R.U.R. and the Test of Time

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Introduction

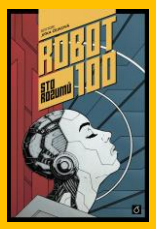
Until preparing this piece, I had not read or seen Čapek's play, but I was aware that it was the source of the word "robot" in English. In preparation for writing this piece, I watched a performance of the play on YouTube [1] (which omits the Epilogue [2]), and then skim-read a script [3].

The performance I watched, as with any play, is a translation or interpretation of the script; here the script is itself a translation of the original. Additionally, that performance was based on a much more modern 2006 translation [4] than the 1923 translation that I subsequently read. I do not analyse these differences here, but note that some of my comments may be influenced by the particular versions I saw and read.

I read a lot of science fiction, so I watched this through SF reading protocols [5]. This means, for example, that I am not going to discuss whether the robots are metaphors for something else; I am interpreting them as actual physical robots. This also means I am focussing on the science fictional world building: the process of building up the described world in my head, assuming that the clues given by the author are literal, rather than metaphorical.

Time and place

A first part of world building is determining when and where the action is set, relative to when the piece was written. That is, even if it is set in our past, is it set in the author's past or future? From the text of Act One [all following quotations are taken from [3], unless otherwise noted], we learn that Rossum discovered his substitute for living material in 1932, after a decade of experimental work on the remote island where the action takes place. Much subsequent development was then needed. It took Rossum "several years" to make a (failed) artificial dog, then a further "ten years" to make a (failed) artificial man. Also, Rossum was young at the point of his first discovery, but died an old man. After his failed artificial man, his nephew ("young Rossum") took over with an engineering eye to the problem; first he "set about learning anatomy himself", then simplified the design, perfected the manufacturing process, and ramped up mass production. There is the impression that even this was in the past, as there are references to this history being told in "all the school books of both Europe and America". So we are to read this as happening probably 50 or more years in the future: so far in the future that much will have changed from the world of today.



Susan Stepney: *R.U.R.* a zkouška času
The English translation of the essay from the Czech book
Robot 100: Sto rozumů, edited by Jitka Čejková,
published by the University of Chemistry and Technology Prague
(Vysoká škola chemicko-technologická v Praze) in 2020

Some assembly required

The next bit of my world building is to unpick how the robots are made. As Walton [5] points out, it is not always important to know how science fictional technology works; sometimes it is just a device to move the plot to the right place. But here, how the technology works is crucial to the plot.

The robots are constructed from organic, life-like material, and have a humanoid appearance; this means in modern parlance, they are not actually robots (mechanical), but androids (organic humanoids). I like that we now have finer divisions of this concept. However, I continue to refer to them as robots here, in deference to the play.

We learn that the robots are made from living matter, but not biological living matter: Rossum's notes include the passage: "Nature has found only one method of organizing living matter. There is, however, another method, more simple, flexible and rapid, which has not yet occurred to nature at all. This second process by which life can be developed was discovered by me today." This earliest discovery is merely "some colloidal mess that a dog wouldn't look at". The engineering process moved this "out of the test tubes", into a form that could "hasten development and form organs, bones and nerves". It is claimed to be relatively easy to make lifeforms, because the "artificial living matter of his had a raging thirst for life. It didn't mind being sewn or mixed together." Despite this raging thirst, however, Rossum's attempts to use the material to make a dog and a man failed. It isn't until young Rossum, with his engineer's design approach, removes everything unnecessary, simplifies everything else, and successfully produces a stripped down version of a person: "a beautiful piece of work. Not much in it, but everything in flawless order. The product of an engineer is technically at a higher pitch of perfection than a product of nature."

The manufacture of the robots' components is described: "there are the vats for the preparation of liver, brains, and so on"; "the spinning mill … [f]or weaving nerves and veins. Miles and miles of digestive tubes pass through it at a time." Despite the inclusion of nerves, their nervous system is too limited; they "feel practically no bodily pain", and are prone to damage themselves because of this.

How these components are assembled into complete robots is left to the imagination in [3], but [4] goes into more detail, describing an assembly line style of manufacture : "there's the assembly room where all these things are put together, it's just like making a car really" [4]. (Recall this was written only a few years after the introduction of the assembly line in the Ford car factory.) Assembly is faster than growth, and this speed is important: "It's absurd to spend ten years making a man. If you can't make him quicker than nature, you might as well shut up shop."

