SEVENTY-TWO LETTERS

When he was a child, Robert's favorite toy was a simple one, a clay doll that could do nothing but walk forward. While his parents entertained their guests in the garden outside, discussing Victoria's ascension to the throne or the Chartist reforms, Robert would follow the doll as it marched down the corridors of the family home, turning it around corners or back where it came from. The doll didn't obey commands or exhibit any sense at all; if it met a wall, the diminutive clay figure would keep marching until it gradually mashed its arms and legs into misshapen flippers. Sometimes Robert would let it do that, strictly for his own amusement. Once the doll's limbs were thoroughly distorted, he'd pick the toy up and pull the name out, stopping its motion in mid-stride. Then he'd knead the body back into a smooth lump, flatten it out into a plank, and cut out a different figure: a body with one leg crooked, or longer than the other. He would stick the name back into it, and the doll would promptly topple over and push itself around in a little circle.

It wasn't the sculpting that Robert enjoyed; it was mapping out the limits of the name. He liked to see how much variation he could impart to the body before the name could no longer animate it. To save time with the sculpting, he rarely added decorative details; he refined the bodies only as was needed to test the name.

Another of his dolls walked on four legs. The body was a nice one, a finely detailed porcelain horse, but Robert was more interested in experimenting with its name. This name obeyed commands to start and stop and knew enough to avoid obstacles, and Robert tried inserting it into bodies of his own making. But this name had more exacting body requirements, and he was never able to form a clay body it could animate. He formed the legs separately and then attached them to the body, but he wasn't able to erase the seams fully; the name didn't recognize the body as a single continuous piece.

He scrutinized the names themselves, looking for some simple substitutions that might distinguish two-leggedness from four-leggedness, or make the body obey simple commands. But the names looked entirely different; on each scrap of parchment were inscribed seventy-two tiny Hebrew letters, arranged in twelve rows of six, and so far as he could tell, the order of the letters was utterly random.

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Robert Stratton and his fourth-form classmates sat quietly as Master Trevelyan paced between the rows of desks.

“Langdale, what is the doctrine of names?”

“All things are reflections of God, and, um, all—”

“Spare us your bumbling. Thorburn, can you tell us the doctrine of names?”

“As all things are reflections of God, so are all names reflections of the divine name.”

“And what is an object’s true name?”

“That name which reflects the divine name in the same manner as the object reflects God.”

“And what is the action of a true name?”

“To endow its object with a reflection of divine power.”

“Correct. Halliwell, what is the doctrine of signatures?”

The natural philosophy lesson continued until noon, but because it was a Saturday, there was no instruction for the rest of the day. Master Trevelyan dismissed the class, and the boys of Cheltenham school dispersed.

After stopping at the dormitory, Robert met his friend Lionel at the border of school grounds. “So the wait’s over? Today’s the day?” Robert asked.

“I said it was, didn’t I?”

“Let’s go, then.” The pair set off to walk the mile and a half to Lionel’s home.

During his first year at Cheltenham, Robert had known Lionel hardly at all; Lionel was one of the day boys, and Robert, like all the boarders, regarded them with suspicion. Then, purely by chance, Robert ran into him while on holiday, during a visit to the British Museum. Robert loved the museum: the frail mummies and immense sarcophagi; the stuffed platypus and pickled mermaid; the wall bristling with elephant tusks and moose antlers and unicorn horns. That particular day he was at the display of elemental sprites: he was reading the card explaining the salamander’s absence when he suddenly recognized Lionel, standing right next to him, peering at the undine in its jar. Conversation revealed their shared interest in the sciences, and the two became fast friends.

As they walked down the road, they kicked a large pebble back and forth between them. Lionel gave the pebble a kick, and laughed as it skittered between Robert’s

ankles. “I couldn’t wait to get out of there,” he said. “I think one more doctrine would have been more than I could bear.”

“Why do they even bother calling it natural philosophy?” said Robert. “Just admit it’s another theology lesson and be done with it.” The two of them had recently purchased A Boy’s Guide to Nomenclature, which informed them that nomenclators no longer spoke in terms of God or the divine name. Instead, current thinking held that there was a lexical universe as well as a physical one, and bringing an object together with a compatible name caused the latent potentialities of both to be realized. Nor was there a single “true name” for a given object: depending on its precise shape, a body might be compatible with several names, known as its “euonyms,” and conversely a simple name might tolerate significant variations in body shape, as his childhood marching doll had demonstrated.

When they reached Lionel’s home, they promised the cook they would be in for dinner shortly and headed to the garden out back. Lionel had converted a toolshed in his family’s garden into a laboratory, which he used to conduct experiments. Normally Robert came by on a regular basis, but recently Lionel had been working on an experiment that he was keeping secret. Only now was he ready to show Robert his results. Lionel had Robert wait outside while he entered first, and then let him enter.

A long shelf ran along every wall of the shed, crowded with racks of vials, stoppered bottles of green glass, and assorted rocks and mineral specimens. A table decorated with stains and scorch marks dominated the cramped space, and it supported the apparatus for Lionel’s latest experiment: a cucurbit clamped in a stand so that its bottom rested in a basin full of water, which in turn sat on a tripod above a lit oil lamp. A mercury thermometer was also fixed in the basin.

“Take a look,” said Lionel.

Robert leaned over to inspect the cucurbit’s contents. At first it appeared to be nothing more than foam, a dollop of suds that might have dripped off a pint of stout. But as he looked closer, he realized that what he thought were bubbles were actually the interstices of a glistening latticework. The froth consisted of homunculi: tiny seminal foetuses. Their bodies were transparent individually, but collectively their bulbous heads and strandlike limbs adhered to form a pale, dense foam.

“So you wanked off into a jar and kept the spunk warm?” he asked, and Lionel shoved him. Robert laughed and raised his hands in a placating gesture. “No, honestly, it’s a wonder. How’d you do it?”

Mollified, Lionel said, “It’s a real balancing act. You have to keep the temperature just right, of course, but if you want them to grow, you also have to keep just the right mix of nutrients. Too thin a mix, and they starve. Too rich, and they get over lively and

start fighting with each other.”

“You’re having me on.”

“It’s the truth; look it up if you don’t believe me. Battles amongst sperm are what cause monstrosities to be born. If an injured foetus is the one that makes it to the egg, the baby that’s born is deformed.”

“I thought that was because of a fright the mother had when she was carrying.” Robert could just make out the minuscule squirmings of the individual foetuses. He realized that the froth was ever so slowly roiling as a result of their collective motions.

“That’s only for some kinds, like ones that are all hairy or covered in blotches. Babies that don’t have arms or legs, or have misshapen ones, they’re the ones that got caught in a fight back when they were sperm. That’s why you can’t provide too rich a broth, especially if they haven’t any place to go: they get in a frenzy. You can lose all of them pretty quick that way.”

“How long can you keep them growing?”

“Probably not much longer,” said Lionel. “It’s hard to keep them alive if they haven’t reached an egg. I read about one in France that was grown till it was the size of a fist, and they had the best equipment available. I just wanted to see if I could do it at all.”

Robert stared at the foam, remembering the doctrine of preformation that Master Trevelyan had drilled into them: all living things had been created at the same time, long ago, and births today were merely enlargements of the previously imperceptible. Although they appeared newly created, these homunculi were countless years old; for all of human history they had lain nested within generations of their ancestors, waiting for their turn to be born.

In fact, it wasn’t just them who had waited; he himself must have done the same thing prior to his birth. If his father were to do this experiment, the tiny figures Robert saw would be his unborn brothers and sisters. He knew they were insensible until reaching an egg, but he wondered what thoughts they’d have if they weren’t. He imagined the sensation of his body, every bone and organ soft and clear as gelatin, sticking to those of myriad identical siblings. What would it be like, looking through transparent eyelids, realizing the mountain in the distance was actually a person, recognizing it as his brother? What if he knew he’d become as massive and solid as that colossus, if only he could reach an egg? It was no wonder they fought.

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Robert Stratton went on to read nomenclature at Cambridge’s Trinity College. There

he studied kabbalistic texts written centuries before, when nomenclators were still called ba'alei shem and automata were called golem, texts that laid the foundation for the science of names: the Sefer Yezirah, Eleazar of Worms' Sodei Razayya, Abulafia's Hayyei ha-Olam ha-Ba. Then he studied the alchemical treatises that placed the techniques of alphabetic manipulation in a broader philosophical and mathematical context: Llull's Ars Magna, Agrippa's De Occulta Philosophia, Dee's Monas Hieroglyphica.

He learned that every name was a combination of several epithets, each designating a specific trait or capability. Epithets were generated by compiling all the words that described the desired trait: cognates and etymons, from languages both living and extinct. By selectively substituting and permuting letters, one could distill from those words their common essence, which was the epithet for that trait. In certain instances, epithets could be used as the bases for triangulation, allowing one to derive epithets for traits undescribed in any language. The entire process relied on intuition as much as formulae; the ability to choose the best letter permutations was an unteachable skill.

He studied the modern techniques of nominal integration and factorization, the former being the means by which a set of epithets—pithy and evocative—were commingled into the seemingly random string of letters that made up a name, the latter by which a name was decomposed into its constituent epithets. Not every method of integration had a matching factorization technique: a powerful name might be refactored to yield a set of epithets different from those used to generate it, and those epithets were often useful for that reason. Some names resisted refactorization, and nomenclators strove to develop new techniques to penetrate their secrets.

Nomenclature was undergoing something of a revolution during this time. There had long been two classes of names: those for animating a body, and those functioning as amulets. Health amulets were worn as protection from injury or illness, while others rendered a house resistant to fire or a ship less likely to founder at sea. Of late, however, the distinction between these categories of names was becoming blurred, with exciting results.

The nascent science of thermodynamics, which established the interconvertibility of heat and work, had recently explained how automata gained their motive power by absorbing heat from their surroundings. Using this improved understanding of heat, a Namenmeister in Berlin had developed a new class of amulet that caused a body to absorb heat from one location and release it in another. Refrigeration employing such amulets was simpler and more efficient than that based on the evaporation of a volatile fluid, and had immense commercial application. Amulets were likewise facilitating the improvement of automata: an Edinburgh nomenclator's research into the amulets that prevented objects from becoming lost had led him to patent a household automaton able to return objects to their proper places.

Upon graduation, Stratton took up residence in London and secured a position as a nomenclator at Coade Manufactory, one of the leading makers of automata in England.

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Stratton’s most recent automaton, cast from plaster of Paris, followed a few paces behind him as he entered the factory building. It was an immense brick structure with skylights for its roof; half of the building was devoted to casting metal, the other half to ceramics. In either section, a meandering path connected the various rooms, each one housing the next step in transforming raw materials into finished automata. Stratton and his automaton entered the ceramics portion.

