



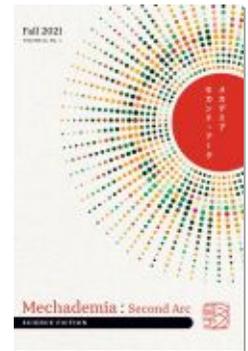
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Robot Theater (*Robotto engeki*) in Japan: Staging Science
Fiction Futures

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Staging Science Fiction Futures

JENNIFER ROBERTSON

Robot Revue

In February 1932, at the height of the first wave of robot-mania in Japan, the all-female Takarazuka Revue performed *Robotto no tawamure* (The robot's playful joke), a musical comedy by playwright Takehara Mitsuzō.¹ Set inside an American department store, the musical spoofs the popular trend of staging robot shows to attract shoppers. The *mise-en-scène* consists of an upstairs and a downstairs room. A lifelike, male-gendered humanoid robot clothed in a belted pants suit, Mary Jane shoes, and a soft bowler-type hat, stands in the center of the upstairs room (Figure 1). Downstairs, the props include a bookshelf lined with encyclopedias and various reference books, and a scientific switchboard with levers operated by a technician that activate the robot's body and mouth. The robot's voice is provided by an announcer downstairs projecting through a telephone receiver connected to the humanoid in the room above. As explained by an onstage chorus:

When the handle is pulled, the robot moves/
Pressing, pressing the pedal, switching it on/
Dance, dance the robot dances/
This is said to be a marvel of science/
But how far will this advance?—so ominous.²

Three female customers who had received an invitation to meet the humanoid at first doubt its ability to perform “exactly like a human being” as advertised. What follows is an excerpt of their interaction: a sexist gag based on the homonymic Romanized English and German words “history” (*hisutorii*) and “Hysterie” (*hisuterii*).

Customer #2: Um, Robot-san, it says in the invitation that you are a walking encyclopedia, so, I want to ask you something about history [*hisutorii*].

Robot: Ah yes, I know that well. It's something that affects women—it's really a problem isn't it?

Customer #2: That's *hisuterii* [*Hysterie*]! I'm asking about *hisutorii* [history]!

Robot: Oh, so you're asking about *rekishi* [history]! Please, ask me Anything! I know about everything since the beginning of time!

Customer #2: Oh my, Robot-san, you are full of confidence, aren't you? In that case, I'll ask you [*pauses to think*] . . . do you know what sparked Luther's Protestant Reformation?

Robot: Of course! I know all about that!³

Downstairs, the announcer passes a note to an assistant directing him to quickly retrieve the book on the history of Christianity. In the meantime, the robot makes small talk with the customers until the book is delivered, whereupon the robot begins to recite a truncated history of the Protestant Reformation. When the humanoid concludes, the three women applaud, and Customer #1 exclaims, "My, your delivery was so smooth it was as though you were reading from a book! At this rate, flesh-and-blood humans are surely doomed!"⁴

The *hisuterii*/*hisutorii* wordplay was a clever nod—sure to elicit giggles—to the extensive coverage in "[f]amily and household magazines, midwifery and obstetrics-gynecology journals, and women's, popular medical, and general-interest magazines" published in the 1930s and early 1940s, of sexual practices and associated anxieties, such as hysteria, frigidity, and infertility.⁵ Robot fiction was a growing subfield within the emerging genre of science fiction and robots were frequent subjects of cartoons and fine art media alike from the mid 1920s onward. Fritz Lang's (1890–1976) revolutionary silent film *Metropolis* (1927), featuring the evil Robot Maria, debuted in Tokyo in 1929 to enthusiastic audiences.⁶ Daily newspapers began to regularly publish articles about robots, such as "Robotto, *kikai ningen*" (Robot, machine human), a two-part series in May and July 1931, in the national daily *Tōkyō Nichinichi Shinbun* penned by psychologist Matsumoto Matatarō (1865–1943) on how in the future, humans will depend on robots.⁷

The same newspaper, a national daily, also ran an advertisement for a futuristic "panorama exhibition" of "Tokyo in the year 1990" (*1990nen no Tōkyō*). The event was held at the Matsuzakaya Department Store in Ueno (November 1–19, 1931). In addition to a moving and talking robot, the public was intro-



Figure 1. The robot in the Takarazuka Revue's *Robotto no tawamure* (1932) performed by Nakoso Nahoko (active 1922–35), top center. Photograph by author from *Takarazuka Shōjo Kagekidan kyakuhonshū* (Takarazuka Girls Revue playscript collection), no. 134 (February 1932).

duced to new technologies, such as television, airplanes, aerial photographs of Tokyo, rockets, and weapons. The advertisement featured a mechanical humanoid robot with a diving-bell shaped head, big round eyes, and a muscular torso with gears and a clock, operating a ship's wheel-like device. Starburst lines around the robot's body make it appear shiny and electrified.⁸ By 1932, robots were a staple image in advertisements from food additives, skin cream, radios, matches, insecticide, and tobacco,⁹ suggesting the proximity of science fiction fantasies to real world commodities.