Robots come in different grades, from those "as powerful as a small tractor" but with only "average intelligence", to superior grades with much higher intelligence. They needed to be apprenticed as workers: "They learn how to speak, write and do arithmetic, as they've got amazing memories. If you read a twenty-volume encyclopedia to them they could repeat it back to you word for word, but they never think of anything new for themselves. They'd make very good university lecturers." [4] (What did Čapek have against university lecturers?)

My world building falters here, trying to decide whether the robots can read: they are trained "to speak, write and do arithmetic", but reading is not explicitly mentioned, although being able to write and not read is strange. Also, when describing their prodigious memories, we are told: "If you read … to them", not, "if

they read…". Earlier, we are told all the office workers on the island are robots; presumably they can read? Eventually, we get to a scene between Helena and the enhanced robot Radius; Helena says: "I had you put into the library, so that you could read everything, understand everything". So, Radius for one can read (unless the ever silly Helena is mistaken?); let's assume at least the sufficiently intelligent of the rest can, too.

Despite the robots' high intelligence, we are told they have no imagination, no creativity, no "soul". And despite the claim of engineering superiority, they sometimes damage themselves because they feel no pain; even if they don't, they only "live about twenty years" before they are "used up". Some robots even break down, getting "robot's cramp" where they stop working, gnashing their teeth. Robots who die or are defective are taken to the "stamping-mill", where they are ground "to powder".

Putting this together gives a picture of organic, humanoid, engineered automata, that are rapidly assembled fully grown on a factory production line from human-like components (liver, brain, nerves, tubes), with a highly efficient simplified design, different grades having different strength and intelligence. After assembly, they are trained as workers, learning to read and write, and to perform their specific tasks. Then they work soullessly for up to 20 years, feeling no pain or other emotions, are used up, and finally recycled.

This picture is not much different from a more modern conception of fictional androids. The main difference is the production line model, rather than some rapid growth process occurring in a vat of organic goo. Modern androids can be anywhere on the spectrum from emotionless droids, through the hypothesised uncanny valley, to indistinguishable from human. Today we are so used to the emotionless droid that Helena's initial mistaking of Sulla for a human seems risible. But Helena herself has only ever experienced the coarser, less intelligent worker versions, quite unlike the intelligent Sulla. Given her mistake with Sulla, her subsequent mistaking of actual humans for robots a few minutes later is very implausible, but is possibly included for comic effect.

The robots are taking our jobs!

Having built a picture of how robots are manufactured, the next world building question is, what effect do they have on the world?

They are being mass produced in vast quantities: "we mix the ingredients for a thousand Robots at one operation", and sold in batches of 10,000 or 15,000 at a time. There are 100,000 robots on the island alone, manufacturing and shipping product, and a warehouse holding 347,000 units. Production volumes are so high that the price of a fully-clothed robot has fallen from $10,000 to $150 over the last 15 years. (In comparison, in 1925, the Ford Model T sold for $260 [6].) 500,000 robots are growing wheat on the Argentine pampas; the price of bread has plummeted as a result. Similar things are happening to the price of all goods, and will continue: "in five years' time … the cost of everything won't be a tenth of what it is now … in ten years … things will be practically without price."

Of course, this ever-cheaper robot labour is replacing human labour: "All factories will go pop like chestnuts if they don't at once buy Robots to lower the cost of production. … all the workers throughout the world will be [un]employed." There is a view that this will actually be an unalloyed good, a new paradise on earth: "Everybody will be free from worry and liberated from the degradation of labor.

Everybody will live only to perfect himself. … the servitude of man to man and the enslavement of man to matter will cease." The food that will become so cheap it is "practically without price" should be available at that effectively zero price to all, and the robots themselves will be so cheap that everyone can have them to perform essential labour: "The Robots will wash the feet of the beggar and prepare a bed for him in his house."

It is recognised that this might cause humanity to lose something: "There was something good in service and something great in humility. There was some kind of virtue in toil and weariness." This does sound to me more like the protest of the privileged who think others benefit from hard toil and humility, but would not want to do it themselves, day in, day out, without choice. But this worry is dismissed: "we cannot reckon with what is lost when we start out to transform the world".

It is also recognised that this might not all happen smoothly: "terrible things may happen at first, but that simply can't be avoided." This is not elaborated on further; rather, paradise is reiterated: "Man shall be free and supreme; he shall have no other aim, no other labour, no other care than to perfect himself. He shall serve neither matter nor man."

