

THE SURPRISING TRUE STORY OF PATRICK S, RUPERT R. SLY, S. AND GUS G. PROTOCELLS IN THEIR VERY EARLY YEARS.

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ABSTRACT

I will tell the full story of Patrick S “The First”, Rupert R., Sly S., and Gus G., Protocells, imagined to have existed about 3.7 billions years ago. Patrick and his friends are autopoietic systems that can “build themselves”, thus they are Kantian wholes, where the parts exist for and by means of the whole. The universe is vastly non-ergodic above the level of atoms. By orders of magnitude, the universe has not had time to create all possible complex molecules. Most complex things will never come to exist. One way to exist above the level of atoms is to be a self-reproducing and evolving Kantian whole such as Patrick and his friends. We think, since Pythagoras and Newton, that we should be able to mathematize the becoming of Patrick and company. We cannot. Nor can we prestate what will happen. We do not even know what can happen. Patrick, Rupert, Sly, and Gus, even if imaginary, unleashed an open ended, unprestatable, radically emergent creativity of the evolving biosphere and above that literally changed the history of the universe. The very coming into existence of Patrick The First affords a new niche, an opportunity for Rupert to emerge, whose very existence then affords a new niche opportunity for Sly. And Patrick, by existing, also affords a new niche for Gus. What is an “affordance or “opportunity” to exist and “for whom” is it an opportunity? Mere rocks are not, so far, “opportunities”, nor are they “for whoms”. What creates “opportunities” that can be “seized” by a “for whom” it is an opportunity? Opportunities explode in diversity along with the autopoietic “for whoms” that, by now existing, create yet more opportunities for yet more “for whoms” to come to exist. Species, by coming to exist, create niches explosively for even more new species. I ask you to listen to their tale, pretend it is true, and help me understand what the story tells us.

THE STORY:

The Surprising True Story of Patrick S “The First”, Rupert R., Sly S., and Gus G. Protocells in Their Very Early Years

Once upon a time, very, very, very long ago, almost, nearly, four billion years ago, off the West Coast of Gowandaland, life as protocells had recently, well, begun. It was all under a turbid sun, on a scorched Earth, in a shallow lagoon. Days and nights came and went, even before Patrick, Rupert, Sly and Gus, really became Patrick, Rupert, Sly, and Gus, but were merely normal protocells amid their Xgen cousins all over the place. Dry and wet and wet and dry, and all the GenXers sort of ate the stuff softly flowing in the lagoon. And they multiplied making so many GenXers that almost four billion years later their grand, grand, grand, grand, you know, would be all over the blue dot planet.

But nobody got much “stuff” because all the even tinier floating stuff floated at the very same speed as did the GenXers. That was ok, because it was true for all of them and nobody got really mad.

But ONE day, Patrick Protocell felt a bump jump hurt inside himself. “What’s that” he thought, a bit fearfully. “Oh its my whatdyacallit sticking out my side!” “Ouch.”

Patrick felt the pinch, and even was pierced. A little molecule, a peptide made of thirteen amino acids, had stuck out of his side.

Then do you know what happened? This little peptide bumped into a huge rock, very much bigger than Patrick, but much smaller than even a thimble.

And the peptide stuck to the big rock. Patrick was STUCK. He could not float about and laugh in the lagoon, hoping for stuff.

“I’ve got to get unstuck”, thought Patrick with alarm. He yanked his tummy and his bottom up, but stayed stuck. The more he tugged the more stuck he seemed to be.

“Oh NO!” thought Patrick. “All is lost. If only I had a mother I could call her!” he winced.

“Oh well, maybe I’ll get unstuck when it gets wet and dry a few times.”, he hoped, rather like a latter day sailboat hung on a rock at low tide.

“I’ll have to make the best of it ‘til then...”

“Maybe I’ll still bump into some stuff?”, he wondered.

“But HOW, I’m all stuck on this old rock.”

Patrick, without too much hope, a bit desperate at his woeful situation, looked up, and guess what?

Well, you’ll never guess what happened to Patrick.

In a trice Patrick saw just flooding at him lots of stuff, just exactly where he was stuck, here and there, everywhere, floating so fast toward him he feared he could never ever gobble up any of the fast streaming stuff.

So, bucked up by the very possibility of stuff, Patrick gobbled as fast as he could.

He ate lots of stuff!

Very full, a very short time later, much shorter than normal, Patrick divided into Two Patricks.