They walked past a row of low vats in which the clay was mixed. Different vats contained different grades of clay, ranging from common red clay to fine white kaolin, resembling enormous mugs abrim with liquid chocolate or heavy cream; only the strong mineral smell broke the illusion. The paddles stirring the clay were connected by gears to a drive shaft, mounted just beneath the skylights, that ran the length of the room. At the end of the room stood an automatous engine: a cast-iron giant that cranked the drive wheel tirelessly. Walking past, Stratton could detect a faint coolness in the air as the engine drew heat from its surroundings.

The next room held the molds for casting. Chalky white shells bearing the inverted contours of various automata were stacked along the walls. In the central portion of the room, apron-clad journeymen sculptors worked singly and in pairs, tending the cocoons from which automata were hatched.

The sculptor nearest him was assembling the mold for a putter, a broad-headed quadruped employed in the mines for pushing trolleys of ore. The young man looked up from his work. “Were you looking for someone, sir?” he asked.

“I’m to meet Master Willoughby here,” replied Stratton.

“Pardon, I didn’t realize. I’m sure he’ll be here shortly.” The journeyman returned to his task. Harold Willoughby was a Master Sculptor First-Degree; Stratton was consulting him on the design of a reusable mold for casting his automaton. While he waited, Stratton strolled idly amongst the molds. His automaton stood motionless, ready for its next command.

Willoughby entered from the door to the metalworks, his face flushed from the heat of the foundry. “My apologies for being late, Mr. Stratton,” he said. “We’ve been working toward a large bronze for some weeks now, and today was the pour. You don’t want to leave the lads alone at a time like that.”

“I understand completely,” replied Stratton.

Wasting no time, Willoughby strode over to the new automaton. “Is this what you’ve had Moore doing all these months?” Moore was the journeyman assisting Stratton on his project.

Stratton nodded. “The boy does good work.” Following Stratton’s requests, Moore had fashioned countless bodies, all variations on a single basic theme, by applying modeling clay to an armature, and then used them to create plaster casts on which Stratton could test his names.

Willoughby inspected the body. “Some nice detail; looks straightforward enough—hold on now.” He pointed to the automaton’s hands: rather than the traditional paddle or mitten design, with fingers suggested by grooves in the surface, these were fully formed, each one having a thumb and four distinct and separate fingers. “You don’t mean to tell me those are functional?”

“That’s correct.”

Willoughby’s skepticism was plain. “Show me.”

Stratton addressed the automaton. “Flex your fingers.” The automaton extended both hands, flexed and straightened each pair of fingers in turn, and then returned its arms to its sides.

“I congratulate you, Mr. Stratton,” said the sculptor. He squatted to examine the automaton’s fingers more closely. “The fingers need to be bent at each joint for the name to take?”

“That’s right. Can you design a piece mold for such a form?”

Willoughby clicked his tongue several times. “That’ll be a tricky bit of business,” he said. “We might have to use a waste mold for each casting. Even with a piece mold, these’d be very expensive for ceramic.”

“I think they will be worth the expense. Permit me to demonstrate.” Stratton addressed the automaton. “Cast a body; use that mold over there.”

The automaton trudged over to a nearby wall and picked up the pieces of the mold Stratton had indicated: it was the mold for a small porcelain messenger. Several journeymen stopped what they were doing to watch the automaton carry the pieces over to a work area. There it fitted the various sections together and bound them tightly with twine. The sculptors’ wonderment was apparent as they watched the automaton’s fingers work, looping and threading the loose ends of the twine into a

knot. Then the automaton stood the assembled mold upright and headed off to get a pitcher of clay slip.

“That’s enough,” said Willoughby. The automaton stopped its work and resumed its original standing posture. Examining the mold, Willoughby asked, “Did you train it yourself?”

“I did. I hope to have Moore train it in metal casting.”

“Do you have names that can learn other tasks?”

“Not as yet. However, there’s every reason to believe that an entire class of similar names exists, one for every sort of skill needing manual dexterity.”

“Indeed?” Willoughby noticed the other sculptors watching, and called out, “If you’ve nothing to do, there’s plenty I can assign to you.” The journeymen promptly resumed their work, and Willoughby turned back to Stratton. “Let us go to your office to speak about this further.”

“Very well.” Stratton had the automaton follow the two of them back to the frontmost of the complex of connected buildings that was Coade Manufactory. They first entered Stratton’s studio, which was situated behind his office proper. Once inside, Stratton addressed the sculptor. “Do you have an objection to my automaton?”

Willoughby looked over a pair of clay hands mounted on a worktable. On the wall behind the table were pinned a series of schematic drawings showing hands in a variety of positions. “You’ve done an admirable job of emulating the human hand. I am concerned, however, that the first skill in which you trained your new automaton is sculpture.”

“If you’re worried that I am trying to replace sculptors, you needn’t be. That is absolutely not my goal.”

“I’m relieved to hear it,” said Willoughby. “Why did you choose sculpture, then?”

“It is the first step of a rather indirect path. My ultimate goal is to allow automatous engines to be manufactured inexpensively enough so that most families could purchase one.”

Willoughby’s confusion was apparent. “How, pray tell, would a family make use of an engine?”

“To drive a powered loom, for example.”

“What are you going on about?”

“Have you ever seen children who are employed at a textile mill? They are worked to exhaustion; their lungs are clogged with cotton dust; they are so sickly that you can hardly conceive of their reaching adulthood. Cheap cloth is bought at the price of our workers’ health; weavers were far better off when textile production was a cottage industry.”

“Powered looms were what took weavers out of cottages. How could they put them back in?”

Stratton had not spoken of this before, and welcomed the opportunity to explain. “The cost of automatous engines has always been high, and so we have mills in which scores of looms are driven by an immense coal-heated Goliath. But an automaton like mine could cast engines very cheaply. If a small automatous engine, suitable for driving a few machines, becomes affordable to a weaver and his family, then they can produce cloth from their home as they did once before. People could earn a decent income without being subjected to the conditions of the factory.”

“You forget the cost of the loom itself,” said Willoughby gently, as if humoring him. “Powered looms are considerably more expensive than the hand looms of old.”

“My automata could also assist in the production of cast-iron parts, which would reduce the price of powered looms and other machines. This is no panacea, I know, but I am nonetheless convinced that inexpensive engines offer the chance of a better life for the individual craftsman.”

“Your desire for reform does you credit. Let me suggest, however, that there are simpler cures for the social ills you cite: a reduction in working hours, or the improvement of conditions. You do not need to disrupt our entire system of manufacturing.”

“I think what I propose is more accurately described as a restoration than a disruption.”

Now Willoughby became exasperated. “This talk of returning to a family economy is all well and good, but what would happen to sculptors? Your intentions notwithstanding, these automata of yours would put sculptors out of work. These are men who have undergone years of apprenticeship and training. How would they feed their families?”

Stratton was unprepared for the sharpness in his tone. “You overestimate my skills as a nomenclator,” he said, trying to make light. The sculptor remained dour. He continued. “The learning capabilities of these automata are extremely limited. They can manipulate molds, but they could never design them; the real craft of sculpture

can be performed only by sculptors. Before our meeting, you had just finished directing several journeymen in the pouring of a large bronze; automata could never work together in such a coordinated fashion. They will perform only rote tasks."

"What kind of sculptors would we produce if they spend their apprenticeship watching automata do their jobs for them? I will not have a venerable profession reduced to a performance by marionettes."

"That is not what would happen," said Stratton, becoming exasperated himself now. "But examine what you yourself are saying: the status that you wish your profession to retain is precisely that which weavers have been made to forfeit. I believe these automata can help restore dignity to other professions, and without great cost to yours."

Willoughby seemed not to hear him. "The very notion that automata would make automata! Not only is the suggestion insulting, it seems ripe for calamity. What of that ballad, the one where the broomsticks carry water buckets and run amuck?"

"You mean 'Der Zauberlehrling'?" said Stratton. "The comparison is absurd. These automata are so far removed from being in a position to reproduce themselves without human participation that I scarcely know where to begin listing the objections. A dancing bear would sooner perform in the London Ballet."

"If you'd care to develop an automaton that can dance the ballet, I would fully support such an enterprise. However, you cannot continue with these dexterous automata."

"Pardon me, sir, but I am not bound by your decisions."

"You'll find it difficult to work without sculptors' cooperation. I shall recall Moore and forbid all the other journeymen from assisting you in any way with this project."

Stratton was momentarily taken aback. "Your reaction is completely unwarranted."

"I think it entirely appropriate."

"In that case, I will work with sculptors at another manufactory."

Willoughby frowned. "I will speak with the head of the Brotherhood of Sculptors, and recommend that he forbid all of our members from casting your automata."

Stratton could feel his blood rising. "I will not be bullied," he said. "Do what you will, but you cannot prevent me from pursuing this."

"I think our discussion is at an end." Willoughby strode to the door. "Good day to you,

Mr. Stratton.”

“Good day to you,” replied Stratton heatedly.

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It was the following day, and Stratton was taking his midday stroll through the district of Lambeth, where Coade Manufactory was located. After a few blocks he stopped at a local market; sometimes among the baskets of writhing eels and blankets spread with cheap watches were automatous dolls, and Stratton retained his boyhood fondness for seeing the latest designs. Today he noticed a new pair of boxing dolls, painted to look like an explorer and a savage. As he looked them over awhile, he could hear nostrum peddlers competing for the attention of a passerby with a runny nose.

“I see your health amulet failed you, sir,” said one man whose table was arrayed with small square tins. “Your remedy lies in the curative powers of magnetism, concentrated in Doctor Sedgewick’s Polarising Tablets!”

“Nonsense!” retorted an old woman. “What you need is tincture of mandrake, tried and true!” She held out a vial of clear liquid. “The dog wasn’t cold yet when this extract was prepared! There’s nothing more potent.”

Seeing no other new dolls, Stratton left the market and walked on, his thoughts returning to what Willoughby had said yesterday. Without the cooperation of the sculptors’ trade union, he’d have to resort to hiring independent sculptors. He hadn’t worked with such individuals before, and some investigation would be required: ostensibly they cast bodies only for use with public-domain names, but for certain individuals these activities disguised patent infringement and piracy, and any association with them could permanently blacken his reputation.

“Mr. Stratton.”

Stratton looked up. A small, wiry man, plainly dressed, stood before him. “Yes; do I know you, sir?”

“No, sir. My name is Davies. I’m in the employ of Lord Fieldhurst.” He handed Stratton a card bearing the Fieldhurst crest.