As noted, Takarazuka's robot play capitalized on the popularity of the robot exhibitions staged in department stores and other public venues in Japan, Europe and the United States, a practice that continues today. The most obvious direct inspiration for the robot character in the Revue's play was the debut in Japan of the life-size mannequin-like German robot *Remarque* at the "Tokyo in the year 1990" exhibition of 1930. Actually, two *Remarques* had

arrived from Dusseldorf; one was sent on to the Tokyo Asahi Newspaper office and the other to the Osaka Asahi Newspaper office. The German humanoid robot, named after novelist Erich Maria Remarque, resembled a middle-aged man in a military uniform. Its hands and neck moved, it could roll its eyes, and it conversed through a wireless receiver through which a human operator provided its voice. Although the humanoid was advertised as speaking German-accented Japanese, a native Japanese speaker was charged with enabling Remarque to converse with the public. Remarque drew a huge crowd at Tokyo's Hibiya Kōkaidō (Public Hall) for a fundraising event on behalf of impoverished citizens.¹⁰

R.U.R. in Japan

Remarque may have inspired the storyline of Takarazuka's comic revue, but the casting of a human actor to play the part of the robot was most likely modeled after the critically acclaimed play, *R.U.R.*, performed in Tokyo in 1924. Published by Czech litterateur Karel Čapek (1890–1938) in 1921, *R.U.R.* (*Rossumovi Univerzální Roboti* [*Rossum's Universal Robots*]), was translated into Japanese in 1923 and staged the following year. Čapek's play introduced the newly coined word "robot," after the Slavic word *robot*a meaning "serf labor," and *robotto* quickly became a ubiquitous buzzword in Japan. Before *robotto*, the words *jinzō ningen* (human-made human) and *kikai ningen* (machine or mechanical human) were used to name manufactured humanlike beings.

A science fiction melodrama with comical passages, the action in *R.U.R.* takes place on an island in 2000,¹¹ where anatomically realistic artificial humans are mass-produced in Rossum's factory from protoplasmic batter and sold all over the world as tireless workers. The company responds to customer demands for robots that conform to gendered occupations. Thus, female robots are manufactured to serve as "waitresses, shop-girls, secretaries,"¹² and male robots to perform manual labor. To make a long story short, new-model robots are provided with emotions and, now are able to experience anger at their exploitation by humans as slave-labor, revolt *en masse*. They kill all but one human, Alquist, a traditional artisan employed by Rossum's. Since the formula for the batter has been destroyed, the artisan is unable to repair or reproduce robots in the factory. Instead, in the closing act, he encourages an emotionally enhanced humanoid couple he calls Adam and Eve to go into the world as husband and wife. Somehow, it is inferred, they will repopulate their kind.

R.U.R. was performed in Tokyo in 1924 under the title *Jinzō ningen* directed by the leftist dramaturg Hijikata Yoshi (1898–1959). Hijikata, whose aristocratic upbringing belied his socialist politics, cofounded with theater director/playwright/actor Osanai Kaoru (1881–1928), the high-tech Tsukiji Shōgekijō (Tsukiji Little Theatre) in 1924; the name referred to both the actual theater and the troupe. *R.U.R.* was among the first plays staged there. Both men were instrumental in founding the *shingeki* (new theater) movement through which Euro-American plays were adapted for Japanese audiences. The Takarazuka Revue was also established in 1913 as a “new theater” in opposition to the “antique” (*koten*) Kabuki theater, and several Revue actors gravitated to other *shingeki* troupes following their retirement from Takarazuka. Founder Kobayashi Ichizō (1873–1957), the Hankyū railroad and department store tycoon, impresario, and two-time cabinet minister, embraced the revue form and Western music as a break with the past and as performing arts that captured a modern zeitgeist.¹³

Hijikata provided the funds for the construction of the Gothic-Romanesque building. The exterior and interior were uniformly dark gray to symbolize the serious business of the avant-garde theater, and care was taken to ensure that all 499 seats offered an unimpaired view of the stage.¹⁴ The dramatic lighting used in *R.U.R.* was made possible by the *Kuppelhorizont* (cyclo-rama), a German innovation that enabled unprecedented special effects and direct and indirect lighting variations. As noted in a review published in the *Tōkyō Asahi Shinbun*, the “striking contrasts of yellow and black amplified the expressionist aesthetic of Čapek’s robot drama.”¹⁵

