

# End of an Era? A Synopsis.

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University of Jyväskylä | Open Science Centre

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My name is Janne-Tuomas Seppänen, and I'm privileged for the invitation to talk about the changes and future of academic publishing and the role of academic libraries in all that. I am so happy that so many of you have tuned in, on such a beautiful summer Friday.



My screen has been acting bit funny lately, so it's best you just trust what you hear me say.



Ah, and now it's throwing quotes at me. Well as Oscar Wilde once said: "The ability to quote is a poor substitute for wit".

Actually, it was Somerset  
Maugham.

and he said: "ability to  
quote is a serviceable  
substitute for wit."

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Anyways, my talk will be me reading you three short stories from history of science, hopefully giving some light on the future of science.

They are all factual, true stories.

"I wanted to be able to tell the  
truth without ever needing to  
worry about the facts"

- Neil Gaiman

 @JanneSeppanen

I mean, things that probably did happen the way I tell them.

"Things need not have  
happened to be true"

- Neil Gaiman

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Or at least they are really convincing accounts of how things could have happened.

"Fiction has to be convincing,  
and life doesn't"

- Neil Gaiman

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Oh shut up, Neil. Here's the first one.

## Dead on Arrival

The hangover he had acquired from Mouton Blanc the night before could not dampen François de Mézeray's excitement in the morning.

He wasn't quite sure if it had been himself or Denis de Sallo who first proposed the idea. Or maybe it had been Blaise Pascal, though the man had been incessant all night about some wager with God, and about his new business idea, "public transportation". Blaise had insisted they try it when they left the cabaret, so they had first waited for the eight-seat carriage circling its scheduled route around Paris, and then paid five sols each for the ride home. François and Denis had quietly agreed the public transportation idea was useless. But this other idea, it was nothing short of audacious, brilliant, revolutionary!

"Denis!", he shouted downstairs as he was getting up from his bed, "you recall the conversation we had last night? About the *Respublica Literaria* correspondences? And the printing press? That we'd start publishing the letters, periodically, in print!"

"But of course I do!", Denis replied, "Such a beautiful idea! Instead of just one person at a time, every scholar in Paris getting access to the newest ideas and experiments by the most ingenious of the world, at the same time! Old René would have loved this."

"Descartes?"

"Yes. Did you hear already? The church now plans to list his works in the next edition of *Index librorum prohibitorum*. Those bastards.", Denis said.

"Ha! They would find it much harder to ban columns on a page of a mass-printed publication, particularly if we put things like obituaries of cardinals right next to them. We could call it *The Journal of Savants*", said François.

"Hey, I just remembered, doesn't Cusson have a press? And he has connections in the royal court? This could actually work out," said Denis with rising glee.

"Yes..." François stopped on his way down on the last step.

Except.

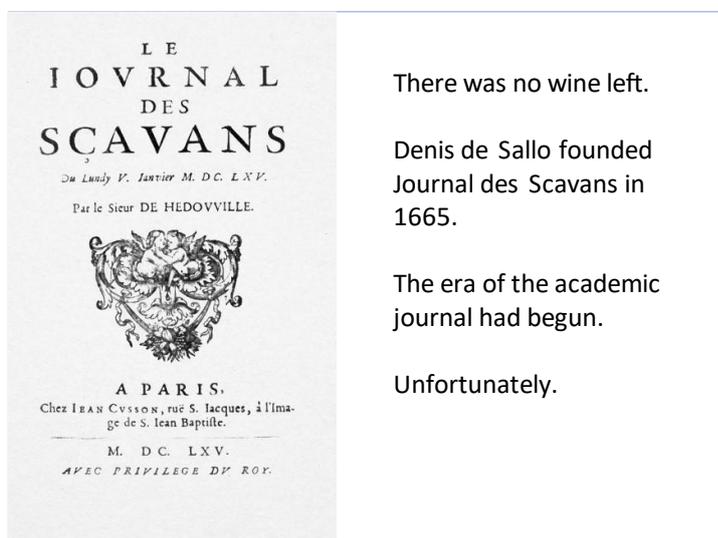
Blaise had also mentioned a letter he had just received from Robert in Oxford. Not from Boyle, but his assistant, Robert Hooke. The young man was eager to explain his fanciful idea of a system of communication towers, that could relay

