

I've been surprised at the number of people who have no immediate association with the phrase "the 29th Day". The 29th Day story refers to a pond that, on day one, has one lily pad. Every day the number of lily pads doubles. The pond will be completely covered in 30 days. The question is: how much of the pond will be covered on the 29th day? Take a second before you read the answer (2 sentences hence). You have all the information you need to answer this question easily. The answer: half the pond will be covered. If you didn't get that, take another second to get it before you read on.

The story illustrates the power of exponential growth, and is generally used in the context of unexpectedly fast changes in resource consumption, where what appears to be abundance ("look, the pond is only half full. We've got plenty of time.") is seriously misleading. Many people think that if the pond is only half full it must be day 15, not day 29.

Let's mess with the story's limited purpose (teaching about exponential growth). First, let's go past 30 days. What happens on day 31? Those lily pads don't just stop. They don't talk to each other and say something like "Time for a break. We've been doubling every day for 30 days. Let's take some time off (like *forever*) before we double again." Those lily pads are hard-wired to double. Day 31 they double, or try to, and the pond has twice as many pads as there is room for each to have its own spot in the sun. It is a mess of undulating green. Day 32 they try to double again, but now there's only a quarter of the space they need to thrive, so they don't. They downgrade from thrive to exist and, if they could talk, they might say they're unhappy, maybe even suffering. Other things living in the pond, never discussed in the original story, start suffering too. The fish can't get to the bugs. The oxygen level in the water goes down because the lily pads degrade the air-water-oxygen exchange. The fish start dying. It won't take long before the pond becomes a swamp. The whole system implodes and explodes. There is dieoff of almost everything, certainly the lily pads and the fish, and some long time later balance eventually returns.

It might return smarter. Those lily pads might start doubling again, but this time maybe they've got some wisdom code that senses how close their neighbors are, and if their neighbor pads are too close, they shut off the "let's keep doubling" gene. Maybe they go into some steady state. No new pads until old ones die. They don't let the pond get covered. Over millennia they've come to "learn" that everything works best if the pond is never more than 1/8 covered.

However, it took millennia to figure that out and in the meantime there were a whole lot of experiments whose reports ended up in the crash and burn folder. Nope. That didn't work. Start over.

The pond never gets bigger. The pond doesn't change, so the lily pads have to change. It could be that the lily pads evolve to have little shovels on the edges of their pads, so as they get close to shore they start digging away at the edge to make the pond larger. They also might evolve to create biochemicals that induce rain, so the larger pond space maintains the same water height. Somewhere, though, they might run into rock, so those shovels would have to have little

diamond edges to chip away at the rock. Somewhere in here you, dear reader, are going to abandon this fantasy. No matter how clever those lily pads get, they are not going to get past covering the earth, and long before they get that far something else might come along and decide that lily pads are perfect for breakfast.

That's why you almost never (or maybe actually never) see a pond covered with lily pads. It's been "worked out", and we don't have the videotape to show how smoothly that process went over the last, say, 100 million years.

It might not have been all that pretty.

Let's rewind the clock and take another shot at the possibility of a happier outcome. If the pond is covered on day 30, and half covered on day 29, what about day 28? 1/4 covered. Day 27? 1/8 covered. Day 26? 1/16 covered. You don't have to go back very many days to notice that the pond appears to have almost no lily pads. On day 20, the pond is only about 1/1000 covered. That's like no cover at all, and it took 20 days to get there.

Now instead of thinking that the lily pads represent a kind of unstoppable pestilence that will end on day 31 or 32 in a crash and burn apocalypse (a metaphor for those human lily pads that are spewing carbon dioxide into the atmospheric pond with abandon), let's get up to day 20 with a new idea. In this reframing of the story, suddenly, spontaneously, some human lily pads have figured out a way to talk to the birds, who have (yes) a bird's eye view of the pond, and learn that the pond is getting covered at an exponential rate. Because of the bird's eye view, these pads are not merely looking at the few of their fellow lily pads already dotting the shore. They're running the numbers. They can see that it took 20 days to get to 1/1000 of the pond covered but that it will only take 10 more days to cover the whole pond, and further they know that unless they can "talk" to those apparently-few lily pads who are happily and unconsciously doubling every day, the pond is going to get to swamp land fast.