“We’re stuck”, they both cried. And indeed they were both stuck to the very same big huge rock.

Patrick and Patricks were dividing so fast, much faster now that they had so much stuff flowing at them, that soon there were lots of Patricks!

In about Seven, there was a large Patrick Patch, many grandchildren of Patrick, who had become, what?

Patrick had become, on getting stuck to the huge rock, the very first “sessile filter feeder” on the early planet Earth. Think of that... The very first one.

And that is how Patrick became PATRICK THE FIRST!

Before Patrick got stuck, he was a typical sophomoric GenXer protocell. Now he was special, he could stay stuck to the rock sessile filter feeding all wet and dry long.

Where had Patrick come from? Well, sort of from nowhere! Patrick the First just emerged! Out of pretty much nowhere!

First there were just GenXers, Patrick among them. All slowly dividing while eating stuff.

But Patrick had had a special opportunity: he had, accidentally of course, seized that very opportunity. His opportunity was that the nutrients were flowing slowly and there were rocks, including the rock he got stuck to. So IF he did get stuck, he'd get more nutrients per unit time than other protocells., so divide faster. That was Patrick's opportunity.

But what does it take in the becoming of the universe for a context to be an “opportunity”, like the rock and slowing flowing nutrient stream was to Patrick?

Not everything or process is an opportunity. A tiny rock by itself is not an opportunity. Nor is a rock and a slowing flowing stream of stuff. There is no opportunity without something that can seize that opportunity and take advantage of it.

And Patrick is just such a “something”. Patrick in fact had seized his opportunity, “For ME” thought Patrick, glad that he was one for whom an opportunity of a life time could be seized.

Patrick had become a “for whom”.

What does it take for something in the universe to “seize an opportunity”

What does it take for something to become or be an opportunity that can be seized and for something to be able to seize it?

The surprising crux of it is: You cannot have an opportunity without something, “a for whom”, for whom the context IS an opportunity. And you cannot have an opportunity without a “for whom” that context IS an opportunity that now can be seized.

What counts as an opportunity makes no sense without something that can seize the opportunity. But this is not imaginary and not just words. Patrick really came to exist in the early biosphere as the first sessile filter feeder, hence he came to exist in the non-ergodic universe above the level of atoms, by seizing his opportunity. He became Patrick The First....sessile filter feeder.

What counts as having seized an opportunity? For Patrick and the biosphere, the success was very real: More Patricks forming the Patrick Patch did in fact outgrow the GenXers per square meter, and did in fact get to exist in the non-ergodic universe above the level of atoms for quite some time.

Patrick and his offspring could do this because they were autopoietic, that is they were self-reproducing systems able to self maintain and reproduce and be selected. He and his offspring were Kantian wholes where the whole exists for and by means of the parts. In particular, Patrick was a collectively autocatalytic set of peptides in a liposome, a hollow lipid vesicle that buds, and is also able to make the lipids to form the liposome. Patrick was an early form of life able to evolve by Natural Selection. That is why Patrick constituted a “for whom” a context, here the slowly flowing nutrient stream and the tiny rock, constituted for Patrick an opportunity to be seized. Patrick came to exist in the non-ergodic universe above the level of atoms, where most complex things will never exist. Patrick actually changed the unfolding history of the whole universe. No mean feat when all he had to hold onto was a tiny rock not as big as a thimble.

“I’m so glad” thought Patrick The First, “I’ll just hang in here and love it and divide when I feel like it”

So Patrick divided and made lots of Patricks, two by two until the Patrick Patch was spread over a big part of the Lagoon.

That is the first part of Patrick’s story, how the first sessile feeder came to exist out of pretty much nothing.

And the story is all you need to know. That’s really what happened. Isn’t that just amazing, first No Patrick, then Patrick “The First” sessile filter feeding, out of nowhere. Just because his peptide happened to stick to the rock.

Later, Darwin would call this sticking a preadaptation in Patrick.

Rupert’s Story. (How Patrick, now that he exists, provides an opportunity for Rupert to emerge and exist.)

Rupert was pretty much your ordinary protocell, a bit laconic. He could not swim but could wiggle a bit as he came near stuff. Maybe he was excited, so he wiggled. But beyond wiggling, Rupert was already a bit special, He could eat stuff, but he could also already stick to other GenXers, and make a hole in them and suck out their inside stuff. Rupert thought this was good, for every now and then he bumped into another GenXer and got a special dinner from it. But bumping into other GenXers did not happen very often as they were all floating in the same slowly moving stream of stuff. Rupert, like the others, mostly ate plain old stuff.