a message across vast distances in visual symbols, in light speed. The towers should of course be equipped with powerful telescopes, so Robert had been asking if Blaise could introduce him to Baruch Spinoza, whose lenses were known to be the best in the world. But there was more. Robert was also keen to learn more about the Pascaline machines, the mechanical calculators Blaise had invented and built. What if every tower was also equipped with a Pascaline? And what if the messages were to be encoded with Bacon's cipher, not to encrypt them, but to represent them in either-or symbols, sort of "binary code", so that a mechanical calculator could run operations on them, faster than any human can? Blaise had explained the letter with a laugh, but now François understood something.

*Natura abhorret a vacuo.* Young Robert's idea would inevitably come to life, to occupy a space that needed it most. And that space was not politics, military matters, or entertainment, but communication of science. The members of *Respublica Literaria*, the ingenuous theorists, inventors, experimenters of the world, those very brightest minds alive in this beginning era of Enlightenment, they shall joyously and immediately embrace the opportunities this technology brings forth. Scientific correspondence on paper would be the first thing to end, because the network of semaphores and pascalines would carry the newest thoughts from Wien to London in just hours, from Leiden to Paris in minutes. François could see it now. Just a few more years, a decade at the most, and everything will be different in scientific communication. The idea of a prestigious periodic pamphlet printed in Paris, as a vehicle for communicating science? That was an idea dead on arrival, at this late stage of modernity, Anno Domini 1662.

"You know what Denis, just forget about the whole thing. Any wine left?"

## THE END



AND THAT IS HOW THE WORLD WIDE WEB WAS BORN. AS WE ALL KNOW, FOR ALMOST 400 YEARS NOW, SCIENTIFIC COMMUNICATION HAS BENEFITED FROM THE RAPID EXCHANGE OF IDEAS THE WEB ALLOWS.

It took more than 300 year before the World Wide Web was born.

 @JanneSeppanen

IT TOOK QUITE A LOT LONGER THAN JUST TEN YEARS, BEFORE SCIENTISTS REALLY EMBRACED THIS COMMUNICATIONS TECHNOLOGY.

Any day now, any day now...

 @JanneSeppanen

FRANCOIS DID NOT LIVE LONG ENOUGH TO SEE MANY OF THE THINGS WE TAKE FOR GRANTED TODAY .

TO LEARN MORE, LET US JUMP TO A STORY ABOUT HUNDRED YEARS AFTER THESE EVENTS:

## GREGOR'S PYRE

A thin wisp of smoke was rising from the abbey garden. Reaching the height of the cloister roofs surrounding the garden, it hesitated, as if unwilling to leave, but then a gust of wind took it and carried it past the brewery chimneys, over the streets of Brno, out over the Svatka river, to dissipate into nothingness on the sky of Czech Moravia.

Charles watched it go, standing by the abbey gate. The new abbot, upon hearing his name and the purpose of his visit, had issued orders banning him from the abbey grounds, and now two quiet but determined and large young friars were standing between Charles and the gate. As if just one would not have been more than enough to keep away a frail 75-year old man, Charles thought bitterly.

He had travelled to Brno from his far-off homeland, in a sort of pilgrimage. Or not pilgrimage, Charles frowned at himself – no, it had been a journey for... atonement. For bringing into accord. For reconciliation. For a last service to a dead friend.

Through the gate, Charles could glimpse the men scurrying across the garden with armfuls of unceremoniously crumpled sheets of papers, those large meteorological charts Gregor had so carefully, lovingly drawn. Then, armfuls of notebooks. A lifetime of ideas, observations, notes on raising bees, of the sex lives of mice, and most importantly, the six thousand pages of flower colours and seed shapes of pea plants for which Charles had come for, all rushed to the voracious fire the new abbot had lit. The smoke started to thicken, billowing in black sorrow.