The *Kuppelhorizont* formed an arc enclosing the back portion of the stage and curved into a dome at the top. The vertical sides could be made of canvas, but the most efficient examples were rigid with a plaster covering. By all accounts the Tsukiji Shōgekijō’s *Kuppelhorizont* was magnificent and its various and ingenious effects astounded the audiences.¹⁶

The *Kuppelhorizont* was instrumental in providing the special effects that, together with stage sets and props, created the futuristic ambience of *R.U.R.* that foregrounded the science fiction themes of the social and psychological consequences of global robotization. The key point here is that cinema is not the only medium where special effects can create and sustain science fiction content, although until very recently, the theater has been underacknowledged as such.¹⁷ Important to note, in conjunction, is that although the future

envisioned in *R.U.R.* is set in 2000, the action unfolds in several indeterminate interludes thereby generating a “fantasy-image of the present, or a timeless myth.”¹⁸ Whether the settings, props, and costumes used in a given performance of *R.U.R.* were futuristic depended on the director, and many productions featured a mix of period styles.

The male robots in the Prague premiere of *R.U.R.* were dressed in long-sleeved, belted linen jumpsuits with numbers on their chests; the females wore belted linen frocks. In the American premiere (October 1922), the male robots sported geometric haircuts and wore Nehru-style short jackets with a triangular numbered plaque on the left, dark trousers, and leather shoes. In the Japanese premiere (July 1924), the male robots wore dark hooded jumpsuits and shoes with elevated heels. The uniform clothing of the robots underscores their singular ethnicity as “Universal” robots, a fact the Rossum’s engineers attribute to the humanoids’ collective focus on destroying humans. Too late, the factory’s director realizes that they should have made “[r]obots of a different color, a different nationality, a different tongue; . . . they’ll no longer be able to conspire with one another; and we—we people will help to foster their prejudices and cultivate their mutual lack of understanding, you see?”¹⁹ Rossum’s robots were mass-produced as workers whose efficiency would both raise productivity and lower the cost of production to the point where there would be “so much everything that things will no longer have any value.” People would be out of work but at the same time poverty would be eliminated: “People will do only what they enjoy. They will live only to perfect themselves.”²⁰ However, the cyber-ecological utopia sustained by Rossum’s robots would soon boomerang and result in dystopian destruction. Namely, the monoethnic robots who initially liberated multiethnic humans from their internecine disputes and warfare were, on account of their identity, able to mobilize to destroy the recently integrated humans!

The robots in the Czech (1921), American (1922), and Japanese (1924) productions of *R.U.R.* look and dress like humans, and therefore their speech is perfunctory and their gestures stiff in order to distinguish them from their flesh-and-blood doppelgängers. However, in the London production of 1923 and in many later productions, the robots wear costumes that make them appear metallic—as radical “others” alien to, and alienated from, fleshly humans. But regardless of costume, it remains the case that the robots “stand for the dehumanizing effects of technological change and industrial capitalism” and reminded early twentieth-century audiences of the global devastation accompanying large-scale militarization during World War I.²¹

Translating *R.U.R.*

Hijikata relied on the July 1923 translation of *R.U.R.* by Uga Itsuo, about whom little is known, who did not use the word “robot(s)” even once in his translation with the exception of his literal transcription of the title, *R.U.R.* (*Rossamusu Unibuāsarū Robottsu*).²² Uga actually saw the play in 1922 at the Garrick Theatre in New York and based his translation on the English version by Paul Selver (1888–1970) who had collaborated closely with Čapek. Selver cut short the final Bible-citing soliloquy by Alquist (the sole surviving human) at the end of the original Czech play and Uga followed suit. Science fiction scholar Robert Philmus suggests that Selver “cleaned up” this and other passages in Čapek’s play that would have offended “Puritan” sensibilities in England and the United States at the time.²³ In Japan, audiences would not have been offended but rather unfamiliar with Alquist’s extensive and convoluted musings about the Book of Genesis. In his one-page preface, Uga briefly introduces Čapek and names all the cities, in addition to Prague and New York, in which *R.U.R.* had already been performed: Paris, London, Rome, Moscow, and Warsaw. Uga also remarks that he arbitrarily (*katte ni*) decided to use the word *jinzō ningen* instead of “robotto/tsu” and Hijikata staged the play using that title.