One day, do you now what happened? Rupert floated into the Patrick Patch far away from most of the Lagoon.

“OH NO”, thought Rupert, “This place is full ofWell I don’t know. How to I get back to the clear lagoon?”

He tried wiggling but got nowhere fast. It was the best he could do.

Rupert was as woeful as Patrick had been. Maybe more. He was far from the clear Lagoon.

Guess what happened to Rupert?

He bumped into Patrick the MMMMCCCDXXXVIII!

Rupert poked a hole in that sad Patrick and ate him up.

“GHA” thought Patrick the MMMMCCCDXXXVIII.

“Cool” though Rupert.

So Rupert became famous in the Lagoon as Rupert “Raptor“ Protocell...”Raptor” Protocell!, He was the very first predator in the Lagoon and the whole earth and in the universe. Rupert changed the history of the whole universe.

Soon there were lots of Ruperts bobbling in the Patrick Patch, which itself was growing in the number of Patricks faster than the Ruperts could manage to eat them all. This was the very first food chain in the biosphere. Out of nothing did it come. The first food chain changed the history of the universe. (So do the rest of the food chains that followed).

Rupert, like Patrick, was a “for whom” there could be an opportunity. The startling thing about Rupert however, is that Rupert’s opportunity included not only the Lagoon with nutrients, but now included Patricks, for by being sessile feeders, Ruperts bumped into Patrick and his kin far faster than into GenXers floating in the nutrient stream in which Rupert and his kin also floated.

Patrick was PART OF THE WHOLE CONTEXT that was Rupert’s opportunity. Rupert seized his opportunity. Patrick, by existing and creating a Patrick Patch AFFORDED an opportunity to Rupert, given that Rupert protocell could not swim and was in a slowly moving nutrient stream where he could only eat stuff and, very rarely, bump into GenXers. So Rupert’s opportunity was Patrick the First and kin, the sessile filter feeders, in the Patrick Patch, where Rupert could bump into many of Patrick’s kind, compared to just eating stuff and the occasional rare treat of eating a GenXer.

Rupert now divided rapidly and soon there were lots of Ruperts growing in the Patrick Patch, or by now several Patrick Patches in the Lagoon.

There was no else one alive in Patrick’s opportunity context. His opportunity was only the slowly flowing stuff and the tiny rock he sort of grabbed onto. But by coming to exist in the universe, Patrick and his own kin in the Patrick Patch now came to constitute the “context”, the very opportunity, for Rupert to come to exist. No Patricks, no Ruperts, who soon quite forgot about eating the hard to bump into GenXers and now depended entirely on eating Patricks to survive.

The ecosystem had become GenXers, floating stuff, Patricks in Pptrick Patches and Ruperts grazing on Patricks. This is a bit like, billions of years later, grass and rabbits.

Could you write an equation for this? How would you know what to write? This Story is pretty much what you need to know. What would Mathematics do here at all? Not much about the becoming of Patrick and Rupert. In fact, mathematics would tell us nothing about this becoming.

But Pythagoras taught that all was Number. Is it? Where is the “number” here? We, looking on, do not need number. And Patrick and Rupert never heard of Pythagoras who grazed in the Agora long thereafter.

The Amazing Story of Sly Protocell

To start with, Sly was a pretty ordinary protocell, except he could, like the early Rupert, eat GenXers if he bumped into them, as well as eating stuff.

Sly, who did not know that his name was rather pejorative, was perfectly happy. He floated in the Lagoon, eating stuff and the occasional GenXer.

One day, Sly bumped into a Rupert. And do you know what happened? By accident, a peptide on Sly's surface attached to Rupert! Sly was embarrassed and Rupert was annoyed at this bondage. But the choice seemed to be Sly's. Rupert could not shake Sly off.

And what do you think happened?

When Rupert ate a Patrick, some of the juice squeezed out of Rupert's insides through the hole, and Sly licked up the left over juice from Patrick's perishing.

Actually, Rupert was glad, because the juice on his outside self felt sticky. Sly was a bit like small fish inside a shark mouth cleaning the shark teeth. Strange way to make a living huh? But Sly changed the universe, because Sly divided faster than before and soon there were lots of Slys attached to lots of Ruperts all over the Patrick Patches in the Lagoon.