Charles whispered, "Gregor, I am so sorry for being late". Then he turned his back to the sight of burning papers, and walked away.

Down the street was the city's semaphore station, and Charles walked there to talk with Alfred in Singapore. He counted the local coins in his pocket, twenty pfennings, enough to send and receive as many messages as he had time for anyways, before he had to catch the train to Prague.

Charles stepped into the chatbooth and tapped his message on the keyboard of the baconcipher.

"I reached Brno today, but the new abbot would rather burn Gregor's papers than let Charles Darwin take them away. Should have used a fake name. Very sad."

He entered Alfred's address code, hit send, then waited. Like most scholars of his standing, Albert had a semaphore system installed at his home. It took ten

minutes before the baconcipher begun to rattle, and Albert's reply printed out on a thin strip of paper.

"Fake name would not have helped, your face is still recognized everywhere, dear friend. Saddened too but not entirely surprised. But this loss is more a personal and a historiographic issue than of any scientific relevance, now. Thirty years ago, when you and I and Gregor were developing the modern synthesis together, that was a moment when loss of those records would have been truly tragic. But now, in the year 1784? After the results have been replicated independently countless times over the decades? When new generations of scientists all over the world are already making new discoveries in evolution and genetics, barely bothering to cite the old stuff by Mendel, Wallace and Darwin? Does it really matter, now, if some bitter prelate destroyed Mendel's notebooks?"

Charles thought for a while, then replied.

"You are right, of course. But after news about Gregor's death reached me, I just felt that the record should finally be set straight. Gregor never wanted to even mention the allegations, let alone start a public fight, but you and I know how much it hurt him. I wonder if the bullies knew Gregor was so anxious about public speaking that he failed the teacher's oral examination, twice, despite being certainly the brightest mind in the room. I so wanted to show everyone that Gregor never falsified a single measurement, that the improbable fit of his data with the theory resulted from the superior carefulness of his methods and willingness to redo the experiment when in doubt, no matter how much more work it took."

Alfred wrote back.

"It is a pity Gregor was so fond of beautiful typography and charts, of notebooks, of paper and ink. Imagine if he had carried a pocket Pascaline instead, and just send the diary notes, method updates, the day's measurements to us every evening? Then time-stamped records of them might exist not only in our records, but at one or several of the relaying semaphore companies."

Indeed, thought Charles. Imagine if.

**THE END**

**AND THAT IS HOW THE MOVEMENT, AND THE ONLINE UNIVERSE OF DATA AND METHODS WE NOW AFFECTIONATELY CALL "GREGOR'S PYRE", WAS BORN AND NAMED.**

Any day now, any day now...

 @JanneSeppanen

DURING THE LAST YEARS OF HIS LIFE, CHARLES DARWIN DEVOTED ALL HIS EFFORTS TO PROMOTING THIS, GETTING THE ROYAL SOCIETY TO BUILD AND MAINTAIN THE INFRASTRUCTURE AND INTEROPERABLE STANDARDS REQUIRED, WHICH WAS QUICKLY EMULATED BY NATIONAL SCHOLARLY ORGANIZATIONS WORLDWIDE. BY THE EARLY 1800's, ALL RESEARCHERS EVERYWHERE WERE USING AND CONTRIBUTING IN THEIR DAILY ROUTINES TO OPEN ONLINE LAB DIARIES, OPEN ONLINE PROTOCOLS, OPEN ONLINE METHOD LIBRARIES, AND OPEN ONLINE DATA REPOSITORIES.

It took until the next millenium before data repositories became a thing.