Edward Maitland, third earl of Fieldhurst and a noted zoologist and comparative anatomist, was president of the Royal Society. Stratton had heard him speak during sessions of the Royal Society, but they had never been introduced. “What can I do for you?”

“Lord Fieldhurst would like to speak with you, at your earliest convenience, regarding

your recent work."

Stratton wondered how the earl had learned of his work. "Why did you not call on me at my office?"

"Lord Fieldhurst prefers privacy in this matter." Stratton raised his eyebrows, but Davies didn't explain further. "Are you available this evening?"

It was an unusual invitation, but an honor nonetheless. "Certainly. Please inform Lord Fieldhurst that I would be delighted."

"A carriage will be outside your building at eight tonight." Davies touched his hat and was off.

At the promised hour, Davies arrived with the carriage. It was a luxurious vehicle, with an interior of lacquered mahogany and polished brass and brushed velvet. The tractor that drew it was an expensive one as well, a steed cast of bronze and needing no driver for familiar destinations.

Davies politely declined to answer any questions while they rode. He was obviously not a manservant, nor a secretary, but Stratton could not decide what sort of employee he was. The carriage carried them out of London into the countryside, until they reached Darrington Hall, one of the residences owned by the Fieldhurst lineage.

Once inside the home, Davies led Stratton through the foyer and then ushered him into an elegantly appointed study; he closed the doors without entering himself.

Seated at the desk within the study was a barrel-chested man wearing a silk coat and cravat; his broad, deeply creased cheeks were framed by woolly gray muttonchops. Stratton recognized him at once.

"Lord Fieldhurst, it is an honor."

"A pleasure to meet you, Mr. Stratton. You've been doing some excellent work recently."

"You are most kind. I did not realize that my work had become known."

"I make an effort to keep track of such things. Please, tell me what motivated you to develop such automata."

Stratton explained his plans for manufacturing affordable engines. Fieldhurst listened with interest, occasionally offering cogent suggestions.

“It is an admirable goal,” he said, nodding his approval. “I’m pleased to find that you have such philanthropic motives, because I would ask your assistance in a project I’m directing.”

“It would be my privilege to help in any way I could.”

“Thank you.” Fieldhurst’s expression became solemn. “This is a matter of grave import. Before I speak further, I must first have your word that you will retain everything I reveal to you in the utmost confidence.”

Stratton met the earl’s gaze directly. “Upon my honor as a gentleman, sir, I shall not divulge anything you relate to me.”

“Thank you, Mr. Stratton. Please come this way.” Fieldhurst opened a door in the rear wall of the study and they walked down a short hallway. At the end of the hallway was a laboratory; a long, scrupulously clean worktable held a number of stations, each consisting of a microscope and an articulated brass framework of some sort, equipped with three mutually perpendicular knurled wheels for performing fine adjustments. An elderly man was peering into the microscope at the furthest station; he looked up from his work as they entered.

“Mr. Stratton, I believe you know Dr. Ashbourne.”

Stratton, caught off guard, was momentarily speechless. Nicholas Ashbourne had been a lecturer at Trinity when Stratton was studying there, but had left years ago to pursue studies of, it was said, an unorthodox nature. Stratton remembered him as one of his most enthusiastic instructors. Age had narrowed his face somewhat, making his high forehead seem even higher, but his eyes were as bright and alert as ever. He walked over with the help of a carved ivory walking stick.

“Stratton, good to see you again.”

“And you, sir. I was truly not expecting to see you here.”

“This will be an evening full of surprises, my boy. Prepare yourself.” He turned to Fieldhurst. “Would you care to begin?”

They followed Fieldhurst to the far end of the laboratory, where he opened another door and led them down a flight of stairs. “Only a small number of individuals—either Fellows of the Royal Society or Members of Parliament, or both—are privy to this matter. Five years ago, I was contacted confidentially by the Académie des Sciences in Paris. They wished for English scientists to confirm certain experimental findings of theirs.”

“Indeed?”

“You can imagine their reluctance. However, they felt the matter outweighed national rivalries, and once I understood the situation, I agreed.”

The three of them descended to a cellar. Gas brackets along the walls provided illumination, revealing the cellar’s considerable size; its interior was punctuated by an array of stone pillars that rose to form groined vaults. The long cellar contained row upon row of stout wooden tables, each one supporting a tank roughly the size of a bathtub. The tanks were made of zinc and fitted with plate-glass windows on all four sides, revealing their contents as a clear, faintly straw-colored fluid.

Stratton looked at the nearest tank. There was a distortion floating in the center of the tank, as if some of the liquid had congealed into a mass of jelly. It was difficult to distinguish the mass’s features from the mottled shadows cast on the bottom of the tank, so he moved to another side of the tank and squatted down low to view the mass directly against a flame of a gas lamp. It was then that the coagulum resolved itself into the ghostly figure of a man, clear as aspic, curled up in foetal position.

“Incredible,” Stratton whispered.

“We call it a megafoetus,” explained Fieldhurst.

“This was grown from a spermatozoon? This must have required decades.”

“It did not, more’s the wonder. Several years ago, two Parisian naturalists named Dubuisson and Gille developed a method of inducing hypertrophic growth in a seminal foetus. The rapid infusion of nutrients allows such a foetus to reach this size within a fortnight.”

By shifting his head back and forth, he saw slight differences in the way the gaslight was refracted, indicating the boundaries of the megafoetus’s internal organs. “Is this creature…alive?”

“Only in an insensate manner, like a spermatozoon. No artificial process can replace gestation; it is the vital principle within the ovum which quickens the foetus, and the maternal influence which transforms it into a person. All we’ve done is effect a maturation in size and scale.” Fieldhurst gestured toward the megafoetus. “The maternal influence also provides a foetus with pigmentation and all distinguishing physical characteristics. Our megafoetuses have no features beyond their sex. Every male bears the generic appearance you see here, and all the females are likewise identical. Within each sex, it is impossible to distinguish one from another by physical examination, no matter how dissimilar the original fathers might have been; only rigorous record keeping allows us to identify each megafoetus.”

Stratton stood up again. “So what was the intention of the experiment if not to develop an artificial womb?”

“To test the notion of the fixity of species.” Realizing that Stratton was not a zoologist, the earl explained further. “Were lens grinders able to construct microscopes of unlimited magnifying power, biologists could examine the future generations nested in the spermatozoa of any species and see whether their appearance remains fixed, or changes to give rise to a new species. In the latter case, they could also determine if the transition occurs gradually or abruptly.

“However, chromatic aberration imposes an upper limit on the magnifying power of any optical instrument. Messieurs Dubuisson and Gille hit upon the idea of artificially increasing the size of the foetuses themselves. Once a foetus reaches its adult size, one can extract a spermatozoon from it and enlarge a foetus from the next generation in the same manner.” Fieldhurst stepped over to the next table in the row and indicated the tank it supported. “Repetition of the process lets us examine the unborn generations of any given species.”

Stratton looked around the room. The rows of tanks took on a new significance. “So they compressed the intervals between ‘births’ to gain a preliminary view of our genealogical future.”

“Precisely.”

“Audacious! And what were the results?”

“They tested many animal species, but never observed any changes in form. However, they obtained a peculiar result when working with the seminal foetuses of humans. After no more than five generations, the male foetuses held no more spermatozoa, and the females held no more ova. The line terminated in a sterile generation.”

“I imagine that wasn’t entirely unexpected,” Stratton said, glancing at the jellied form. “Each repetition must further attenuate some essence in the organisms. It’s only logical that at some point the offspring would be so feeble that the process would fail.”

“That was Dubuisson and Gille’s initial assumption as well,” agreed Fieldhurst, “so they sought to improve their technique. However, they could find no difference between megafoetuses of succeeding generations in terms of size or vitality. Nor was there any decline in the number of spermatozoa or ova; the penultimate generation was fully as fertile as the first. The transition to sterility was an abrupt one.

“They found another anomaly as well: while some spermatozoa yielded only four or fewer generations, variation occurred only across samples, never within a single

sample. They evaluated samples from father and son donors, and in such instances, the father's spermatozoa produced exactly one more generation than the son's. And from what I understand, some of the donors were aged individuals indeed. While their samples held very few spermatozoa, they nonetheless held one more generation than those from sons in the prime of their lives. The progenitive power of the sperm bore no correlation with the health or vigor of the donor; instead, it correlated with the generation to which the donor belonged."

Fieldhurst paused and looked at Stratton gravely. "It was at this point that the Académie contacted me to see if the Royal Society could duplicate their findings. Together we have obtained the same result using samples collected from peoples as varied as the Lapps and the Hottentots. We are in agreement as to the implication of these findings: that the human species has the potential to exist for only a fixed number of generations, and we are within five generations of the final one."

—

Stratton turned to Ashbourne, half expecting him to confess that it was all an elaborate hoax, but the elder nomenclator looked entirely solemn. Stratton looked at the megafoetus again and frowned, absorbing what he had heard. "If your interpretation is correct, other species must be subject to a similar limitation. Yet from what I know, the extinction of a species has never been observed."

Fieldhurst nodded. "That is true. However, we do have the evidence of the fossil record, which suggests that species remain unchanged for a period of time, and then are abruptly replaced by new forms. The Catastrophists hold that violent upheavals caused species to become extinct. Based on what we've discovered regarding preformation, it now appears that extinctions are merely the result of a species reaching the end of its lifetime. They are natural rather than accidental deaths, in a manner of speaking." He gestured to the doorway from which they had entered. "Shall we return upstairs?"

Following the two other men, Stratton asked, "And what of the origination of new species? If they're not born from existing species, do they arise spontaneously?"

"That is as yet uncertain. Normally only the simplest animals arise by spontaneous generation: maggots and other vermiform creatures, typically under the influence of heat. The events postulated by Catastrophists—floods, volcanic eruptions, cometary impacts—would entail the release of great energies. Perhaps such energies affect matter so profoundly as to cause the spontaneous generation of an entire race of organisms, nested within a few progenitors. If so, cataclysms are not responsible for mass extinctions, but rather generate new species in their wake."

Back in the laboratory, the two elder men seated themselves in the chairs present. Too

agitated to follow suit, Stratton remained standing. “If any animal species were created by the same cataclysm as the human species, they should likewise be nearing the end of their life spans. Have you found another species that evinces a final generation?”

Fieldhurst shook his head. “Not as yet. We believe that other species have different dates of extinction, correlated with the biological complexity of the animal; humans are presumably the most complex organism, and perhaps fewer generations of such complex organisms can be nested inside a spermatozoon.”

“By the same token,” countered Stratton, “perhaps the complexity of the human organism makes it unsuitable for the process of artificially accelerated growth. Perhaps it is the process whose limits have been discovered, not the species.”

