

The Great Simplification

Nate Hagens (00:00:02):

You are listening to The Great Simplification with Nate Hagens, that's me. On this show, we try to explore and simplify what's happening with energy, the economy, the environment, and our society. Together with scientists, experts, and leaders, this show is about understanding the bird's eye view of how everything fits together, where we go from here, and what we can do about it as a society and as individuals.

(00:00:33):

Today, I have not a second but a third conversation on The Great Simplification, with my friend and colleague, Chuck Watson. I've known Chuck for 15 years. He's a former Air Force pilot. He's a risk analyst. He's worked for the government, government agencies like NASA, the State Department, the private sector. Since I've known Chuck, he never calls attention to himself or his own deeds and stories. He is singularly focused on stabilization and mitigating risks. I learned on this conversation some things about him that he's never told me in 15 years. He is a reluctant spokesperson for the systemic risks involved in a nuclear escalation. But I think the fact that he agreed to do this conversation and share his expertise on the difference between conventional and nuclear weapons, what are the escalation pathways? What are the damages? And more specifically, what can we do as a nation, as a world, and as individuals to minimize the risk of a nuclear civilization ending exchange, is why he agreed to share these things today.

(00:01:59):

I hope you all spend the time to listen to this roughly 90 minute conversation with my friend and risk expert, Chuck Watson. Hello, my friend.

Chuck Watson (00:02:21):

Hi, Nate. How are you?

Nate Hagens (00:02:22):

I'm good. How are you?

Chuck Watson (00:02:25):

The Great Simplification

Well, it seems like we are always talking about something depressing, but I have to say this is probably one of the most important topics that we can talk about.

Nate Hagens (00:02:35):

Unfortunately, I agree with you. So you have been on this podcast twice already to talk about Ukraine and Russia, actually, several months before that situation came into reality, and to talk about nuclear war, nuclear weapons. And I've gotten a lot of feedback from listeners that I want to hone in today on what we can do internationally, as a nation and as individuals, to minimize the risk of what you've referred to as a potential civilization-ending nuclear exchange. So that's where I want to go with today's conversation, avoiding nuclear war in the near term. But I want to first kind of recap a few of the things we talked about and also take a deeper dive in some of the basics, kind of like what nuclear weapons are, how they're different than conventional, what a limited or large scale nuclear exchange would do to our world, and how the current geopolitical legal war landscape makes it increasingly, unfortunately, possible that this could happen.

(00:03:53):

So one thing that I've learned in the past couple of months is, well, two things that I've learned. Number one, I know very little about this important situation, and number two, I can't really believe much of what I'm reading because it feels like, yesterday's podcast was with Tristan Harris, talking about social media and algorithms, it feels like there's these stories spinning around that I don't really know if they're true or not. And so on this topic, I am privileged, lucky, or cursed depending on the perspective, to have someone, count someone as a friend who, A, is extremely knowledgeable about this stuff and B, is willing to talk about it. So maybe we start there, just to be clear to our listeners that you are an eminent expert on this topic. Could you share a bit about why that is, your background, as much as you can share, in any case, on why you have insights and expertise on this topic?

Chuck Watson (00:05:03):

Well, and I always get nervous when people use the word expert on any topic, and I would have to say my somewhat ignominious career, I've been involved in a lot of the topics that get blended into this whole subject. Because we're not just talking about

The Great Simplification

the technical aspects of nuclear weapons and how they're used from a military standpoint, this is so interwoven with things like diplomacy and international law and the moral codes and all of these other factors. And unfortunately, there's a tendency to get stovepiped. And again, I've been quite fortunate in that I've been in and involved on the military side of things, I've been involved in the planning emergency management, it's called now, but it used to be called civil defense. And that's actually an interesting point and diversion that we want to avoid. But I will say it's interesting because coming at it from a civil defense standpoint, when you think about a hurricane versus a nuclear bomb, well, you'll pick the hurricane any day of the week. And so it helps to give you some perspective on various kinds of disasters.

(00:06:14):

So that's a piece of it. The diplomacy side, I've spent a lot of my career working on international projects, so I've really come to appreciate things like how international technical agencies, how the UN works, how multilateral and bilateral negotiations happen, and how those agreements work. And that's something that, again, it's not any particular brilliance or skill or talent on my part, it's just that I've been fortunate to end up being in those rooms and in those discussions. I'm not somebody that you would've ever heard of, but I've probably been in the room on a lot of fairly, in hindsight, momentous events over the last 40 years. And it makes for an interesting perspective, I hope.

Nate Hagens (00:07:00):

I don't know if you're comfortable sharing this, and if you're not, we can edit it out. But you've told me in the past that you have a flag that used to fly over the White House, signed by Ronald Reagan, for your efforts back in the day. Can you speak to that or not?

Chuck Watson (00:07:18):

Yeah, actually, one of the little bits of trivia and memento that I have is I do have a flag that was presented to me in the Oval Office by Ronald Reagan. And so you say that and people immediately go, "Aha, you're one of those ultra conservative types." But I have a signed thank you note from Janet Reno for a particular mission and

The Great Simplification

operation that I did as well, that's framed lower on the wall, but it's still on the same wall with the flag from President Reagan.

(00:07:50):

So I like to feel that my role is, and my oath was to protect this country, I think the best way to protect this country is also taking into account that we've got to look out for humanity and we've got to look out for the bigger picture and be very careful about getting too narrowly focused on our own issues. And particularly getting to work with senior diplomats and even presidential level leaders from other countries, you really start to understand that we do have, we've been called the indispensable nation, which I think is true, but the way it's used is very deceptive and destructive. I think we have a positive role to play, but part of that positive role is by recognizing other countries have interests and looking out for everybody is beneficial to all of us, which is a really kumbaya thing for somebody that grew up in the Republican Party to say.