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WHILE HIS CONTRIBUTIONS TO THE THEORY OF EVOLUTION ARE OF COURSE ALSO ACKNOWLEDGED, DARWIN IS NOW CELEBRATED MORE AS THE FATHER OF THE MOVEMENT THAT RESULTED IN THESE TOOLS AND RESOURCES, WHICH HAVE BEEN, AND CONTINUE TO BE, OF INCALCULABLE VALUE TO PROGRESS OF HUMANITY EVER SINCE.

THERE ARE STILL COUPLE MISSING PIECES FROM THE REALITY  
YOU AND I ARE FAMILIAR WITH. WE WILL FIND THEM IN THE  
THIRD STORY:

## **MEDAL FOR ROSALIND**

Rachel still remembered everything about the day she got the medal.

The warmth of the sun on the last day of Spring Term 1838. How the flower decorations for the graduation ceremony in the school hall were arranged around the posters screaming the Nazi atrocities in Europe and calling the brothers of the girls to enlist to war. How the seams of the new dress had been chafing her waist, because she just could not have asked her father to take it to be adjusted. He never said, but she knew he had had to borrow money to buy it in the first place. How he had been so proud of her, a Jew refugee girl passing the new home country's matriculation exam. The tiny fluttering of a butterfly of hope in the bottom of her stomach, when the High Mistress had stepped up to the dais to announce the scholarships, and the death of hope when the banker's daughter had stepped up to receive it. The crushing pain of knowing this last day at school was the first day of the rest of her life shut outside the pursuit of new knowledge. How she had quickly wiped the tears before her father would notice.

And then after the ceremony, how the banker's daughter had walked up to them with her confident stride and intense stare right at your eyes, her impatient interruption of their polite congratulations: "My father says that the scholarship should go to a deserving refugee, because we can afford Cambridge without it. I agree with him, and I have chosen you. Here." How small the school's medal had been in her hand, cheap brass, yet heavier than anything she had held before or since.

Rosalind still remembered everything about the day she got the medal.

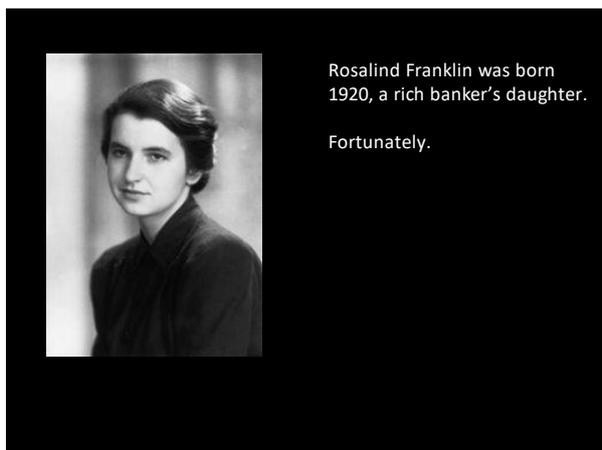
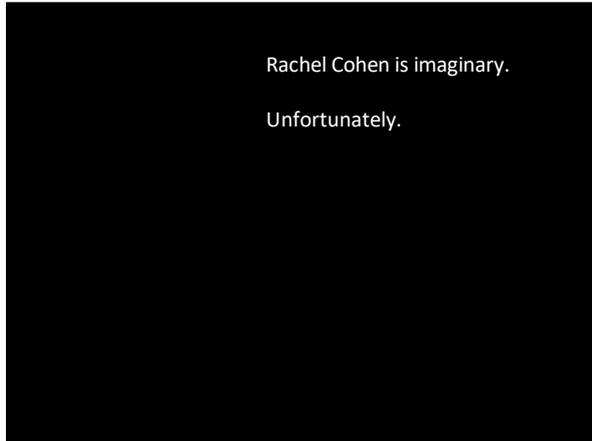
The grand concert hall in Stockholm, 1886. How she had met the eyes of the King of Sweden the same way she did everyone else's, and how he was the first to lower his head, just like everyone else she met. How thankful she felt, for Francis, James, Maurice, and Raymond, for their friendship and inspiration, and for insisting from day one, that they all publish their work only in registered reports. How she knew that the tiny fluttering in the bottom of her stomach was just the old surgery scars inside her, reacting to excitement, nothing to worry about, and how she had turned to smile to Rachel sitting on the front row, right then.