A second Japanese translation of *R.U.R.* was published in 1924 under the title *Robotto* by Suzuki Zentarō (1883–1950), a novelist, playwright, and translator.²⁴ Suzuki is credited by some Japanese theater scholars as having been instrumental in popularizing the word “robot” in Japan. Unlike Uga, Suzuki wrote a long introduction in which he summarized the play and advanced his own concerns about the mechanization of labor and presaged the disturbing robotization of weapons today. Both Suzuki’s and Uga’s translation of *R.U.R.* was preceded by the former’s five-part article on Čapek’s play serialized in the *Tōkyō Asahi Shinbun* in April 1923 detailing the storyline and providing synopses of each act.²⁵ Uga’s preface indicates that he completed the translation while residing in the United States so he may not have been aware of either Suzuki’s article or that he was translating *R.U.R.*

Likewise, Hijikata probably did not see Suzuki’s newspaper article, as he was in Europe from November 1922 through December 1923. While in Berlin, he, like Čapek earlier, eagerly imbibed the influence of German Expressionism. During his sojourn in Moscow, Hijikata studied the biomechanics system of actor training developed by the theater actor and director Vsevolod Meyerhold (1874–1940), who advocated the “Taylorization of the theatre.”²⁶

Briefly, Meyerhold's biomechanics was a "scientific" approach to utilizing bodily expressions honed by technical mastery in order to most efficiently and consistently communicate the essence of a character to the audience. Meyerhold viewed his technique as an antidote to his former mentor Konstantin Stanislavski's (1863–1938) psychological realism. The Stanislavski System, employed by the Takarazuka Revue, focused on eliciting an actor's emotional identification with a character through the "magic if" process: "What would I do if I were in X's position?"²⁷ Meyerhold, in contrast, advocated the creation of character through well-rehearsed movements and not psychology. Biomechanics, he posited, enabled a purity of theatrical performance unclouded by stray thoughts, inconsistencies, and audience interruptions that could affect an emotional, psychologically-oriented actor.

In his writings on dramaturgy, Meyerhold acknowledges the influence the Kabuki and Noh theaters on his development of biomechanics. He notes the "agility" of the Japanese actor, who is both "acrobat and dancer," and appreciates how "patterned movements," as opposed to words and dialogues alone, determine and convey the essence of human interactions.²⁸ Ironically, Hijikata and other shingeki leaders influenced by Meyerhold were highly critical of Japanese traditional theaters, defining themselves as "what is not Kabuki"—even though they employed Kabuki actors, some of whom, like Ichikawa Sadanji II (1880–1940) and Kawarasaki Chōjūrō IV (1902–1981), had met at length with both Stanislavsky and Meyerhold in Moscow during their 1928 European tour.²⁹

Hijikata cut short a multiyear tour of Europe when he learned about the powerful noon-time earthquake of September 1, 1923, that devastated Tokyo and Yokohama. Four hundred thousand persons were killed and two million left homeless by the earthquake and attendant fires. Forty-five percent of workers lost their jobs as industries were destroyed. Hundreds of thousands of refugees camped in public parks. Rumors spread that resident Koreans resentful of Japan's colonization of Korea in 1910 were taking advantage of the chaos to poison well water and to collaborate with leftists to overthrow the government. Thousands of Koreans were murdered by vigilantes, and social radicals assassinated by the police. Martial law was declared. The natural disaster amplified the military state's deep-seated fears about modernity, even as the celebration of automation and mechanical engineering in the name of "scientific nationalism" continued apace.³⁰

The catastrophic earthquake and its chaotic aftermath formed the apocalyptic backstory for the staging of *R.U.R.* in Tokyo. On the one hand, the

robots represented the social groups oppressed by a capitalist economy intertwined with the imperialist state, and on the other, they represented the potential of “the masses” to challenge the authoritarian state. Because of his anti-imperialist, socialist politics, Hijikata was arrested in 1932 and fled to the Soviet Union the following year but was deported to Europe in 1937, which coincides with the period in which his mentor, Meyerhold, was persecuted by Joseph Stalin, who had launched a campaign against avant-garde art and theater. Meyerhold was tortured and forced into making a false confession about spying for Japan and Britain, and subsequently executed by firing squad in February 1940.³¹ Hijikata returned to Japan in 1941, was arrested again, and was released after the war, whereupon he joined the Communist Party and became involved in the theater scene, teaching and directing. Curiously, given his early involvement with Meyerhold, he published several books on the Stanislavsky System in the 1950s.³²