But Sly did more. You see, Patrick and his offspring did not attach to tiny rocks very well and sometime slipped off. But when Sly slurped up the juice from Rupert's gobbling a Patrick, Sly seemed to excrete a glue into the little area of the Lagoon that helped glue Patrick to the rocks! So in the presence of Ruperts with Slys, Patricks lived more securely in their Patrick Patches, more firmly attached to the tiny rocks.

What had come about? Sly had come to exist. His opportunity was now both Ruperts, and Patricks in the first place. Sly was also a "for whom" who seized his opportunity. Now Sly existed too, out of nothing much. Sly was a "for whom" too, just like Patrick and Rupert each poised to seize his unique but different opportunity.

But more, Rupert no longer ate GenXers, as told above. But Patricks slipped off their rocks sometimes and died, lowering the number of Patricks upon whom Ruperts could graze, so holding down the population of Patrick and also of Rupert. But Sly helped glue Patricks to their rocks more firmly, so everyone benefitted. Patrick provided a niche for Rupert, who provided a niche for Sly who helped provide a niche for Patrick! They formed a three species "collectively autocatalytic set"! Such collectively autocatalytic sets of species mutually creating niches for one another exist today as well.

In fact the Sly glue was so great that Patrick sort of forgot to attach very well to rocks and now depended pretty much on Sly. The autocatalytic little ecosystem became tighter and mutually co-dependent. They worked well together and Patrick and Rupert and Sly and their kin got to exist in the non-ergodic universe for a pretty long time.

The Story of Gus,

Gus was also just your ordinary GenXer. He bobbed around in the Lagoon like all the rest.

Every now and then he saw a tiny rock and reached for it, but could not grab the rock, so he floated and divided, but not too fast.

One Spring day, Gus bobbed into a Patrick Patch, and guess what?

Gus bumped into a Patrick and Gus COULD grab a Patrick. Gus did grab a Patrick and guess what he learned?

Gus was indirectly stuck to Patrick's rock! He was quite glad for he had tried and failed to grab a rock himself before. But now the slowly flowing stream of stuff floated rapidly by stuck Gus too, and he ate lots more Stuff. Like Patrick, Gus divided faster. Sometimes there were two or three Guses attached to one Patrick, who was rather annoyed, but could not shake Gus off, because Patrick could only wiggle.

Gus is a "for whom" and Patrick is his opportunity. So Patrick afforded TWO new niches, constituted two new opportunities, one to Rupert, and one to Gus!

Darwin somewhere wrote an image of species driving a wedge in the crowded floor of a competitive nature to create a space to live in. That is not the story of Patrick, Rupert, Sly and Gus at all. Patrick, in seizing his opportunity and becoming Patrick "The First", and forming the Patrick Patch, thereby creates and affords a new niche for Rupert. Patrick IS the niche and opportunity for Rupert. Rupert IS the niche for Sly, and Sly becomes by his glue part of the niche for Patrick. And Patrick is the niche for Gus. There is no wedge driven into the crowded floor of nature, the floor itself is expanding, creating new niches by creating Patrick, Rupert, Sly and Gus who create the niches for one another. The same is largely true of the biosphere, and global economy, both of which have exploded in diversity just as Patrick gave rise to Rupert who gave rise to Sly who stabilized the three species ecosystem and Gus came along to hang off Patrick.

We seem to make our worlds and thereby make rooms for one another. Each "for whom" makes even more opportunities for others in its adjacent possible. The adjacent possible rooms explode faster than the occupants who, by exiting, create those veryß adjacent possible rooms.

In much the same ways both the biosphere and global economy explode in diversity, on average. Each species affords one or more adjacent possible new niches for yet new species, so expand what now becomes possible. Spanish moss hangs from laboring trees. New goods, and services and production capacities expand what further new goods and services can now make a living. Personal computers made word processing possible, which made file sharing possible which made the World Wide Web possible, which affords a place to sell on the Web, which made content on the Web that soon enabled browsers.

It is not only that the floor of nature is crowded by competition as Darwin thought, but rather that each species also affords adjacent possible new niches, new "wide cracks" in the floor of nature, that invite the next new species into those wide cracks that constitute new niches. The possible new niches expand faster than the species that create them. Patrick created two niches, one for Rupert, one for Gus. The Web enabled both Ebay and Amazon.

This is an unprestatable becoming of "for whoms" that can seize their specific opportunities in adjacent possible niches, that we each in turn create. The "floor of Nature" expands housing ever more room after room that we jointly co-create faster than we all come into existence. And that is how complexity emerges.