“An astute observation, Mr. Stratton. Experiments are continuing with species that more closely resemble humans, such as chimpanzees and ourang-outangs. However, the unequivocal answer to this question may require years, and if our current interpretation is correct, we can ill afford the time spent waiting for confirmation. We must ready a course of action immediately.”

“But five generations could be over a century—” He caught himself, embarrassed at having overlooked the obvious: not all persons became parents at the same age.

Fieldhurst read his expression. “You realize why not all the sperm samples from donors of the same age produced the same number of generations: some lineages are approaching their end faster than others. For a lineage in which the men consistently father children late in life, five generations might mean over two centuries of fertility, but there are undoubtedly lineages that have reached their end already.”

Stratton imagined the consequences. “The loss of fertility will become increasingly apparent to the general populace as time passes. Panic may arise well before the end is reached.”

“Precisely, and rioting could extinguish our species as effectively as the exhaustion of generations. That is why time is of the essence.”

“What is the solution you propose?”

“I shall defer to Dr. Ashbourne to explain further,” said the earl.

Ashbourne rose and instinctively adopted the stance of a lecturing professor. “Do you recall why it was that all attempts to make automata out of wood were abandoned?”

Stratton was caught off guard by the question. “It was believed that the natural grain

of wood implies a form in conflict with whatever we try to carve upon it. Currently there are efforts to use rubber as a casting material, but none have met with success."

"Indeed. But if the native form of wood were the only obstacle, shouldn't it be possible to animate an animal's corpse with a name? There the form of the body should be ideal."

"It's a macabre notion; I couldn't guess at such an experiment's likelihood of success. Has it ever been attempted?"

"In fact it has: also unsuccessfully. So these two entirely different avenues of research proved fruitless. Does that mean there is no way to animate organic matter using names? This was the question I left Trinity in order to pursue."

"And what did you discover?"

Ashbourne deflected the question with a wave of his hand. "First let us discuss thermodynamics. Have you kept up with recent developments? Then you know the dissipation of heat reflects an increase in disorder at the thermal level. Conversely, when an automaton condenses heat from its environment to perform work, it increases order. This confirms a long-held belief of mine that lexical order induces thermodynamic order. The lexical order of an amulet reinforces the order a body already possesses, thus providing protection against damage. The lexical order of an animating name increases the order of a body, thus providing motive power for an automaton.

"The next question was, how would an increase in order be reflected in organic matter? Since names don't animate dead tissue, obviously organic matter doesn't respond at the thermal level; but perhaps it can be ordered at another level. Consider: a steer can be reduced to a vat of gelatinous broth. The broth comprises the same material as the steer, but which embodies a higher amount of order?"

"The steer, obviously," said Stratton, bewildered.

"Obviously. An organism, by virtue of its physical structure, embodies order; the more complex the organism, the greater the amount of order. It was my hypothesis that increasing the order in organic matter would be evidenced by imparting form to it. However, most living matter has already assumed its ideal form. The question is, what has life but not form?"

The elder nomenclator did not wait for a response. "The answer is, an unfertilized ovum. The ovum contains the vital principle that animates the creature it ultimately gives rise to, but it has no form itself. Ordinarily, the ovum incorporates the form of the foetus compressed within the spermatozoon that fertilizes it. The next step was

obvious.” Here Ashbourne waited, looking at Stratton expectantly.

Stratton was at a loss. Ashbourne seemed disappointed, and continued. “The next step was to artificially induce the growth of an embryo from an ovum, by application of a name.”

“But if the ovum is unfertilized,” objected Stratton, “there is no preexisting structure to enlarge.”

“Precisely.”

“You mean structure would arise out of a homogenous medium? Impossible.”

“Nonetheless, it was my goal for several years to confirm this hypothesis. My first experiments consisted of applying a name to unfertilized frog eggs.”

“How did you embed the name into a frog’s egg?”

“The name is not actually embedded, but rather impressed by means of a specially manufactured needle.” Ashbourne opened a cabinet that sat on the worktable between two of the microscope stations. Inside was a wooden rack filled with small instruments arranged in pairs. Each was tipped with a long glass needle; in some pairs they were nearly as thick as those used for knitting, in others as slender as a hypodermic. He withdrew one from the largest pair and handed it to Stratton to examine. The glass needle was not clear, but instead seemed to contain some sort of dappled core.

Ashbourne explained. “While that may appear to be some sort of medical implement, it is in fact a vehicle for a name, just as the more conventional slip of parchment is. Alas, it requires far more effort to make than taking pen to parchment. To create such a needle, one must first arrange fine strands of black glass within a bundle of clear glass strands so that the name is legible when they are viewed end-on. The strands are then fused into a solid rod, and the rod is drawn out into an ever thinner strand. A skilled glassmaker can retain every detail of the name no matter how thin the strand becomes. Eventually one obtains a needle containing the name in its cross section.”

“How did you generate the name that you used?”

“We can discuss that at length later. For the purposes of our current discussion, the only relevant information is that I incorporated the sexual epithet. Are you familiar with it?”

“I know of it.” It was one of the few epithets that was dimorphic, having male and female variants.

“I needed two versions of the name, obviously, to induce the generation of both males and females.” He indicated the paired arrangement of needles in the cabinet.

Stratton saw that the needle could be clamped into the brass framework with its tip approaching the slide beneath the microscope; the knurled wheels presumably were used to bring the needle into contact with an ovum. He returned the instrument. “You said the name is not embedded, but impressed. Do you mean to tell me that touching the frog’s egg with this needle is all that’s needed? Removing the name doesn’t end its influence?”

“Precisely. The name activates a process in the egg that cannot be reversed. Prolonged contact of the name had no different effect.”

“And the egg hatched a tadpole?”

“Not with the names initially tried; the only result was that symmetrical involutions appeared in the surface of the egg. But by incorporating different epithets, I was able to induce the egg to adopt different forms, some of which had every appearance of embryonic frogs. Eventually I found a name that caused the egg not only to assume the form of a tadpole, but also to mature and hatch. The tadpole thus hatched grew into a frog indistinguishable from any other member of the species.”

“You had found a euonym for that species of frog,” said Stratton.

Ashbourne smiled. “As this method of reproduction does not involve sexual congress, I have termed it ‘parthenogenesis.’ ”

Stratton looked at both him and Fieldhurst. “It’s clear what your proposed solution is. The logical conclusion of this research is to discover a euonym for the human species. You wish for mankind to perpetuate itself through nomenclature.”

“You find the prospect troubling,” said Fieldhurst. “That is to be expected: Dr. Ashbourne and myself initially felt the same way, as has everyone who has considered this. No one relishes the prospect of humans being conceived artificially. But can you offer an alternative?” Stratton was silent, and Fieldhurst went on. “All who are aware of both Dr. Ashbourne’s and Dubuisson and Gille’s work agree: there is no other solution.”

Stratton reminded himself to maintain the dispassionate attitude of a scientist. “Precisely how do you envision this name being used?” he asked.

Ashbourne answered. “When a husband is unable to impregnate his wife, they will seek the services of a physician. The physician will collect the woman’s menses, separate out the ovum, impress the name upon it, and then reintroduce it into her

womb.”

“A child born of this method would have no biological father.”

“True, but the father’s biological contribution is of minimal importance here. The mother will think of her husband as the child’s father, so her imagination will impart a combination of her own and her husband’s appearance and character to the foetus. That will not change. And I hardly need mention that name impression would not be made available to unmarried women.”

“Are you confident this will result in well-formed children?” asked Stratton. “I’m sure you know to what I refer.” They all knew of the disastrous attempt in the previous century to create improved children by mesmerizing women during their pregnancies.

Ashbourne nodded. “We are fortunate in that the ovum is very specific in what it will accept. The set of euonyms for any species of organism is very small; if the lexical order of the impressed name does not closely match the structural order of that species, the resulting foetus does not quicken. This does not remove the need for the mother to maintain a tranquil mind during her pregnancy; name impression cannot guard against maternal agitation. But the ovum’s selectivity provides us assurance that any foetus induced will be well formed in every aspect, except the one anticipated.”

Stratton was alarmed. “What aspect is that?”

“Can you not guess? The only incapacity of frogs created by name impression was in the males; they were sterile, for their spermatozoa bore no preformed foetuses inside. By comparison, the female frogs created were fertile: their eggs could be fertilized in either the conventional manner, or by repeating the impression with the name.”

Stratton’s relief was considerable. “So the male variant of the name was imperfect. Presumably there needs to be further differences between the male and female variants than simply the sexual epithet.”

“Only if one considers the male variant imperfect,” said Ashbourne, “which I do not. Consider: while a fertile male and a fertile female might seem equivalent, they differ radically in the degree of complexity exemplified. A female with viable ova remains a single organism, while a male with viable spermatozoa is actually many organisms: a father and all his potential children. In this light, the two variants of the name are well matched in their actions: each induces a single organism, but only in the female sex can a single organism be fertile.”

“I see what you mean.” Stratton realized he would need practice in thinking about nomenclature in the organic domain. “Have you developed euonyms for other

species?”

“Just over a score, of various types; our progress has been rapid. We have only just begun work on a name for the human species, and it has proved far more difficult than our previous names.”

“How many nomenclators are engaged in this endeavor?”

“Only a handful,” Fieldhurst replied. “We have asked a few Royal Society members, and the Académie has some of France’s leading designateurs working on it. You will understand if I do not mention any names at this point, but be assured that we have some of the most distinguished nomenclators in England assisting us.”

“Forgive me for asking, but why are you approaching me? I am hardly in that category.”

“You have not yet had a long career,” said Ashbourne, “but the genus of names you have developed is unique. Automata have always been specialized in form and function, rather like animals: some are good at climbing, others at digging, but none at both. Yet yours can control human hands, which are uniquely versatile instruments: what else can manipulate everything from a wrench to a piano? The hand’s dexterity is the physical manifestation of the mind’s ingenuity, and these traits are essential to the name we seek.”

“We have been discreetly surveying current nomenclatoral research for any names that demonstrate marked dexterity,” said Fieldhurst. “When we learned of what you had accomplished, we sought you out immediately.”

“In fact,” Ashbourne continued, “the very reason your names are worrisome to sculptors is the reason we are interested in them: they endow automata with a more humanlike manner than any before. So now we ask, will you join us?”

Stratton considered it. This was perhaps the most important task a nomenclator could undertake, and under ordinary circumstances he would have leapt at the opportunity to participate. But before he could embark upon this enterprise in good conscience, there was another matter he had to resolve.