Robo Thespians

Both the Takarazuka Revue’s *Robotto no tawamure* and the Tsukiji Shōgekijō’s *Jinzō ningen (R.U.R.)* productions featured humans performing as robots. The use of actual humanoid robots as thespians was pioneered by contemporary playwright and director Hirata Oriza (b. 1962) in collaboration with roboticist Ishiguro Hiroshi (b. 1963), perhaps best known for Geminoid-HI, his android double—HI are his initials (Figure 2). Hirata founded Seinendan, a theater company housed at the Komaba Agora Theatre in Tokyo, in 1983 during his sophomore year in college. Hirata, whom I interviewed in October 2015, writes and stages plays that “reflect the intricate mentality of contemporary society in Japan.” He began collaborating with Ishiguro in 2006 shortly after joining Osaka University’s Center for the Study of Communication Design. Like Hijikata Yoshio, Hirata grew up in an affluent Tokyo family and traveled widely. His father is a screenwriter and his mother a psychological counselor. Quitting high school at sixteen, Hirata embarked on a bicycle trip around the world (visiting twenty-six countries) and published his travel journal in 1981. The following year he was admitted to International Christian University in the suburbs of Tokyo, graduating in 1986 with a BA in Humanities.

Hirata was an exchange student at Yonsei University in Korea during his junior year (1984), an experience that later led to his organizing several theater workshops in Korea and writing a trilogy of plays titled “Citizens of

Seoul” which have been performed by his own and Korean theater companies. The first of the trilogy, *Citizens of Seoul*, set in 1909, a year before Japan formally colonized Korea, premiered in 1989; the second, set in 1919 debuted in 2000; and the third, set in 1929, premiered in 2006. The trilogy tracks the rise and fall over three decades of the “ordinary everyday life” (*seikatsu*) of the Shinozaki family who managed a stationery store in Seoul, revealing, in Hirata’s words, the “nonchalant arrogance” and “ridiculous isolation” of Japanese colonialists. Although Hirata, who considers himself a “very political playwright,” is critical of Japan’s imperialist legacy, he is not interested in invoking either science or fiction, as did Čapek and Hijikata, to produce overtly political dramas or theatrical manifestos. Rather, whereas Hijikata’s staging of *R.U.R.* and other European dramas aimed, in part, to “de-Japanize” theater in Japan, Hirata’s robot plays (*robotto engeki*) are constructively viewed as proceeding from, and promoting, a form of Japanese cultural exceptionalism. That is, Hirata employs the robots to showcase the “unique” features of the Japanese language, particularly its gestural and nonverbal modalities. His collaborator, Ishiguro is keen on using the theater as a real-world venue outside of the laboratory for exploring human-robot interactions.



Figure 2. Geminoid-F (left) and Geminoid-HI (right). Photo permission and credit: Osaka University and ATR Hiroshi Ishiguro Laboratory. <http://www.geminoid.jp/ja/robots.html>.

As a playwright, Hirata aims to illuminate the existential milieu of the Japanese people. His abiding interest in creating a theater of the quotidian, or what, since the 1990s, Hirata has referred to as “quiet theater” (*shizuka na engeki*), informs his development of “contemporary colloquial theater theory” (*gendai kōgo engekiron*).³³ These initiatives, together with his collaborative work with Ishiguro since 2006 in developing the new genre of robot theater, fulfill several of Hirata’s “cultural policy agendas” (*bunka seisaku*) for Japan. Not only has he written extensively on the subject of “cultural policy,” but during the opposition Democratic Party of Japan’s brief administration (2009–12), he served as a special advisor to the cabinet on international cultural affairs.³⁴

New military technologies deployed in World War I and showcased in robot exhibitions in the 1930s were the backdrops for Čapek’s *R.U.R.* and the Takarazuka Revue’s robot comedy. Hirata and Ishiguro’s *robotto engeki* project grew out of Ishiguro’s involvement with the Humanoid Robotics Project inaugurated by the state in 1998, one of the results of which was the creation of Honda’s world-renowned bipedal robot, ASIMO. In February 2007, former Prime Minister Abe Shinzō unveiled *Innovation 25*, a visionary blueprint for revitalizing Japan through the robotization of the workplace and home. Today the project is referred to as *Society 5.0*. Abe’s initiatives were instrumental in Japan’s emergence as the leading producer of industrial and other types of robots, from those shaped like cooking appliances and bathtubs, to humanoids and exoskeletons. His vision of near future families cohabiting with companion robots, however, has been criticized as “outdated science fiction.”³⁵