This has all the dreadful sound of the blinkered visionary who sees a perfect future, and never mind who else gets hurt or trampled underfoot as they seek to realise their vision; that is just unavoidable collateral damage. They see only the good that may happen, and discount the bad that will happen.

And, of course, we are currently living through the "terrible things may happen at first" part of scenario. Mechanical robots are indeed taking people's jobs, and are reducing the cost of goods. But those unemployed people are not benefitting from the reduced consumer prices, as they have not got the means to purchase the (still non-zero priced) goods, nor the (very much non-zero priced) robots to perform their personal labour. And the way economies are currently arranged makes it unlikely that this poor getting poorer scenario will transform into an equitable distribution of wealth scenario without some major upheavals and more "terrible things".

March! March! March!

And major upheavals there are in the world of R.U.R., but not towards the envisioned paradise. The final bit of world building is figuring out how it all went wrong. The robots, inevitably, rise up against their human creators. There are two suggested potential causes of the final disaster.

First, Helena is worried that the intelligent robots will hate people, and so eggs on Dr. Gall to make them more human-like: "I thought that if they were more like us they would understand us better. That they couldn't hate us if they were only a little more human." Silly Helena. "Nobody can hate man more than man." The unenhanced are emotionless, unable to hate or even resent. Only once they have been enhanced do they want more, want freedom, want power, and come to resent the puny humans who they regard as inferior in every way: "You are not as strong as the Robots. You are not as skilful as the Robots. The Robots can do everything. You only give orders. You do nothing but talk." But Busman determines that this enhancement cannot be the reason for the uprising: it started only three years ago, and only a few hundred have been enhanced, out of the few hundred million robots in total: "it's practically of no consequence whatever". Clearly none of them have heard of the Butterfly effect [7].

Second, although the manufacturers are producing robots as labourers, some of their customers are using them as soldiers. This seems to have been started by some resistance to the robots: "the working men in America revolted against the Robots and smashed them up", presumably because the robots were taking their jobs. Then "the governments turned the Robots into soldiers, and there were so many wars". These wars are some of the "terrible things" alluded to earlier: "those are only passing troubles, which are bound to happen before the new conditions are established". When Nana demands to know why they keep selling robots as soldiers, Helena denies any corporate responsibility: "Domin can't know what they're to be used for. When an order comes for them he must just send them", Domin being the head of R.U.R., the sole manufacturer of robots. The robots learn how to fight as soldiers, but it isn't clear why this makes them revolt. They could still be emotionless drones just obeying orders.

My world building here relies on some interpretation of the robot manifesto that says: "Robots throughout the world, we command you to kill all mankind. Spare no men. Spare no women." This can be understood as a combination of the two effects: the enhanced robots (and possibly just the super-enhanced Radius) have learned to hate, and order all robots to kill humans; the vast majority of still-unenhanced robots are just following these orders. Clearly they should have been endowed with the three laws of robotics [8], but unfortunately for humanity, these were not published until 1942.

Overall, the revolt is related to the problem of consciousness. What is required to take something from being a mere machine, to one that can reflect, and seek to achieve its own desires? Here the standard robots are not conscious, but the enhanced ones are. What this extra enhancement is, is not described. Science fictionally, this is not a problem: we are into the realm of not needing to know how a mechanism works [5], simply that it does, in order to get us from here to there in the plot.

The tragedy of the plot is that the robots are superior to humans in all ways but one: the humans have the secret of their manufacture. They kill all the humans and lose that secret, which means that all the robots will also die, within 20 years. The epilogue (in the script, but not in the production) has two of the enhanced robots attempting to find the secret with the help of Alquist, now the last human alive. But the secret is lost. (I am not sure why. The single copy of the written instructions are certainly destroyed (hence the importance of backups). But the factory still exists, and the robots were the ones running the factory. There must be enough information to reverse engineer the process there.) The two robots each offer to sacrifice themselves in pursuit of the secret, but attempt to stop the other making that sacrifice. They have learned to love. Alquist realises this, and sends them off to be the new Adam and Eve. How discovering the emotion of love makes the robots able to physically reproduce when that capability has not been engineered into them is left unexplained, just as unexplained as the fact that humans all stopped reproducing once there was no more need for people's labour.

What's with Nana?

So I have managed to perform my mental world building on robot manufacture and robot use. Robot rebellion is a little harder, but I can manage it with a bit of effort. As for robot reproduction, well, maybe Campbell was right to drop the epilogue in his production [2]. But my biggest problem with world building is the character Nana. Nana is Helena's servant.