Rachel had made it to Cambridge, too. Her hypotheses on treatment of ovarian cancer had been brilliant already as a student, but she never would have had the means to pay for the protocol publishing fees all prestigious semaphore servers charged, and thus no hope of getting the attention of research groups who could

fund such a study. Rosalind had helped her and paid the publication fees, not knowing it would save her own life before turning 40.

Everyone still remembered her prize acceptance speech.

## THE END



AND THAT IS HOW REGISTERED REPORTS BECAME THE ONLY ACCEPTED WAY OF POSITING A TEST OF A HYPOTHESIS, AND THE ONLY WAY TO ESTABLISH SCIENTIFIC PRIORITY OF AN IDEA OR A DISCOVERY,

Pre-registration and Registered Reports only came to be in the last 10 years.

They're still very rare.

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AND THAT WAS HOW THE PAY-TO-PUBLISH MODEL CRUMBLED, ALMOST OVERNIGHT.

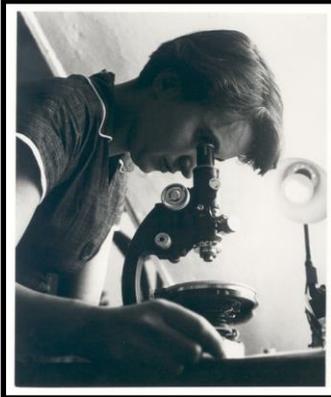
APC in...

**nature** : 9,500€

**ScienceAdvances** : 4,500€

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AS WE ALL KNOW FROM OUR HIGH SCHOOL HISTORY CLASSES, ROSALIND FRANKLIN'S NOBEL PRIZE ACCEPTANCE SPEECH IN 1886 WAS A MONUMENTAL EVENT



Rosalind Franklin died  
1958.

She was only 37 years old.

THE WAY SHE PAINTED THE INSPIRATIONAL COLLEGIAL ENVIRONMENT SHE ENJOYED AT KING'S COLLEGE WITH JAMES WATSON, FRANCIS CRICK, MAURICE WILKINS AND RAYMOND GOSLING.

They rode to fame without her.

On her horse.

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HER FIERCE, SEARING INDICTMENT OF THE INEQUALITY OF OPPORTUNITY IN SCIENCE, THAT SHE TOLD THROUGH THE TRUE STORY OF RACHEL COHEN. AND HOW HER STANDING THERE TO GIVE THE SPEECH WAS LITERALLY A LIVING EXAMPLE OF THE VALUE OF NOT EXCLUDING RACHEL.

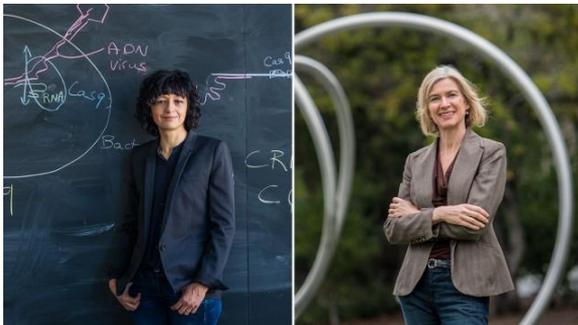
How many Rachels we lose?

Every year.

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AND A REMINDER OF THE PRICE OF PRIVILEGE – DR. FRANKLIN WOULD HAVE MOST PROBABLY DIED OF OVARIAN CANCER YEARS BEFORE HER MOST GROUNDBREAKING DISCOVERIES – ESTABLISHING THE CRISPR TECHNOLOGY OF GENETIC EDITING AROUND 1880 – WITHOUT THE SURGICAL TECHNIQUES DEVELOPED BY RACHEL COHEN.