In a joint article on *robotto engeki* published in 2011 in *Nihon Robotto Gakkaiishi* (*Journal of the Robotics Society of Japan*), Hirata and Ishiguro claim as their objective, the creation of “a new phenomenon that constitutes a synthesis of technology (*gijutsu*) and the performing arts (*geijutsu*)—as opposed to art forms that celebrate technological expertise alone. It is easy to admire (*kanshin*) the high-tech skills and imagination involved in creating a humanoid robot; however, we want our audiences to become emotionally moved and inspired (*kandō*) by the robot actors.”³⁶ For Hirata and Ishiguro, the theater provides a research platform for the enactment of science fiction scenarios about human-robot coexistence, however ordinary and banal. They employ the theater stage as a site where human-robot interactions can be choreographed, rehearsed, and evaluated by nonspecialist audiences. Significantly, the communicative medium of these ordinary scenarios is, basically, biomechanics (in the Meyerholdian sense); namely, “patterned movements” (*kata*),

or gestures and poses that convey meaning and facilitate comprehension. An additional biomechanics element is the importance of timing (that is, speed and duration) and synchrony. Thus, Hirata's scripts provide precise instructions as to how many centimeters robots and humans should move in a given direction, and how many seconds and fractions of a second should separate the verbal and nonverbal exchanges between the robots and human actors. This type of scientific precision of the scripted repartees is true of Hirata's plays that do not include robots. In fact, Hirata has declared that he does "not find that [humans] and robots are all that different in essence. Robots are built in order to work, and their functions are very precisely modeled on human functions—so much so that nothing in their essence allows one to distinguish their functions from those of humans."³⁷

Hirata and Ishiguro seek to demonstrate in *robotto engeki* that communication on and off stage is not dependent on proficient verbal dialogue alone. A decade before he began working with Ishiguro, Hirata conceived of the theater as a place "to portray not events or actions, but rather human existence and relationships. . . . The problem is not *what* is said, but *how* it is said."³⁸ By prioritizing the "how," Hirata confirms an observation made by the late literary scholars and critics Joseph Krupnik and Robert Scholes that the "favorite themes" of science fiction, namely, the "psychological and social implications of scientific and technological developments" rather than the scientific systems themselves, can readily be enacted on a theater stage.³⁹ Hirata does include dialogues—albeit very short ones—in his *robotto engeki*, but most of the verbal interactions consist of interjections (*aizuchi*, *kantōshi*), single words, sentence fragments, and pregnant pauses that distinguish Japanese conversational speech, and that require cultural and linguistic competence to be fully understood. Among the common interjections vocalized by the robots that foster emotional identification and existential familiarity, are *ē*, *ēto*, *mā*, *ya*, *sā*, *un*, *ūn*, *nē*, *hē*, *anō*, *are*, and *osoraku*, to name but a few.

I, Worker: The Robots

The first robot theater production, *Hataraku Watashi (I, Worker)*, premiered at the Agora Theatre in 2008 and has since been performed widely in Japan and abroad. Written by Hirata and programmed by Ishiguro, the play was designed as a scientific experiment within a fictional account of human-robot coexistence and collaboration. The title recalls the etymology of Ča-

pek's "robot" as a tireless worker. Actually, defining what a robot is poses a challenge. As roboticist Illah Nourbakhsh writes in *Robot Futures*, one should "never as a roboticist ask what a robot is. The answer changes too quickly. By the time researchers finish their most recent debate on what is and what isn't a robot, the frontier moves on as whole new interaction technologies are born."⁴⁰ Having perused dozens of descriptions, I composed a definition that is both comprehensive and concise: A robot is an assemblage of different technologies—sensors, optics, software (including some level of artificial intelligence), telecommunications tools, actuators, batteries, polymers, etc.—that make it capable of interacting with and navigating within its environment with various degrees of human supervision and/or through tele-operation. Real world robots exist in many forms, from swallowable microbots and rice cookers to vacuum cleaners and large industrial robots. Humanoid robots resemble the human body but are themselves less end products than platforms for spinoff industries, such as mobility devices, surveillance tools, and, increasingly, weapons systems.

Mitsubishi Heavy Industry's yellow Wakamaru-model humanoid robots were recruited to act in Japanese productions of *I, Worker*. Wakamaru has a head with two ovaloid eyes on top of a moveable neck, and two moveable arms with mitten-like hands. The head has two parts that fit together like a ball and socket; the top part, which has an undulating profile, nods and rotates. Because at that time, Wakamaru was also used by JAXA (Japan Aerospace Exploration Agency) in research related to a future robot moon base, the humanoid was not permitted to travel abroad due to security risks. Instead, a less complex humanoid, Robovie R3 (designed by Ishiguro) has been used in foreign productions of *I, Worker*, such as the one in New York sponsored by the Japan Society in February 2013, although the public relations poster and video trailer feature Wakamaru (Figure 3).⁴¹ Robovie's head is one integral unit—unlike Wakamaru's ball-and-socket style head. Both robots lack mouths, although Wakamaru's undulating profile is suggestive of one. Whereas Wakamaru's large ovaloid eyes are uniformly dark, Robovie's eyes are more humanlike, with a pupil, iris and sclera.