“You honor me with your invitation, but what of my work with dexterous automata? I still firmly believe that inexpensive engines can improve the lives of the labouring class.”

“It is a worthy goal,” said Fieldhurst, “and I would not ask you to give it up. Indeed, the first thing we wish you to do is to perfect the epithets for dexterity. But your efforts at social reform would be for naught unless we first ensure the survival of our

species.”

“Obviously, but I do not want the potential for reform that is offered by dexterous names to be neglected. There may never be a better opportunity for restoring dignity to common workers. What kind of victory would we achieve if the continuation of life meant ignoring this opportunity?”

“Well said,” acknowledged the earl. “Let me make a proposal. So that you can best make use of your time, the Royal Society will provide support for your development of dexterous automata as needed: securing investors and so forth. I trust you will divide your time between the two projects wisely. Your work on biological nomenclature must remain confidential, obviously. Is that satisfactory?”

“It is. Very well then, gentlemen: I accept.” They shook hands.

—

Some weeks had passed since Stratton last spoke with Willoughby, beyond a chilly exchange of greetings in passing. In fact, he had little interaction with any of the union sculptors, instead spending his time working on letter permutations in his office, trying to refine his epithets for dexterity.

He entered the manufactory through the front gallery, where customers normally perused the catalogue. Today it was crowded with domestic automata, all the same model char-engine. Stratton saw the clerk ensuring they were properly tagged.

“Good morning, Pierce,” he said. “What are all these doing here?”

“An improved name is just out for the ‘Regent’,” said the clerk. “Everyone’s eager to get the latest.”

“You’re going to be busy this afternoon.” The keys for unlocking the automata’s name slots were themselves stored in a safe that required two of Coade’s managers to open. The managers were reluctant to keep the safe open for more than a brief period each afternoon.

“I’m certain I can finish these in time.”

“You couldn’t bear to tell a pretty housemaid that her char-engine wouldn’t be ready by tomorrow.”

The clerk smiled. “Can you blame me, sir?”

“No, I cannot,” said Stratton, chuckling. He turned toward the business offices behind

the gallery, when he found himself confronted by Willoughby.

“Perhaps you ought to prop open the safe,” said the sculptor, “so that housemaids might not be inconvenienced. Seeing how destroying our institutions seems to be your intent.”

“Good morning, Master Willoughby,” said Stratton stiffly. He tried to walk past, but the other man stood in his way.

“I’ve been informed that Coade will be allowing nonunion sculptors onto the premises to assist you.”

“Yes, but I assure you, only the most reputable independent sculptors are involved.”

“As if such persons exist,” said Willoughby scornfully. “You should know that I recommended that our trade union launch a strike against Coade in protest.”

“Surely you’re not serious.” It had been decades since the last strike launched by the sculptors, and that one had ended in rioting.

“I am. Were the matter put to a vote of the membership, I’m certain it would pass: other sculptors with whom I’ve discussed your work agree with me about the threat it poses. However, the union leadership will not put it to a vote.”

“Ah, so they disagreed with your assessment.”

Here Willoughby frowned. “Apparently the Royal Society intervened on your behalf and persuaded the Brotherhood to refrain for the time being. You’ve found yourself some powerful supporters, Mr. Stratton.”

Uncomfortably, Stratton replied, “The Royal Society considers my research worthwhile.”

“Perhaps, but do not believe that this matter is ended.”

“Your animosity is unwarranted, I tell you,” Stratton insisted. “Once you have seen how sculptors can use these automata, you will realize that there is no threat to your profession.”

Willoughby merely glowered in response and left.

The next time he saw Lord Fieldhurst, Stratton asked him about the Royal Society’s involvement. They were in Fieldhurst’s study, and the earl was pouring himself a whiskey.

“Ah yes,” he said. “While the Brotherhood of Sculptors as a whole is quite formidable, it is composed of individuals who individually are more amenable to persuasion.”

“What manner of persuasion?”

“The Royal Society is aware that members of the trade union’s leadership were party to an as-yet-unresolved case of name piracy to the Continent. To avoid any scandal, they’ve agreed to postpone any decision about strikes until after you’ve given a demonstration of your system of manufacturing.”

“I’m grateful for your assistance, Lord Fieldhurst,” said Stratton, astonished. “I must admit, I had no idea that the Royal Society employed such tactics.”

“Obviously, these are not proper topics for discussion at the general sessions.” Lord Fieldhurst smiled in an avuncular manner. “The advancement of Science is not always a straightforward affair, Mr. Stratton, and the Royal Society is sometimes required to use both official and unofficial channels.”

“I’m beginning to appreciate that.”

“Similarly, although the Brotherhood of Sculptors won’t initiate a formal strike, they might employ more indirect tactics; for example, the anonymous distribution of pamphlets that arouse public opposition to your automata.” He sipped at his whiskey. “Hmm. Perhaps I should have someone keep a watchful eye on Master Willoughby.”

—

Stratton was given accommodations in the guest wing of Darrington Hall, as were the other nomenclators working under Lord Fieldhurst’s direction. They were indeed some of the leading members of the profession, including Holcombe, Milburn, and Parker; Stratton felt honored to be working with them, although he could contribute little while he was still learning Ashbourne’s techniques for biological nomenclature.

Names for the organic domain employed many of the same epithets as names for automata, but Ashbourne had developed an entirely different system of integration and factorization, which entailed many novel methods of permutation. For Stratton it was almost like returning to university and learning nomenclature all over again. However, it was apparent how these techniques allowed names for species to be developed rapidly; by exploiting similarities suggested by the Linnaean system of classification, one could work from one species to another.

Stratton also learned more about the sexual epithet, traditionally used to confer either male or female qualities to an automaton. He knew of only one such epithet, and was

surprised to learn it was the simplest of many extant versions. The topic went undiscussed by nomenclatoral societies, but this epithet was one of the most fully researched in existence; in fact its earliest use was claimed to have occurred in biblical times, when Joseph's brothers created a female golem they could share sexually without violating the prohibition against such behavior with a woman. Development of the epithet had continued for centuries in secrecy, primarily in Constantinople, and now the current versions of automatous courtesans were offered by specialized brothels right here in London. Carved from soapstone and polished to a high gloss, heated to blood temperature and sprinkled with scented oils, the automata commanded prices exceeded only by those for incubi and succubi.

It was from such ignoble soil that their research grew. The names animating the courtesans incorporated powerful epithets for human sexuality in its male and female forms. By factoring out the carnality common to both versions, the nomenclators had isolated epithets for generic human masculinity and femininity, ones far more refined than those used when generating animals. Such epithets were the nuclei around which they formed, by accretion, the names they sought.

Gradually Stratton absorbed sufficient information to begin participating in the tests of prospective human names. He worked in collaboration with the other nomenclators in the group, and between them they divided up the vast tree of nominal possibilities, assigning branches for investigation, pruning away those that proved unfruitful, cultivating those that seemed most productive.

The nomenclators paid women—typically young housemaids in good health—for their menses as a source of human ova, which they then impressed with their experimental names and scrutinized under microscopes, looking for forms that resembled human foetuses. Stratton inquired about the possibility of harvesting ova from female megafoetuses, but Ashbourne reminded him that ova were viable only when taken from a living woman. It was a basic dictum of biology: females were the source of the vital principle that gave the offspring life, while males provided the basic form. Because of this division, neither sex could reproduce by itself.

Of course, that restriction had been lifted by Ashbourne's discovery: the male's participation was no longer necessary since form could be induced lexically. Once a name was found that could generate human foetuses, women could reproduce purely by themselves. Stratton realized that such a discovery might be welcomed by women exhibiting sexual inversion, feeling love for persons of the same rather than the opposite sex. If the name were to become available to such women, they might establish a commune of some sort that reproduced via parthenogenesis. Would such a society flourish by magnifying the finer sensibilities of the gentle sex, or would it collapse under the unrestrained pathology of its membership? It was impossible to guess.

Before Stratton's enlistment, the nomenclators had developed names capable of generating vaguely homuncular forms in an ovum. Using Dubuisson and Gille's methods, they enlarged the forms to a size that allowed detailed examination; the forms resembled automata more than humans, their limbs ending in paddles of fused digits. By incorporating his epithets for dexterity, Stratton was able to separate the digits and refine the overall appearance of the forms. All the while, Ashbourne emphasized the need for an unconventional approach.

"Consider the thermodynamics of what most automata do," said Ashbourne during one of their frequent discussions. "The mining engines dig ore, the reaping engines harvest wheat, the woodcutting engines fell timber; yet none of these tasks, no matter how useful we find them to be, can be said to create order. While all their names create order at the thermal level, by converting heat into motion, in the vast majority the resulting work is applied at the visible level to create disorder."

"This is an interesting perspective," said Stratton thoughtfully. "Many long-standing deficits in the capabilities of automata become intelligible in this light: the fact that automata are unable to stack crates more neatly than they find them; their inability to sort pieces of crushed ore based on their composition. You believe that the known classes of industrial names are not powerful enough in thermodynamic terms."

"Precisely!" Ashbourne displayed the excitement of a tutor finding an unexpectedly apt pupil. "This is another feature that distinguishes your class of dexterous names. By enabling an automaton to perform skilled labour, your names not only create order at the thermal level, they use it to create order at the visible level as well."

"I see a commonality with Milburn's discoveries," said Stratton. Milburn had developed the household automata able to return objects to their proper places. "His work likewise involves the creation of order at the visible level."

"Indeed it does, and this commonality suggests a hypothesis." Ashbourne leaned forward. "Suppose we were able to factor out an epithet common to the names developed by you and Milburn: an epithet expressing the creation of two levels of order. Further suppose that we discover a euonym for the human species, and were able to incorporate this epithet into the name. What do you imagine would be generated by impressing the name? And if you say 'twins' I shall clout you on the head."

Stratton laughed. "I daresay I understand you better than that. You are suggesting that if an epithet is capable of inducing two levels of thermodynamic order in the inorganic domain, it might create two generations in the organic domain. Such a name might create males whose spermatozoa would contain preformed foetuses. Those males would be fertile, although any sons they produced would again be sterile."

His instructor clapped his hands together. “Precisely: order that begets order! An interesting speculation, wouldn’t you agree? It would halve the number of medical interventions required for our race to sustain itself.”

“And what about inducing the formation of more than two generations of foetuses? What kind of capabilities would an automaton have to possess, for its name to contain such an epithet?”

“The science of thermodynamics has not progressed enough to answer that question, I’m afraid. What would constitute a still-higher level of order in the inorganic domain? Automata working cooperatively, perhaps? We do not yet know, but perhaps in time we will.”

