but automatons can be found throughout Japan performing all manner of functions. In Japan, automatons are always designed with the expectation that they both fulfill a specific duty and also operate as an independent member of society. Although the functions they serve often involve simple labor, automatons are highly respected, and Japanese people view negatively anyone who claims to "own" one.

Africa and Australia

Although not socially or politically related, these two continents can be described almost identically in terms of the presence of automatons. On the coastal cities, particularly where European influence is strongest, automatons may very occasionally be seen, usually attached to the European households that brought them. However, there have yet to be any recorded examples of automatons being taken into the interior of either continent.

Much of the reason for this lies in the purely practical issues involved in bringing delicate gearwork into the extremely high temperatures that are found on both continents. While it may be relatively simple to design a temperature-

balanced watch, a temperature-balanced thinking machine is another thing entirely. The amount of work necessary to design an automaton specifically for these environments far outweighs any benefit to be derived from doing so. For the moment, automatons are suited only to southern Africa and southeastern Australia. Any further inward and behavior is likely to become erratic.

The High Seas

As with most questions of cargo and citizenship, the registry of an airship or sailing vessel determines the laws that it ostensibly follows regarding automatons. However, automaton piracy is a very real danger in many parts of the world. There is no more valuable commodity on the black market; automatons can be sold as labor, trophies, technological specimens, or just parts. Savvy pirate bands even employ gearsmiths of their own to modify captured automatons so that they are unrecognizable when they are resold. In many cases, the phonographaton is removed so that the automaton can no longer speak.

Because of the hazards of overseas travel, automatons traveling openly—whether alone or as companions—often pay additional security fees. Also, some passenger vessels have instituted a "no-contest" policy if pirates demand that any obvious automatons be turned over. Automaton travelers are advised to check their tickets carefully for such clauses. Alternately, they can be powered down, packed, and shipped as cargo. This is typically safer and cheaper, though considerably less dignified.

Finding Parts and Finding Work

The gearsmithing profession is still quite young. Methods and techniques of automaton design are constantly changing, and new technology becomes available faster almost faster than any one individual can adapt to it. Many gearsmiths hope to contribute something new to science, but even the best find it necessary to focus long hours of work on one aspect of construction or programming to make even the slightest progress. Yet numerous professional journals are shipped around the world every month, full of the latest gadgets for eager gearsmiths to incorporate into their own works.

The effect of this hectic progress has been to separate gearsmiths generally into two groups: the inventors and the technicians. Inventors are those whose primary goal is to create new devices, new projects. In general, these gearsmiths are the ones who build completed automatons and then proudly present them at social events before moving on to their next creation. Most university-trained gearsmiths and their apprentices tend to fall into this category.

The technicians, on the other hand, are entrepreneurs with a scientific bent. They have seen the automation boom as a great opportunity to supply needed parts and services. These gearsmiths typically run shops where they make and sell components for other gearsmiths to use in their projects. Their instruction is often practical; they may be former military repair technicians, apprentices more interested in business than invention, or dabblers who have read enough to figure out how to make a few saleable parts.

The demarcation between these two groups is not perfect. There may be shop owners who can and have constructed an entire automaton, but simply do not often choose to do so. There may also be inventors who insist on crafting every component themselves, although that inevitably means a significantly lower rate of production. The key distinction tends to be that inventors have some initial source of funding, whether personal wealth or investor backing. The development of a complete automaton is a significant financial commitment, and gearsmiths looking to turn a profit quickly discover that selling parts and components is more consistently and immediately lucrative.

With regard to investor backing, the most common funding source for starting gearsmiths trying to get set up on the inventor side is a company—typically mining or transportation—from the Republic of Texas or the Rocky Mountain Republic. These companies are eager to import automatons and will happily ship them from anywhere in the world. This can raise legal issues for gearsmiths in the American Consolidated Union, as an automaton completed in the ACU could declare its citizenship before being sent west. This is typically resolved by only activating the automaton after it leaves the country or by building the automaton without a phonographaton in the first place so that it has no voice with which to declare its citizenship. Both solutions may be ethically questionable, but they are strictly legal.

For the most part, inventors tend to cluster in the cities closest to the five major universities mentioned above. Technicians, on the other hand, go where there is business. They can certainly be found in the college towns, supplying the needs of all those up-and-coming scientists. But they also tend to gather wherever automatons may be. Even the most remote mining town in the Rocky Mountain Republic is just as likely to have a gearsmith as a saloon.

In fact, the greater difficulty for traveling gearsmiths or independent automatons is finding electrical components. A faulty condensor can be one of the most difficult parts to replace while abroad. Even in the RMR, where spark wranglers frequently act as foremen for automaton mines, actual stores selling electrical devices are rare. Most cautious travelers are therefore advised to carry at least one backup power supply for each automaton.