Their conversation does not start out easily. On day 20 only one out of 1000 lily pads is willing to "see the future" and agree to stop doubling. On day 21 there are 2 out of 1000 lily pads willing to change their habits. On day 22 we're up to 4 out of a 1000. The pond keeps getting covered by the other 996 out of 1000 that haven't bought the story. We might have to get to day 27, when just over 10% of the lily pads have bought the story, to have enough mojo to convince, or coerce, the remaining 90% that hitting day 31 or 32 without changing is going to take the whole pond down. Of course, by day 27 the birds are chatting away like crazy because the pond is now really looking different. Some oxygen sensitive fish are floating belly up. Those lily pads that didn't care before are now smelling rotting flesh and the water is murky. It may be time to listen up.

Rather than see the story as describing an inevitable disaster, the idea here is that the transformation to sustainability will appear to be infinitely small even by day 20. By day 27 about 10% will be on board and by day 30 the transformation will have taken place. Rather than see the lily pads as consuming the pond, the reframed story imagines the lily pads as expressions

of environmental wisdom. The goal in this version is in fact to cover the pond with wisdom. The fully covered pond of wisdom means no lily pad takes more than it gives back, and further, that the lily pads have reached a sustainable relationship with all the other systems in the pond. They don't own the pond. They can't live without the pond, and because they are now wise, they know that.

If we translate this teaching story to reality in America today, a day in the life of the pond's transformation to wisdom might be 2 years of clock time. Taking that as a starting estimate, then if we are at "day 20" in 2013 where only one in 1000 Americans "buys" the sustainability story, then by 2015 we'd have two out of 1000 who walk the sustainability talk. By 2017 we're at 4 out of 1000 and it won't be until about 2027 will about 128 out of 1000 Americans be walking the talk. That's assuming that it takes 2 years to "double" the number of Americans who believe we can't just talk about energy but we have to do something serious (which means, actually, that they embrace and realize Zero Net Energy—you give back as much energy as you consume).

It also means that by 2027 just under 90% don't buy the story, so we are far from collectively wise.

What to do? If the story's trajectory has merit, then there are two tasks. One, shrink the doubling time from 2 years per "day" to 1.5 years or 1 year per "day". Two, increase the conversion rate from doubling every "day equivalent" to more than doubling. Maybe tripling.

How to do these tasks?

That's where each of us comes in.

First, each of us has to cross the line to wisdom, even and especially under the pressures of uncertainty, habit and convenience. This is not a job to be done by others. With that attitude, it will always be someone else's job. One could look at this as sacrifice. One could also look at this as return to sanity. If your starting place is in excess (even though you don't call it that), it will look like sacrifice. If your starting place is "OMG I didn't realize what I was doing!" then it will look like return to sanity.

If you are a smoker, then quitting smoking might seem like a sacrifice OR it might seem like a return to health with the probability of avoiding suffering and premature death. How you look at it doesn't change the fact that you are transforming from one behavior to another, but how you look at it might make a difference in whether you actually walk your talk.

(In reality, each of us is a smoker. We're smoking carbon and producing carbon dioxide. We can't see it and it will take a long time to have its effects, so long, in fact, that those who will get an untreatable and preventable lung cancer are our children and grandchildren.)

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Second, each of us has to nudge someone else. That's the "doubling" part. The nudge has two parts. That someone else has to cross the line to wisdom (which means not just talk but walk) *and* find another someone to nudge.

Then, the next day, we both have to *do it again!* Passing the baton is not the right image. Weeding the garden might be a better image. It's not enough just because there are now 2 of you weeding. Tomorrow there will be more weeds. You'll need 4 of you, then 8, then 16, then... Wisdom means you accept that. That's the only way the pond will get covered with wisdom. You are doubling, like before, but now you are doubling *the right stuff*.

There's momentum here. The more people in the parade, the more people want to join the parade. On day 20 it seems pretty lonely out there on the street all by yourself. By day 23 there's 8 of you. Not quite so bad. The task is to make it through the first few days; they are the hardest. Pretty soon the parade becomes a party and then wisdom has penetrated the code just like those first smarter lily pads that decided to stop before it was too late. One difference is that we don't have to go through a hundred million years of trial and error.

Do we?