Stratton gave voice to a question that had posed itself to him some time ago. “Dr. Ashbourne, when I was initiated into our group, Lord Fieldhurst spoke of the possibility that species are born in the wake of catastrophic events. Is it possible that entire species were created by use of nomenclature?”

“Ah, now we tread in the realm of theology. A new species requires progenitors containing vast numbers of descendants nested within their reproductive organs; such forms embody the highest degree of order imaginable. Can a purely physical process create such vast amounts of order? No naturalist has suggested a mechanism by which this could occur. On the other hand, while we do know that a lexical process can create order, the creation of an entire new species would require a name of incalculable power. Such mastery of nomenclature could very well require the capabilities of God; perhaps it is even part of the definition.

“This is a question, Stratton, to which we may never know the answer, but we cannot allow that to affect our current actions. Whether or not a name was responsible for the creation of our species, I believe a name is the best chance for its continuation.”

“Agreed,” said Stratton. After a pause, he added, “I must confess, much of the time when I am working, I occupy myself solely with the details of permutation and combination, and lose sight of the sheer magnitude of our endeavor. It is sobering to think of what we will have achieved if we are successful.”

“I can think of little else,” replied Ashbourne.

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Seated at his desk in the manufactory, Stratton squinted to read the pamphlet he’d been given on the street. The text was crudely printed, the letters blurred.

“Shall Men be the Masters of NAMES, or shall Names be the masters of MEN? For too

long the Capitalists have hoarded Names within their coffers, guarded by Patent and Lock and Key, amassing fortunes by mere possession of LETTERS, while the Common Man must labour for every shilling. They will wring the ALPHABET until they have extracted every last penny from it, and only then discard it for us to use. How long will We allow this to continue?"

Stratton scanned the entire pamphlet, but found nothing new in it. For the past two months he'd been reading them, and encountered only the usual anarchist rants; there was as yet no evidence for Lord Fieldhurst's theory that the sculptors would use them to target Stratton's work. His public demonstration of the dexterous automata was scheduled for next week, and by now Willoughby had largely missed his opportunity to generate public opposition. In fact, it occurred to Stratton that he might distribute pamphlets himself to generate public support. He could explain his goal of bringing the advantages of automata to everyone, and his intention to keep close control over his names' patents, granting licenses only to manufacturers who would use them conscientiously. He could even have a slogan: "Autonomy through Automata," perhaps?

There was a knock at his office door. Stratton tossed the pamphlet into his wastebasket. "Yes?"

A man entered, somberly dressed, and with a long beard. "Mr. Stratton?" he asked. "Please allow me to introduce myself: my name is Benjamin Roth. I am a kabbalist."

Stratton was momentarily speechless. Typically such mystics were offended by the modern view of nomenclature as a science, considering it a secularization of a sacred ritual. He never expected one to visit the manufactory. "A pleasure to meet you. How may I be of assistance?"

"I've heard that you have achieved a great advance in the permutation of letters."

"Why, thank you. I didn't realize it would be of interest to a person like yourself."

Roth smiled awkwardly. "My interest is not in its practical applications. The goal of kabbalists is to better know God. The best means by which to do that is to study the art by which He creates. We meditate upon different names to enter an ecstatic state of consciousness; the more powerful the name, the more closely we approach the Divine."

"I see." Stratton wondered what the kabbalist's reaction would be if he learned about the creation being attempted in the biological nomenclature project. "Please continue."

"Your epithets for dexterity enable a golem to sculpt another, thereby reproducing

itself. A name capable of creating a being that is, in turn, capable of creation would bring us closer to God than we have ever been before."

"I'm afraid you're mistaken about my work, although you aren't the first to fall under this misapprehension. The ability to manipulate molds does not render an automaton able to reproduce itself. There would be many other skills required."

The kabbalist nodded. "I am well aware of that. I myself, in the course of my studies, have developed an epithet designating certain other skills necessary."

Stratton leaned forward with sudden interest. After casting a body, the next step would be to animate the body with a name. "Your epithet endows an automaton with the ability to write?" His own automaton could grasp a pencil easily enough, but it couldn't inscribe even the simplest mark. "How is it that your automata possess the dexterity required for scrivening, but not that for manipulating molds?"

Roth shook his head modestly. "My epithet does not endow writing ability, or general manual dexterity. It simply enables a golem to write out the name that animates it, and nothing else."

"Ah, I see." So it didn't provide an aptitude for learning a category of skills; it granted a single innate skill. Stratton tried to imagine the nomenclatoral contortions needed to make an automaton instinctively write out a particular sequence of letters. "Very interesting, but I imagine it doesn't have broad application, does it?"

Roth gave a pained smile; Stratton realized he had committed a faux pas, and the man was trying to meet it with good humor. "That is one way to view it," admitted Roth, "but we have a different perspective. To us the value of this epithet, like any other, lies not in the usefulness it imparts to a golem, but in the ecstatic state it allows us to achieve."

"Of course, of course. And your interest in my epithets for dexterity is the same?"

"Yes. I am hoping that you will share your epithets with us."

Stratton had never heard of a kabbalist making such a request before, and clearly Roth did not relish being the first. He paused to consider. "Must a kabbalist reach a certain rank in order to meditate upon the most powerful ones?"

"Yes, very definitely."

"So you restrict the availability of the names."

"Oh no; my apologies for misunderstanding you. The ecstatic state offered by a name

is achievable only after one has mastered the necessary meditative techniques, and it's these techniques that are closely guarded. Without the proper training, attempts to use these techniques could result in madness. But the names themselves, even the most powerful ones, have no ecstatic value to a novice; they can animate clay, nothing more."

"Nothing more," agreed Stratton, thinking how truly different their perspectives were. "In that case, I'm afraid I cannot grant you use of my names."

Roth nodded glumly, as if he'd been expecting that answer. "You desire payment of royalties."

Now it was Stratton who had to overlook the other man's faux pas. "Money is not my objective. However, I have specific intentions for my dexterous automata which require that I retain control over the patent. I cannot jeopardize those plans by releasing the names indiscriminately." Granted, he had shared them with the nomenclators working under Lord Fieldhurst, but they were all gentlemen sworn to an even greater secrecy. He was less confident about mystics.

"I can assure you that we would not use your name for anything other than ecstatic practices."

"I apologize; I believe you are sincere, but the risk is too great. The most I can do is remind you that the patent has a limited duration; once it has expired, you'll be free to use the name however you like."

"But that will take years!"

"Surely you appreciate that there are others whose interests must be taken into account."

"What I see is that commercial considerations are posing an obstacle to spiritual awakening. The error was mine in expecting anything different."

"You are hardly being fair," protested Stratton.

"Fair?" Roth made a visible effort to restrain his anger. "You 'nomenclators' steal techniques meant to honor God and use them to aggrandize yourselves. Your entire industry prostitutes the techniques of yezirah. You are in no position to speak of fairness."

"Now see here—"

"Thank you for speaking with me." With that, Roth took his leave.

Stratton sighed.

—

Peering through the eyepiece of the microscope, Stratton turned the manipulator's adjustment wheel until the needle pressed against the side of the ovum. There was a sudden enfolding, like the retraction of a mollusc's foot when prodded, transforming the sphere into a tiny foetus. Stratton withdrew the needle from the slide, unclamped it from the framework, and inserted a new one. Next he transferred the slide into the warmth of the incubator and placed another slide, bearing an untouched human ovum, beneath the microscope. Once again he leaned toward the microscope to repeat the process of impression.

Recently, the nomenclators had developed a name capable of inducing a form indistinguishable from a human foetus. The forms did not quicken, however: they remained immobile and unresponsive to stimuli. The consensus was that the name did not accurately describe the non-physical traits of a human being. Accordingly, Stratton and his colleagues had been diligently compiling descriptions of human uniqueness, trying to distill a set of epithets both expressive enough to denote these qualities, and succinct enough to be integrated with the physical epithets into a seventy-two-letter name.

Stratton transferred the final slide to the incubator and made the appropriate notations in the logbook. At the moment he had no more names drawn in needle form, and it would be a day before the new foetuses were mature enough to test for quickening. He decided to pass the rest of the evening in the drawing room upstairs.

Upon entering the walnut-paneled room, he found Fieldhurst and Ashbourne seated in its leather chairs, smoking cigars and sipping brandy. "Ah, Stratton," said Ashbourne. "Do join us."

"I believe I will," said Stratton, heading for the liquor cabinet. He poured himself some brandy from a crystal decanter and seated himself with the others.

"Just up from the laboratory, Stratton?" inquired Fieldhurst.

Stratton nodded. "A few minutes ago I made impressions with my most recent set of names. I feel that my latest permutations are leading in the right direction."

"You are not alone in feeling optimistic; Dr. Ashbourne and I were just discussing how much the outlook has improved since this endeavor began. It now appears that we will have a euonym comfortably in advance of the final generation." Fieldhurst puffed on his cigar and leaned back in his chair until his head rested against the antimacassar.

“This disaster may ultimately turn out to be a boon.”

“A boon? How so?”

“Why, once we have human reproduction under our control, we will have a means of preventing the poor from having such large families as so many of them persist in having right now.”

Stratton was startled, but tried not to show it. “I had not considered that,” he said carefully.

Ashbourne also seemed mildly surprised. “I wasn’t aware that you intended such a policy.”

“I considered it premature to mention it earlier,” said Fieldhurst. “Counting one’s chickens before they’re hatched, as they say.”

“Of course.”

“You must agree that the potential is enormous. By exercising some judgment when choosing who may bear children or not, our government could preserve the nation’s racial stock.”

“Is our racial stock under some threat?” asked Stratton.

“Perhaps you have not noticed that the lower classes are reproducing at a rate exceeding that of the nobility and gentry. While commoners are not without virtues, they are lacking in refinement and intellect. These forms of mental impoverishment beget the same: a woman born into low circumstances cannot help but gestate a child destined for the same. Consequent to the great fecundity of the lower classes, our nation would eventually drown in coarse dullards.”

“So name impressing will be withheld from the lower classes?”

“Not entirely, and certainly not initially: when the truth about declining fertility is known, it would be an invitation to riot if the lower classes were denied access to name impressing. And of course, the lower classes do have their role to play in our society, as long as their numbers are kept in check. I envision that the policy will go in effect only after some years have passed, by which time people will have grown accustomed to name impression as the method of fertilization. At that point, perhaps in conjunction with the census process, we can impose limits on the number of children a given couple would be permitted to have. The government would regulate the growth and composition of the population thereafter.”

“Is this the most appropriate use of such a name?” asked Ashbourne. “Our goal was the survival of the species, not the implementation of partisan politics.”