Chapter 6

The Personhood of the Automaton

Editor's Note—I wrote the following essay for the May 20, 1871 edition of Scientific American. Mr. Porter, though a brilliant inventor himself, had remained skeptical on the issue of automaton personhood. After a conversation earlier in that year, he agreed to allow me to not only consider my ideas but to publish them in his magazine. Since that time, I am happy to say that he has shifted in his attitudes. He has not joined with those of us who champion automaton rights in Texas and the Rockies, but that speaks more to his reluctance to involve himself in international politics than to any continuing disagreement on the principles I outlined in my article.

The nature of intelligence remains an open question, and the rapid rise of the thinking machine seems to have confounded its analysis. However, the historical record of this rapid growth may offer us a path to understanding intelligence itself. As we watch automatons rapidly achieve what Mr. Darwin suggested took humans many thousands of years, we may begin to understand exactly this strange quality that we ourselves possess. This is not a new thought—many parlor conversations these days involve speculation on when automatons will be the equal of humans—but I would argue that the core of intelligence is simpler than we presume, and has been demonstrated by automatons from their very earliest stages.

The venerable Professor Lovelace, whom we now think of as the matron of automated thought, began from the most basic of foundations. Her early works were focused on the idea of instructing machines to act in a particular way upon certain conditions being met. The first automated factories she designed for Fitch & Fulton were based on this principle—wait until something expected happens, and then carry out a specific action. Would we say those factories were capable of complex thought? Unlikely. And yet they possessed an unprecedented ability to troubleshoot minute problems in extremely complex processes, an ability that soon outpaced even experienced human workers not only in its execution but more importantly in its analysis.

Detractors of automated thought will no doubt point out that this analysis was very specific and programmatic. Yes, such a factory could rapidly determine if the warp of a textile was not perfectly aligned, but it could not perform a different

but nevertheless simple task like peeling an orange. And to such detractors, I would ask—have you ever handed a child an orange for the first time? Have we as humans not been programmed to solve tasks as well? Our experiences and our teachings train us to act in certain ways when conditions are met. Without them, we are as Locke's tabula rasa—an unprogrammed machine.

Yet the business of the child is learning, and in this aspect the early automated factories were sorely lacking. New tasks were impossible, as every scenario had to be anticipated and built in from the beginning. When changes in the process were required, the device had to be almost entirely remade. However, Mr. Babbage and Countess Lovelace were soon able to encourage the technology in a new direction by focusing on the use of punch cards. In many ways, punch cards offered the first method by which a machine might learn. The first Analytical Engine could be used to perform new tasks simply by replacing its programming. It was a simple machine, only able to hold in its mind—that is, the punch card hopper—one task at a time. Nevertheless, it possessed a capacity to learn that was limited only by the Countess's ability to teach (which was not a significant limitation, given her knowledge of differential calculus).

This capacity to learn was expanded in the first human-shaped automatons that Babbage and Lovelace designed. We can certainly credit Carl Friedrich Beyer and his team (especially the young Franz Realeaux) for the advances in miniaturization that dramatically reduced the scale of thinking machines from building-sized to person-sized. Yet their actual thinking process continued to use the methods that our visionary Countess had developed for textile factories. These methods were simply replicated many times to account for the variety of tasks the new automatons might be expected to perform.

These first examples of modern automatons were designed for battle, so their skill focus was fairly specific. However, they were also provided with the ability to take orders—that is, to accept instructions, analyze how they might be best carried out, and then fulfill them. Consider how profound that advance was in light of the nature of intelligence. Some see it as a logical step from that first Analytical Engine, but in truth those automatons were leagues beyond anything built before. And you can see it in their behavior. I once had the pleasure of meeting an automaton veteran, and I found him to be perhaps somewhat set in his views but overall a respectable and delightful gentleman. If we are to question the personhood of such a man simply because he is formed of brass and gears, I say that there are men of flesh and blood that we must likewise question.

Yet in the last decade, how much greater the mechanical person has become! New technologies seem to spring up every day, resulting in larger vocabularies, finer motor control, and broader skill sets. I know of some gearsmiths who even

design automatons with undefined skill modules built in that can then be used to store new skills chosen by the automaton himself. And I ask—is this not the very heart of intelligence? To reach higher and then to grasp the fruit with one's own hand?

But in the midst of it all, we still find Babbage's Engine and Lovelace's programming. They are still the frame upon which everything else is built. So although many people nowadays are inclined to recognize intelligence in the modern automaton, I shall boldly suggest that it has been present from the beginning. And I must conclude that there is no such thing as the "question" of personhood—automatons are persons, undeniably. How we treat them merely determines whether we are as well.