The one-meter tall, thirty-kilogram Wakamaru debuted in February 2003 billed as a "communication robot." Yellow was the color selected for the robot's body because it "attracts attention, is invigorating, and has strong connotations with happiness."⁴² Created from the start as a male-gendered robot, Wakamaru's name was inspired by the two sensors (infra-red and ultrasonic) on the forehead which look like the eyebrows of Wakamaru's namesake, the

heroic twelfth-century samurai, Minamoto no Yoshitsune whose childhood name was Ushiwakamaru (young ox). Another camera is located on top of his head. Wakamaru's body shape was inspired by samurai armor (*yoroi*) and men's formal kimono (*hakama*). In *I, Worker*, Wakamaru cross-dresses—one of the two robots wears a bow tie to signify “male,” the other an apron to signify “female.”

The movement and rotation of the two robot bodies, the roll and tilt of their heads, the direction of their gaze, the gesturing and placement of their arms and hands are all choreographed to generate, not human likeness per se, but rather “presence” (*sonzaisei*) and “live-ness” (*ikimono rashisa*). Apologies are invoked by hanging the head down; doubtfulness is suggested by tilting the head to one side. Regret or a negative reaction involves a backward movement. “Liveness” is also imparted by having the robots make slight movements and shift the direction of their gaze when not moving or speaking. These gestures are enhanced by the highlights and shadows cast by stage lighting. The humanoids roll at a top speed of one kilometer/hour fueled by a battery backpack that needs recharging after twenty minutes, which is the length of the play. Most importantly for Hirata's dramaturgical purposes, Wakamaru recognizes faces and short sentences and can synthesize speech. In *I, Worker*, the robots are programmed and operate semi-autonomously; an operator backstage oversees their performance and watches for glitches.

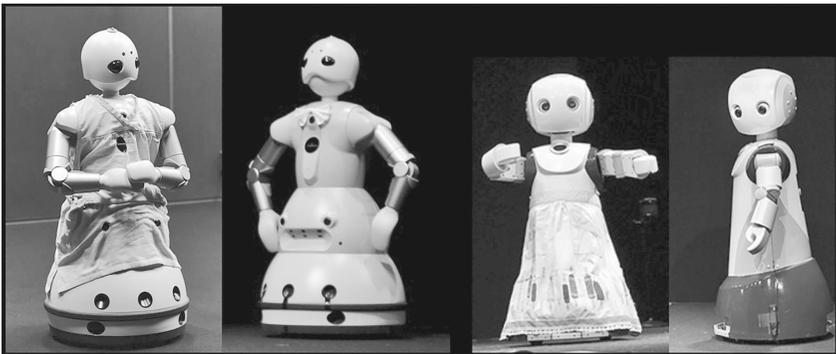


Figure 3. Wakamaru and Robovie R3 robots used in the Japanese and foreign productions, respectively, of *I, Worker*. Composite photograph created by author. Wakamaru photographs from <https://www.unitedlife.sk/roboty-a-umenie/>; <https://www.ycam.jp/archive/works/i-worker/>. Photograph permission and credit for Robovie R3 images from Julie Lemberger, <http://julielemberger.com/>.

I, Worker: The Play

I, Worker is set in the near future and features a robot couple, Momoko (female) and Takeo (male), who are employed as servants of a human couple, Mayama Ikue (wife) and Mayama Yūji (husband). In keeping with Hirata's (like Meyerhold's) eschewal of superficial theatricality and his emphasis on the minimum necessary conditions for communication, the sets are minimal: a table, floor cushions, serving dishes, a book. The floor and walls are charcoal gray. Colorful spectacular sets would interfere with the character development and psychological tension in science fiction plays;⁴³ the visual neutrality spotlights the nature of the relationship among and between the four characters in the play.

Yūji lacks any motivation to work—he is a *hikikomori*, suffering from acute social withdrawal (a serious social problem today in Japan, especially among teenagers). Ikue is ambivalent about having children, an attitude echoed off stage by Japanese women especially. Hirata's script alludes to former PM Abe's idea that robot maids would boost the low birthrate by freeing married women from the drudgery of unpaid housework and childcare, thus allowing them to pursue careers outside the home.⁴⁴ Yūji lounges at home chatting with the robots and enjoys tasty meals prepared by Momoko. Ikue, who also suffers from depression, agonizes over what to do about Yūji since, as her parents have reminded them, husbands *should* work outside the home.