“On the contrary, this is purely scientific. Just as it’s our duty to ensure the species survives, it’s also our duty to guarantee its health by keeping a proper balance in its population. Politics doesn’t enter into it; were the situation reversed and there existed a paucity of labourers, the opposite policy would be called for.”

Stratton ventured a suggestion. “I wonder if improvement in conditions for the poor might eventually cause them to gestate more refined children?”

“You are thinking about changes brought about by your cheap engines, aren’t you?” asked Fieldhurst with a smile, and Stratton nodded. “Your intended reforms and mine may reinforce each other. Moderating the numbers of the lower classes should make it easier for them to raise their living conditions. However, do not expect that a mere increase in economic comfort will improve the mentality of the lower classes.”

“But why not?”

“You forget the self-perpetuating nature of culture,” said Fieldhurst. “We have seen that all megafoetuses are identical, yet no one can deny the differences between the populaces of nations, in both physical appearance and temperament. This can only be the result of the maternal influence: the mother’s womb is a vessel in which the social environment is incarnated. For example, a woman who has lived her life among Prussians naturally gives birth to a child with Prussian traits; in this manner the national character of that populace has sustained itself for centuries, despite many changes in fortune. It would be unrealistic to think the poor are any different.”

“As a zoologist, you are undoubtedly wiser in these matters than we,” said Ashbourne, silencing Stratton with a glance. “We will defer to your judgment.”

For the remainder of the evening the conversation turned to other topics, and Stratton did his best to conceal his discomfort and maintain a facade of bonhomie. Finally, after Fieldhurst had retired for the evening, Stratton and Ashbourne descended to the laboratory to confer.

“What manner of man have we agreed to help?” exclaimed Stratton as soon as the door was closed. “One who would breed people like livestock?”

“Perhaps we should not be so shocked,” said Ashbourne with a sigh. He seated himself upon one of the laboratory stools. “Our group’s goal has been to duplicate for humans a procedure that was intended only for animals.”

“But not at the expense of individual liberty! I cannot be a party to this.”

“Do not be hasty. What would be accomplished by your resigning from the group? To the extent that your efforts contribute to our group’s endeavor, your resignation would serve only to endanger the future of the human species. Conversely, if the group attains its goal without your assistance, Lord Fieldhurst’s policies will be implemented anyway.”

Stratton tried to regain his composure. Ashbourne was right; he could see that. After a moment, he said, “So what course of action should we take? Are there others whom we could contact, members of Parliament who would oppose the policy that Lord Fieldhurst proposes?”

“I expect that most of the nobility and gentry would share Lord Fieldhurst’s opinion on this matter.” Ashbourne rested his forehead on the fingertips of one hand, suddenly looking very old. “I should have anticipated this. My error was in viewing humanity purely as a single species. Having seen England and France working toward a common goal, I forgot that nations are not the only factions that oppose one another.”

“What if we surreptitiously distributed the name to the labouring classes? They could draw their own needles and impress the name themselves, in secret.”

“They could, but name impression is a delicate procedure best performed in a laboratory. I’m dubious that the operation could be carried out on the scale necessary without attracting governmental attention, and then falling under its control.”

“Is there an alternative?”

There was silence for a long moment while they considered. Then Ashbourne said, “Do you recall our speculation about a name that would induce two generations of foetuses?”

“Certainly.”

“Suppose we develop such a name but do not reveal this property when we present it to Lord Fieldhurst.”

“That’s a wily suggestion,” said Stratton, surprised. “All the children born of such a name would be fertile, so they would be able to reproduce without governmental restriction.”

Ashbourne nodded. “In the period before population control measures go into effect, such a name might be very widely distributed.”

“But what of the following generation? Sterility would recur, and the labouring classes

would again be dependent upon the government to reproduce."

"True," said Ashbourne, "it would be a short-lived victory. Perhaps the only permanent solution would be a more liberal Parliament, but it is beyond my expertise to suggest how we might bring that about."

Again Stratton thought about the changes that cheap engines might bring; if the situation of the working classes was improved in the manner he hoped, that might demonstrate to the nobility that poverty was not innate. But even if the most favorable sequence of events obtained, it would require years to sway Parliament. "What if we could induce multiple generations with the initial name impression? A longer period before sterility recurs would increase the chances that more liberal social policies would take hold."

"You're indulging a fancy," replied Ashbourne. "The technical difficulty of inducing multiple generations is such that I'd sooner wager on our successfully sprouting wings and taking flight. Inducing two generations would be ambitious enough."

The two men discussed strategies late into the night. If they were to conceal the true name of any name they presented to Lord Fieldhurst, they would have to forge a lengthy trail of research results. Even without the additional burden of secrecy, they would be engaged in an unequal race, pursuing a highly sophisticated name while the other nomenclators sought a comparatively straightforward euonym. To make the odds less unfavorable, Ashbourne and Stratton would need to recruit others to their cause; with such assistance, it might even be possible to subtly impede the research of others.

"Who in the group do you think shares our political views?" asked Ashbourne.

"I feel confident that Milburn does. I'm not so certain about any of the others."

"Take no chances. We must employ even more caution when approaching prospective members than Lord Fieldhurst did when establishing this group originally."

"Agreed," said Stratton. Then he shook his head in disbelief. "Here we are forming a secret organization nested within a secret organization. If only foetuses were so easily induced."

—

It was the evening of the following day, the sun was setting, and Stratton was strolling across Westminster Bridge as the last remaining costermongers were wheeling their barrows of fruit away. He had just had supper at a club he favored, and was walking back to Coade Manufactory. The previous evening at Darrington Hall had disquieted

him, and he had returned to London earlier today to minimize his interaction with Lord Fieldhurst until he was certain his face would not betray his true feelings.

He thought back to the conversation where he and Ashbourne had first entertained the conjecture of factoring out an epithet for creating two levels of order. At the time he had made some efforts to find such an epithet, but they were casual attempts given the superfluous nature of the goal, and they hadn't borne fruit. Now their gauge of achievement had been revised upward: their previous goal was inadequate, two generations seemed the minimum acceptable, and any additional ones would be invaluable.

He again pondered the thermodynamic behavior induced by his dexterous names: order at the thermal level animated the automata, allowing them to create order at the visible level. Order begetting order. Ashbourne had suggested that the next level of order might be automata working together in a coordinated fashion. Was that possible? They would have to communicate in order to work together effectively, but automata were intrinsically mute. What other means were there by which automata could engage in complex behavior?

He suddenly realized he had reached Coade Manufactory. By now it was dark, but he knew the way to his office well enough. Stratton unlocked the building's front door and proceeded through the gallery and past the business offices.

As he reached the hallway fronting the nomenclators' offices, he saw light emanating from the frosted-glass window of his office door. Surely he hadn't left the gas on? He unlocked his door to enter, and was shocked by what he saw.

A man lay facedown on the floor in front of the desk, hands tied behind his back. Stratton immediately approached to check on the man. It was Benjamin Roth, the kabbalist, and he was dead. Stratton realized several of the man's fingers were broken; he'd been tortured before he was killed.

Pale and trembling, Stratton rose to his feet, and saw that his office was in utter disarray. The shelves of his bookcases were bare; his books lay strewn facedown across the oak floor. His desk had been swept clear; next to it was a stack of its brass-handled drawers, emptied and overturned. A trail of stray papers led to the open door to his studio; in a daze, Stratton stepped forward to see what had been done there.

His dexterous automaton had been destroyed; the lower half of it lay on the floor, the rest of it scattered as plaster fragments and dust. On the worktable, the clay models of the hands were pounded flat, and his sketches of their design torn from the walls. The tubs for mixing plaster were overflowing with the papers from his office. Stratton took a closer look, and saw that they had been doused with lamp oil.

He heard a sound behind him and turned back to face the office. The front door to the office swung closed and a broad-shouldered man stepped out from behind it; he'd been standing there ever since Stratton had entered. "Good of you to come," the man said. He scrutinized Stratton with the predatory gaze of a raptor, an assassin.

Stratton bolted out the back door of the studio and down the rear hallway. He could hear the man give chase.

He fled through the darkened building, crossing workrooms filled with coke and iron bars, crucibles and molds, all illuminated by the moonlight entering through skylights overhead; he had entered the metalworks portion of the factory. In the next room he paused for breath, and realized how loudly his footsteps had been echoing; skulking would offer a better chance at escape than running. He distantly heard his pursuer's footsteps stop; the assassin had likewise opted for stealth.

Stratton looked around for a promising hiding place. All around him were cast-iron automata in various stages of near-completion; he was in the finishing room, where the runners left over from casting were sawed off and the surfaces chased. There was no place to hide, and he was about to move on when he noticed what looked like a bundle of rifles mounted on legs. He looked more closely, and recognized it as a military engine.

These automata were built for the War Office: gun carriages that aimed their own cannon, and rapid-fire rifles, like this one, that cranked their own barrel-clusters. Nasty things, but they'd proven invaluable in the Crimea; their inventor had been granted a peerage. Stratton didn't know any names to animate the weapon—they were military secrets—but only the body on which the rifle was mounted was automatous; the rifle's firing mechanism was strictly mechanical. If he could point the body in the right direction, he might be able to fire the rifle manually.

He cursed himself for his stupidity. There was no ammunition here. He stole into the next room.

It was the packing room, filled with pine crates and loose straw. Staying low between crates, he moved to the far wall. Through the windows he saw the courtyard behind the factory, where finished automata were carted away. He couldn't get out that way; the courtyard gates were locked at night. His only exit was through the factory's front door, but he risked encountering the assassin if he headed back the way he'd come. He needed to cross over to the ceramicworks and double back through that side of the factory.

From the front of the packing room came the sound of footsteps. Stratton ducked behind a row of crates, and then saw a side door only a few feet away. As stealthily as

he could, he opened the door, entered, and closed the door behind him. Had his pursuer heard him? He peered through a small grille set in the door; he couldn't see the man, but felt he'd gone unnoticed. The assassin was probably searching the packing room.

Stratton turned around, and immediately realized his mistake. The door to the ceramicworks was in the opposite wall. He had entered a storeroom, filled with ranks of finished automata, but with no other exits. There was no way to lock the door. He had cornered himself.

Was there anything in the room he could use as a weapon? The menagerie of automata included some squat mining engines, whose forelimbs terminated in enormous pickaxes, but the axheads were bolted to their limbs. There was no way he could remove one.

Stratton could hear the assassin opening side doors and searching other storerooms. Then he noticed an automaton standing off to the side: a porter used for moving the inventory about. It was anthropomorphic in form, the only automaton in the room of that type. An idea came to him.