—Fairman Rogers

Editor's Note—The following theological essay was written by James Andrew Corcoran with the hopes of publishing it in a new edition of the American Catholic Miscellany, a periodical that has languished since its editorial offices were destroyed in a fire some ten years ago. As I am acquainted with Dr. Corcoran and have had many rousing discussions with him, I offered him the opportunity to publish his thoughts in this volume in order to perhaps inspire interest towards reviving the magazine.

American Catholics are beset. The heresies of the modern era surround us and consume us, making our daily travels a continual trial of deciding between anti-social declamation and sinful acquiescence. I see many of my fellow believers wavering, faltering, saying that perhaps we must accept the world as it is rather than how we wish it would be. But faith demands that we remain vigilant and unyielding! Our spiritual leadership demands it! God Himself demands it! As the one true Church wrestles with the devil that is Rationalism, it is our duty as Catholics to fight as well on the side of constancy and to tell the world what we know to be true—that God alone creates life, that the soul is His domain, and that we imperil our own immortality by encroaching on His will.

I was privileged two years ago to attend as one of the American representatives to the first ever General Council to be held in the Vatican Basilica itself. At that venerable gathering, the word "automaton" was never uttered, yet in the forming of its two very important documents—the Dei Filius and the Pastor Aeternus—we may find both evidence of faith to directly deny the personhood of

mechanical devices as well as a path forward for dealing with the social and political questions created by their continued presence.

In the first question—that of personhood—we look to the Dei Filius, the dogmatic constitution on the Catholic faith. It is our faith itself that shows us the ways in which automatons do now and must forever be separate from humans. In Chapter 1, "On God the creator of all things," it is written,

> *This one true God, by his goodness and almighty power, not with the intention of increasing his happiness, nor indeed of obtaining happiness, but in order to manifest his perfection by the good things which he bestows on what he creates, by an absolutely free plan, together from the beginning of time brought into being from nothing the twofold created order, that is the spiritual and the bodily, the angelic and the earthly, and thereafter the human which is, in a way, common to both since it is composed of spirit and body.*

This "twofold created order" of spirit and body is what makes humanity unique. It is our human birthright as stewards of Earth. Automatons were not "brought into being from nothing," they were created by mere human hands. Regardless of how intricate they may be or how impressive they may yet become, they will forever remain devoid of the spirit that God Almighty bequeathed to Man. For this alone, they are no persons.

But there is more to be considered. For some have asked me whether I feel automatons may be saved (foolish as this question may be in light of the absence of a soul). Here, too, our new-forged constitution provides the necessary understanding. In Chapter 3, "On Faith," it is written,

> *Since, then, without faith it is impossible to please God and reach the fellowship of his sons and daughters, it follows that no one can ever achieve justification without it, neither can anyone attain eternal life unless he or she perseveres in it to the end.*

Automatons are creatures not only absent of spirit, but also absent of faith. They cannot hold beliefs in mysteries unknown and unseen. And they certainly cannot persevere in that belief until the end of their days. Without faith, there is no eternal life. Why, then, would we evangelize to faithless constructs? After all, they cannot even partake of the Eucharist, one of the most important sacraments! They cannot commune with God here on Earth. How could they possibly hope for an eternal communion in Heaven?

Automatons, clearly, must remain outside of the Church. But what does this mean for our social and political institutions? How are we as Catholics to behave with regard to these mechanical individuals? What policies should we seek from our governments?

For the answers to these questions, we continue on to the Pastor Aeturnus, the first dogmatic constitution on the church of Christ. The most relevant section lies in Chapter 3, "On the power and character of the primacy of the Roman pontiff," where it is written,

> *And therefore we condemn and reject the opinions of those who hold that this communication of the supreme head with pastors and flocks may be lawfully obstructed; or that it should be dependent on the civil power, which leads them to maintain that what is determined by the apostolic see or by its authority concerning the government of the church, has no force or effect unless it is confirmed by the agreement of the civil authority.*

Let us be clear—no civil authority may contravene the words and teachings of the Church. No civil law may override religious law. The law of Rome stands above all for the faithful. And this law has been clear with regard to automatons—they are not persons, and because they are not they shall not be treated as such.