CRISPR technology did result in a Nobel Prize... but not until 2020



Emmanuelle Charpentier and Jennifer Doudna

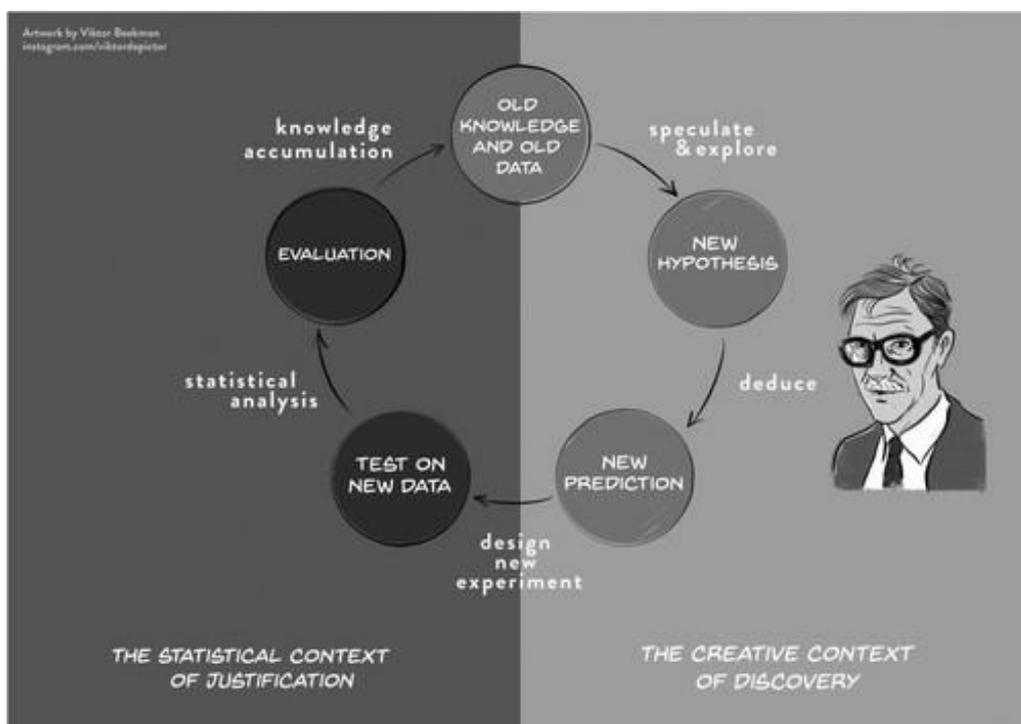
# *The Beginning*

SOME QUESTIONS TO THINK ABOUT IN LIGHT OF THESE STORIES

- Is journal prestige a thing worth keeping?
- Is paywall in front of a scientist any less harmful than paywall in front of a reader?
- Is "paper" a useful way to communicate science?

We, too, live interesting times.

- Open protocols (protocols.io founded 2012)
- Open online methods
- Open online hypotheses
- Preprints (arXiv 1991, bioRxiv 2013)
- Data repositories (Dryad 2008, Zenodo 2013)
- Registered Reports



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“It is a serious offense against the social ethics of science to pass off an exploration as a genuine testing procedure .“

“Unfortunately , this can be done quite easily by making it appear as if the hypotheses had already been formulated before the investigation started. Such misleading practices strike at the roots of “open” communication among scientists .”

- Adriaan de Groot, 1961/1969

This is ~60 years  
ago...

Shall we continue to just adapt to  
the journal- and article-based  
reality as it's fed to us?

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Or do we want to become writers  
in our own story?

*Once upon a time,*

 @JanneSeppanen

## Epilogue

I was supposed to talk about this, but stories happened. As they do.

Check it out online:  
[oscsolutions.cc.jyu.fi/jyucite](https://oscsolutions.cc.jyu.fi/jyucite)



“Perhaps it would be simpler if you just did what you’re told and did not try to understand things.”

- GNU Terry Pratchett