Stratton checked the back of the porter's head. Porters' names had entered the public domain long ago, so there were no locks protecting its name slot; a tab of parchment protruded from the horizontal slot in the iron. He reached into his coat pocket for the notebook and pencil he always carried and tore out a small portion of a blank leaf. In the darkness he quickly wrote seventy-two letters in a familiar combination, and then folded the paper into a tight square.

To the porter, he whispered, "Go stand as close to the door as you can." The cast-iron figure stepped forward and headed for the door. Its gait was very smooth, but not rapid, and the assassin would reach this storeroom any moment now. "Faster," hissed Stratton, and the porter obeyed.

Just as it reached the door, Stratton saw through the grille that his pursuer had arrived on the other side. "Get out of the way," barked the man.

Ever obedient, the automaton shifted to take a step back when Stratton yanked out its name. The assassin began pushing against the door, but Stratton was able to insert the new name, cramming the square of paper into the slot as deeply as he could.

The porter resumed walking forward, this time with a fast, stiff gait: his childhood doll, now life-size. It immediately ran into the door and, unperturbed, kept it shut with the force of its marching, its iron hands leaving fresh dents in the door's oaken surface with every swing of its arms, its rubber-shod feet chafing heavily against the brick floor. Stratton retreated to the back of the storeroom.

“Stop,” the assassin ordered. “Stop walking, you! Stop!”

The automaton continued marching, oblivious to all commands. The man pushed on the door, but to no avail. He then tried slamming into it with his shoulder, each impact causing the automaton to slide back slightly, but its rapid strides brought it forward again before the man could squeeze inside. There was a brief pause, and then something poked through the grille in the door; the man was prying it off with a crowbar. The grille abruptly popped free, leaving an open window. The man stretched his arm through and reached around to the back of the automaton’s head, his fingers searching for the name each time its head bobbed forward, but there was nothing for them to grasp; the paper was wedged too deeply in the slot.

The arm withdrew. The assassin’s face appeared in the window. “Fancy yourself clever, don’t you?” he called out. Then he disappeared.

Stratton relaxed slightly. Had the man given up? A minute passed, and Stratton began to think about his next move. He could wait here until the factory opened; there would be too many people about for the assassin to remain.

Suddenly the man’s arm came through the window again, this time carrying a jar of fluid. He poured it over the automaton’s head, the liquid splattering and dripping down its back. The man’s arm withdrew, and then Stratton heard the sound of a match being struck and then flaring alight. The man’s arm reappeared bearing the match, and touched it to the automaton.

The room was flooded with light as the automaton’s head and upper back burst into flames. The man had doused it with lamp oil. Stratton squinted at the spectacle: light and shadow danced across the floor and walls, transforming the storeroom into the site of some druidic ceremony. The heat caused the automaton to hasten its vague assault on the door, like a salamandrine priest dancing with increasing frenzy, until it abruptly froze: its name had caught fire, and the letters were being consumed.

The flames gradually died out, and to Stratton’s newly light-adapted eyes the room seemed almost completely black. More by sound than by sight, he realized the man was pushing at the door again, this time forcing the automaton back enough for him to gain entrance.

“Enough of that, then.”

Stratton tried to run past him, but the assassin easily grabbed him and knocked him down with a clout to the head.

His senses returned almost immediately, but by then the assassin had him facedown

on the floor, one knee pressed into his back. The man tore the health amulet from Stratton's wrist and then tied his hands together behind his back, drawing the rope tightly enough that the hemp fibers scraped the skin of his wrists.

"What kind of man are you, to do things like this?" Stratton gasped, his cheek flattened against the brick floor.

The assassin chuckled. "Men are no different from your automata; slip a bloke a piece of paper with the proper figures on it, and he'll do your bidding." The room grew light as the man lit an oil lamp.

"What if I paid you more to leave me alone?"

"Can't do it. Have to think about my reputation, haven't I? Now let's get to business." He grasped the smallest finger of Stratton's left hand and abruptly broke it.

The pain was shocking, so intense that for a moment Stratton was insensible to all else. He was distantly aware that he had cried out. Then he heard the man speaking again. "Answer my questions straight now. Do you keep copies of your work at home?"

"Yes." He could only get a few words out at a time. "At my desk. In the study."

"No other copies hidden anywhere? Under the floor, perhaps?"

"No."

"Your friend upstairs didn't have copies. But perhaps someone else does?"

He couldn't direct the man to Darrington Hall. "No one."

The man pulled the notebook out of Stratton's coat pocket. Stratton could hear him leisurely flipping through the pages. "Didn't post any letters? Corresponding with colleagues, that sort of thing?"

"Nothing that anyone could use to reconstruct my work."

"You're lying to me." The man grasped Stratton's ring finger.

"No! It's the truth!" He couldn't keep the hysteria from his voice.

Then Stratton heard a sharp thud, and the pressure in his back eased. Cautiously, he raised his head and looked around. His assailant lay unconscious on the floor next to him. Standing next to him was Davies, holding a leather blackjack.

Davies pocketed his weapon and crouched to unknot the rope that bound Stratton. “Are you badly hurt, sir?”

“He’s broken one of my fingers. Davies, how did you—?”

“Lord Fieldhurst sent me the moment he learned whom Willoughby had contacted.”

“Thank God you arrived when you did.” Stratton saw the irony of the situation—his rescue ordered by the very man he was plotting against—but he was too grateful to care.

Davies helped Stratton to his feet and handed him his notebook. Then he used the rope to tie up the assassin. “I went to your office first. Who’s the fellow there?”

“His name is—was Benjamin Roth.” Stratton managed to recount his previous meeting with the kabbalist. “I don’t know what he was doing there.”

“Many religious types have a bit of the fanatic in them,” said Davies, checking the assassin’s bonds. “As you wouldn’t give him your work, he likely felt justified in taking it himself. He came to your office to look for it, and had the bad luck to be there when this fellow arrived.”

Stratton felt a flood of remorse. “I should have given Roth what he asked.”

“You couldn’t have known.”

“It’s an outrageous injustice that he was the one to die. He’d nothing to do with this affair.”

“It’s always that way, sir. Come on, let’s tend to that hand of yours.”

—

Davies bandaged Stratton’s finger to a splint, assuring him that the Royal Society would discreetly handle any consequences of the night’s events. They gathered the oil-stained papers from Stratton’s office into a trunk so that Stratton could sift through them at his leisure, away from the manufactory. By the time they were finished, a carriage had arrived to take Stratton back to Darrington Hall; it had set out at the same time as Davies, who had ridden into London on a racing-engine. Stratton boarded the carriage with the trunk of papers, while Davies stayed behind to deal with the assassin and make arrangements for the kabbalist’s body.

Stratton spent the carriage ride sipping from a flask of brandy, trying to steady his nerves. He felt a sense of relief when he arrived back at Darrington Hall; although it

held its own variety of threats, Stratton knew he'd be safe from assassination there. By the time he reached his room, his panic had largely been converted into exhaustion, and he slept deeply.

He felt much more composed the next morning, and ready to begin sorting through his trunkful of papers. As he was arranging them into stacks approximating their original organization, Stratton found a notebook he didn't recognize. Its pages contained Hebrew letters arranged in the familiar patterns of nominal integration and factorization, but all the notes were in Hebrew as well. With a renewed pang of guilt, he realized it must have belonged to Roth; the assassin must have found it on his person and tossed it in with Stratton's papers to be burned.

He was about to set it aside, but his curiosity bested him: he'd never seen a kabbalist's notebook before. Much of the terminology was archaic, but he could understand it well enough; among the incantations and sephirotic diagrams, he found the epithet enabling an automaton to write its own name. As he read, Stratton realized that Roth's achievement was more elegant than he'd previously thought.

The epithet didn't describe a specific set of physical actions, but instead the general notion of reflexivity. A name incorporating the epithet became an autonym: a self-designating name. The notes indicated that such a name would express its lexical nature through whatever means the body allowed. The animated body wouldn't even need hands to write out its name; if the epithet were incorporated properly, a porcelain horse could likely accomplish the task by dragging a hoof in the dirt.

Combined with one of Stratton's epithets for dexterity, Roth's epithet would indeed let an automaton do most of what was needed to reproduce. An automaton could cast a body identical to its own, write out its own name, and insert it to animate the body. It couldn't train the new one in sculpture, though, since automata couldn't speak. An automaton that could truly reproduce itself without human assistance remained out of reach, but coming this close would undoubtedly have delighted the kabbalists.

It seemed unfair that automata were so much easier to reproduce than humans. It was as if the problem of reproducing automata need be solved only once, while that of reproducing humans was a Sisyphean task, with every additional generation increasing the complexity of the name required.

And abruptly Stratton realized that he didn't need a name that redoubled physical complexity, but one than enabled lexical duplication.

The solution was to impress the ovum with an autonym, and thus induce a foetus that bore its own name.

The name would have two versions, as originally proposed: one used to induce male

foetuses, another for female foetuses. The women conceived this way would be fertile as always. The men conceived this way would also be fertile, but not in the typical manner: their spermatozoa would not contain preformed foetuses, but would instead bear either of two names on their surfaces, the self-expression of the names originally born by the glass needles. And when such a spermatozoon reached an ovum, the name would induce the creation of a new foetus. The species would be able to reproduce itself without medical intervention, because it would carry the name within itself.

He and Dr. Ashbourne had assumed that creating animals capable of reproducing meant giving them preformed foetuses, because that was the method employed by nature. As a result they had overlooked another possibility: that if a creature could be expressed in a name, reproducing that creature was equivalent to transcribing the name. An organism could contain, instead of a tiny analogue of its body, a lexical representation instead.

Humanity would become a vehicle for the name as well as a product of it. Each generation would be both content and vessel, an echo in a self-sustaining reverberation.

Stratton envisioned a day when the human species could survive as long as its own behavior allowed, when it could stand or fall based purely on its own actions, and not simply vanish once some predetermined life span had elapsed. Other species might bloom and wither like flowers over seasons of geologic time, but humans would endure for as long as they determined.

Nor would any group of people control the fecundity of another; in the procreative domain, at least, liberty would be restored to the individual. This was not the application Roth had intended for his epithet, but Stratton hoped the kabbalist would consider it worthwhile. By the time the autonym’s true power became apparent, an entire generation consisting of millions of people worldwide would have been born of the name, and there would be no way any government could control their reproduction. Lord Fieldhurst—or his successors—would be outraged, and there would eventually be a price to be paid, but Stratton found he could accept that.

He hastened to his desk, where he opened his own notebook and Roth’s side by side. On a blank page, he began writing down ideas on how Roth’s epithet might be incorporated into a human euonym. Already in his mind Stratton was transposing the letters, searching for a permutation that denoted both the human body and itself, an ontogenic encoding for the species.