And of course in many of the more faithful European and South American nations, this has often resulted in full bans on their use and manufacture. However, the countries of North America are awash with Protestants, many of whom are more than willing to engage in the vagaries of Rationalism. Thus it falls to us—the minority Catholics—to stand up to these Baptists, Quakers, Lutherans, and Episcopalians and share our understanding of the automaton as anathema. Yet even if we are unsuccessful in persuading others to our view socially or legally, still we must keep firm. We must avoid the company of automatons, we must deny ourselves the easy luxury of mechanical assistance, and we must proclaim the Truth until the end of our days, for only in this faithfulness can we be assured of our own eternal salvation.

—James Andrew Corcoran

Editor's Note—At first I had considered the previous two essays sufficient to present opposing viewpoints in the discussion of personhood. However, in reviewing the initial manuscript of this volume, my wife asked me why I had not requested the opinion of one for whom this question is anything but academic. She suggested that I inquire of a Mr. Charles, an automaton she has known socially for some time now. Mr. Charles agreed, and this is the letter he wrote in response to my request.

Am I a person? A seemingly important question, yet it cannot be considered without first answering the more difficult variant: What is a person?

Humans often corner me and my kind with discussions of whether we are persons, and at its heart is always the inherent understanding that they themselves must be. But I then wonder—how do they know? If "person" is just another word for "human," then I must acknowledge that I am no person. And yet in that case humans should perhaps look to themselves to raise this question again, for there are still humans that are treated unlike other persons. In the American Consolidated Union, they make up approximately half the population, yet somehow a ballot by the remaining half that should by all rights be called a plurality is nevertheless considered a "majority" in our strange democracy.

Ah, but in this glorious land of the free, I am also privileged with voting rights. And consequently I understand that this does not necessarily resolve the question of personhood. For after all women are allowed to vote in the Rocky Mountain Republic, whereas I would still be considered property. What an odd reversal! Could it be that the laws of nature are transformed as one travels from the Atlantic to the Pacific? Sadly not, as fascinating as such a phenomenon might be. Rather it must be that the laws of man remain inadequate to describe that which truly is. We must not, then, look to laws to tell us what is a person.

So if "person" does not equate to "human," and its definition cannot be clearly provided by current laws, where else can we look to help us discover what this thing may be? Certainly there are those who look to science, but their examinations are primarily concerned with the inner workings—the physical nature of things both biological and mechanical. But what can that possibly tell us? It is true that I share parts with much simpler devices, but so too do humans share parts with much simpler creatures. In both our cases we are more than mere constructions of building blocks. Alternately, some have tried to argue a scientific separation between humans and lesser creatures based on their varying brain sizes. However, I would strongly discourage anyone from pursuing that line of reasoning, as my brain occupies the bulk of my torso and is therefore larger than any man's. No, I do not believe science has a conclusive answer for us.

What of philosophy then? That great and changing art that humans have admired since time immemorial. Let us consider Kierkegaard:

> *For the existing person, existing is for him his highest interest, and his interestedness in existing in his actuality.*

And here in this simple statement, we have an answer! For as an existing person, I have a continued interest in existing. This is what separates the human

from the beast and indeed what separates the clockwork person from the clockwork device. Beasts and devices may be taught to avoid destruction, but they do not pursue existence qua existence. In one fell swoop, Kierkegaard makes me a person.

But what of those who would contest the Danish gentleman? Perhaps his ideas are too new to have been properly examined, and surely someone will come along soon to dissect his logic. Then we should go back further, this time to the great German thinker Immanuel Kant and his Critique of Pure Reason:

> *For if the smallest empirical element of thought, if any particular perception of my internal state, were to be introduced among the grounds of cognition of this science, it would not be a rational, but an empirical doctrine of the soul. We have thus before us a pretended science, raised upon the single proposition, "I think," whose foundation or want of foundation we may very properly, and agreeably with the nature of a transcendental philosophy, here examine…"I think" is therefore the only text of rational psychology, from which it must develop its whole system. It is manifest that this thought, when applied to an object (myself), can contain nothing but transcendental predicates thereof; because the least empirical predicate would destroy the purity of the science and its independence of all experience.*

What profound defense for the ubiquity of personhood! Merely by asserting that "I think," I may immediately and irrevocably join the company of rational persons. And none may question my place without also questioning his own, because my qualifications are the same as any other's. And so we must conclude with Kant that the only reasonable foundation of personhood is the very ability to assert oneself as a person.

And here is where I will provide my small additions to this discussion—the more specific questions of personhood remain interesting and even important, but let us apply them universally. Let philosophy continue to debate on the nature of "person" and religion on the nature of "soul." But let myself and my kind also be included in these debates. And to the curiously self-dividing world of humans, I would humbly suggest the likewise inclusion of all human genders and races. There is much that we can contribute towards the ongoing examination of self, and the growth of understanding can only be increased by the expansion of society to include all persons.

—Mr. Charles of Philadelphia, 1872