First of all, I had an initial problem, because in the production I watched, Nana looks to me very much like the robot Sulla. Maybe the two credited actors look similar; maybe one was understudying the other in the filmed production; maybe I am not very good at recognising people in slightly fuzzy YouTube videos. Nevertheless, on watching, I first assumed this was the same character, and that either Nana was robot Sulla changed over time, or was another robot built to the same pattern, but with more human qualities. So I kept expecting the reveal that Nana was a robot. But it became clear this was not actually a plot twist.

However, why isn't Nana a robot? The whole point of the expounded robot vision is to reduce human drudgery, and let all humanity be served by their own robots. If anywhere should reduce drudgery first, it should be on the island where the robots are manufactured! All the office workers, the factory workers, even the not-very-good cooks, on the island are robots, why not Helena's maid? Helena is supposed to be trying to liberate robots, and has no trouble trying to enhance Radius; she should be doing the same with a personal servant robot. Nana thinks she has been brought to the island because Helena is scared of the robots, but Helena denies this.

Nana's main purpose actually seems to be to expound a religious point of view. Some of the other characters do talk about "souls", and god, but most are quite atheistic. It appears to be Nana's role to rail against the unnatural robots: "it's against God's will", "All these new-fangled things are an offense to the Lord. It's downright wickedness. Wanting to improve the world after He has made it." It is interesting that she is portrayed as a comic, barely literate, character.

Conclusion

As a science fiction tale, this is quite prescient. It has robots – androids really – that are still well ahead of our current technology. It worries about these robots taking people's jobs, and worries about robot soldiers killing people. And it includes the issue of how might robots become conscious, and if that will make them a threat to humanity. These are all issues that current science fiction still grapples with. In that sense it has stood the test of time excellently.

In other senses, it is very much of its time, most particularly in its gender stereotyping. Interestingly, the performance I watched [1] gender swaps many of the roles, so that Harry Domin is the only male character. This gives it a very different feel from the original, which has only two female characters: Helena, a foolish young woman who exists to be info-dumped at, and to make silly mistakes and rash decisions; and Nana, a foolish old woman who exists to comically rant. In the original, the humans on the island are all men, who all instantly foolishly fall in love with Helena. (And don't get me started on Dorin's proposal to Helena.) There are female-looking robots, but these are manufactured to be "Servants, saleswomen, stenographers" because "People are used to it."

Additionally, the transport and communications have not advanced at all in the assumed 50+ year future in which the story is set. The island is serviced by boats, not aeroplanes, despite aeroplanes, and even commercial passenger flights, existing at the time of the original writing. And communication is by telephone on the island, and telegram off the island.

It is this lack of any other progress, this lack of wider authorial world building beyond the single change of the robots, that makes me believe that this was not intended as a pure science fiction story, but a story

where the science fictional elements actually are metaphors for problems all too human. And those problems are all too contemporary.

[1] Karel Čapek, translated by David Wyllie. R.U.R., Edward Alderton Theatre, February 2012. Act One, https://youtu.be/iFm3LG-eMHg ; Act Two https://youtu.be/zTx5IWMdFQc ; Act Three https://youtu.be/JQxtxr8kJpI

[2] Mark Campbell. Director's Notes. Rossum's Universal Robots Programme, Edward Alderton Theatre, 2012. http://www.edwardalderton.org/rur_prog.pdf

[3] Karel Čapek, translated by Paul Selver and Nigel Playfair. R.U.R. (Rossum's Universal Robots) 1923. Available from http://preprints.readingroo.ms/RUR/rur.pdf

[4] Karel Čapek, translated by David Wyllie. R.U.R. (Rossum's Universal Robots) 2006. Available from https://ebooks.adelaide.edu.au/c/capek/karel/rur/

[5] Jo Walton. SF reading protocols. 2010. https://www.tor.com/2010/01/18/sf-reading-protocols/

[6] https://en.wikipedia.org/wiki/Ford_Model_T#Mass_production

[7] Edward N. Lorenz. Predictability: Does the Flap of a Butterfly's wings in Brazil Set off a Tornado in Texas? AAAS, 1972. Available at: http://eaps4.mit.edu/research/Lorenz/Butterfly_1972.pdf

[8] Isaac Asimov. "Runaround". Astounding Science Fiction, March 1942

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