In a parallel twist, Takeo confesses to Ikue that like Yūji, he “doesn't feel like working for some reason,” nor does he want to go shopping with her even though he is capable of doing so. “There's nothing wrong with my electrical circuits,” he remarks, “I just don't want to go out.”⁴⁵ Ikue is doubly troubled by the dull torpor into which both her husband and Takeo have fallen. Takeo reflects that since robots were meant to work (for humans) what does it mean when they refuse to do so? The self-aware robots in *I, Worker*, and the blurring of human and robot behaviors, recall episodes in *R.U.R.*, although neither Takeo nor Momoko act on their self-awareness to punish their human counterparts, as did their *R.U.R.* forebearers. Rather, both robots assimilate into and reinforce the status quo, underscoring the emphasis in the Japanese robotics industry that robots are not inherently dangerous, and are patently domesticable.

The robots' embodied presence is conventionally gendered. Both speak in synthesized monotones but Momoko's voice has a higher pitch and she speaks more slowly than Takeo. Except when she dances briefly, her arms are never far from her body and their movement is curvilinear. Momoko often crosses

her hands in front of her, which in addition to being a “feminine” posture, also makes her body look smaller. She tends to stare or gaze off for longer periods of time and “smiles” more often. Takeo’s movements are more angular, and when he is still, his arms and hands hang by his side. In choreographing the gendered gestures and poses of the Wakamaru robots, Hirata, who has collaborated with the Takarazuka Revue and former Revue actors in his other robot plays, drew from the binary construction and reification of gender perfected by the all-female Revue.⁴⁶

I, Worker closes on a romantic if maudlin note that seems to reference Alquist’s *Genesis*-referencing soliloquy in *R.U.R.* Ikue has gone outside to view the beautiful sunset. Takeo notices that she has been crying. He and Momoko discuss the sunset: “More than looking at it alone,” he says, looking at her, “when you’re with someone else you remember all kinds of things, and that makes it beautiful.” Momoko muses, “I wonder if that’s so?” “Apart from that,” Takeo replies, “I am unable to comprehend.” Momoko is silent. “I’m unable to comprehend anything beyond saying it’s beautiful,” Takeo continues. Momoko asks, “Is that so?” Takeo concludes, “We just haven’t evolved that far.” Takeo and Momoko slowly look downward as the stage lights dim.⁴⁷ There is no Alquist to send them into the world as a new Adam and Eve. Hirata’s robots are (semi-)autonomous agents who are fully interpellated into a dysfunctional human couple’s life but not (yet) fully human themselves.

Final Curtain

Hijikata’s production in 1924 of Čapek’s *R.U.R.* sparked an ongoing fascination with robots who continue to thrive as protagonists and villains alike in manga and anime. Since the 1960s, when the state embarked on a policy of automation over replacement migration to extend the productivity of the domestic workforce, the dominant trend in the Japanese media has been to characterize robots as benign and human-friendly. The robotto engeki productions of Hirata and Ishiguro remove the “fiction” from “science fiction” by showcasing robots as domesticable companions in the real world and demonstrating the plausibility—even desirability—of human-robot coexistence. The future likelihood of robot-human coexistence is overdetermined in a later Hirata-Ishiguro robot theater collaboration, *Sayonara* (2010), in which the android Geminoid-F[emale] (see Figure 2) is cast as a caregiver who placidly recites poetry in French, German, and Japanese to comfort a young woman suffering

from a terminal illness.⁴⁸ The android was employed by her parents who then absconded (In the drearier 2015 film version, the woman is dying of radiation poisoning and is left in the care of the fembot when the rest of the population evacuates). Unlike the Wakamaru robots, Geminoid-F is immobile and her face alone is activated via motion-capture sensors and tele-operation.

I, Worker addresses, but does not redress, social issues and crises in Japanese society today; the robots mirror the human couple's existential conundrums. Takeo and Momoko—and Geminoid-F in *Sayonara*—stand for social arrangements, kinship relations, and modes of thinking and (re)acting. As a genre of science fiction, *robotto engeki* underscores the increasing dependence of humans on technology and robotic devices. All of the robot plays discussed above evince the serious possibilities of theater as a science fiction medium. Takarazuka's "playful robot" spoof presages robots and robotic devices with software that enables them access to Wikipedia data (which, like reference books, are not synonymous with learned or experiential knowledge). The Revue robot is also fallible, although not on the order of the *R.U.R.* robots which in their angry frenzy to destroy humanity, also destroy the very humans who can repair and recreate them. Hirata and Ishiguro employ science fiction scenarios of human-robot coexistence in *robotto engeki* for complementary purposes. On the one hand, Hirata is keen on demonstrating the uniqueness of Japanese gestural and interjectional communication patterns, and on the other, Ishiguro uses the theater as a "living laboratory" where human-robot interactions can be observed and assessed. All of these robot plays, which span nearly a century, are less about the virtues of technophilia or the folly of technophobia, and more about the tensely ambivalent frisson generated by the intersection of human lives and robot live-ness.

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