Nate Hagens (00:08:49):

Well, it's why we're friends. We face a lot of existential issues, or at least perceived to be existential issues, and that's why I'm doing this podcast, talk to knowledgeable people who care, and you're certainly one of those. So thank you for that intro, let's get into it here. Briefly, let's start from the absolute basics, what is a nuclear weapon and how do they work, briefly?

Chuck Watson (00:09:20):

So going back to the 1930s, physicists started to figure out that you can generate enormous quantities of energy by breaking the binding energy between, actually inside of atoms. And so when you talk about splitting the atom, that's basically what a fission bomb is doing. The other kind of nuclear reaction we need to talk about is fusion, which is what goes on in the sun, and that's basically the opposite. You're cramming lightweight elements together to make heavier elements. So the first race to build a nuclear bomb got started because of physicists coming out of Germany. And of course, the very famous Einstein letter that people may have heard of, warned that there was a tremendous potential to build a bomb that was, and I'm going to use the technical term, an order of magnitude, and I mean that literally, 10 to 100, to 1,000 times more powerful than a conventional explosive.

The Great Simplification

(00:10:15):

And the way it works is really pretty simple in the sense that if you take unstable atoms like uranium, certain isotopes of uranium, if you cram them together, then the neutrons that get produced causes that material to tear itself apart. And so that's a fission bomb, where you basically take two chunks of uranium that are subcritical, in other words, they won't go off on their own, you cram them together and they blow up because they end up splitting themselves and converting the binding energy, the atoms into energy. And it happens in an uncontrolled way, you have a nuclear bomb, if it happens in a controlled way, you have a nuclear reactor that you can generate heat and generate power from. So the race in World War II was to build this super weapon, and to give you just a little bit of context on how powerful nuclear weapons are, it would've taken approximately 200 B-29 missions to drop the equivalent bomb energy of what the single B-29 Enola Gay dropped on Hiroshima. So it's thousands of times more destructive, one nuclear bomb is thousands of times more destructive than a conventional explosive, and that's just the explosive part.

Nate Hagens (00:11:35):

Yeah, we'll get into that, but I just want to understand the origin of why our species developed this. Was it because they wanted to kill a lot of people because that would be an offensive move, or was it a shock and awe, we need to demonstrate we're capable of this, so an offensive move was actually a defensive move. What was the thinking back then, just briefly, or can you speculate to that?

Chuck Watson (00:12:04):

Yeah, I've read quite a bit about that. Richard Rhodes has a fantastic set of books about that, that was done after some of the material became declassified in the '90s, early 2000s, and it's really pretty interesting because it's a lot of those factors. First off, there was fear. You have to remember when the nuclear weapons program got started, Hitler was overrunning Europe, even though it turned out to not be true, and there's some speculation that Heisenberg, the lead German scientist, actually sabotaged their program because he didn't want his government to have access to that kind of power.

(00:12:41):

The Great Simplification

But at the time, fascism, the world was plunged into war, nobody knew how it was going to come out. So the thought that the other side could get this super powerful weapon where it would replace hundreds if not thousands of airplanes and bombs with a single device, well, that just scared everybody to death. So that started the race. Then as it became clearer that, well, we were so far ahead that Germany, Japan had no hope of actually building a device during the war. It became more of an efficiency thing in the sense that, okay, if you've got to destroy a city, well this bomb can do it, and it only takes one airplane to do it. And so it becomes almost frightening to say, but this is the way humans think, it's a cost-effectiveness calculation.

Nate Hagens (00:13:27):

It's optimal foraging theory at a large scale in a military sense.

Chuck Watson (00:13:34):

And there is one additional point that you mentioned, the shock and awe. Well, by 1944, it was pretty clear that of course, both Germany and Japan were going to be defeated, and so then there was the race to develop and shape the postwar world. And so of course, that meant that, well, Russia bounced back, the Soviet Union bounced back. It was clearly going to be a major player. So then the thinking started to go, well, we need to send a message that we have these powerful weapons and to use that in the post-war negotiations. And there was legitimate thought to, if using this bomb shortened the war, well, you can say it's selfish, but if you're one of those soldiers waiting to invade Japan, then there's a very powerful argument to say, I don't want to be one of those hundreds of thousands of casualties if we have to invade Japan, if by destroying some of their cities with this powerful device ends the war sooner, then that's a good thing. So it was all those factors blended together.

Nate Hagens (00:14:36):

How many nuclear weapons were there in 1944? How many were there at the time of Proud Prophet in the early '80s in the Reagan administration, versus how many are there now? Just rough ballpark.

Chuck Watson (00:14:53):

Yeah, so in 1944, there were zero. In 1945-

The Great Simplification

Nate Hagens (00:15:00):

Or one or two. Okay.

Chuck Watson (00:15:00):

Well, '44 was zero, but '45, that was actually a big fear because when they dropped, the first bomb, Little Boy was a uranium only bomb. And then the one on Nagasaki was called Fat Boy, it was a plutonium bomb. There was only enough material to make three. And so that was a big fear is, okay, we use these and if they don't fold, then we've got to try to build more. And at the time, it was very difficult to do that. So then through the '40s, it was very small numbers. In fact, the original idea was to build more of the Nagasaki types, but they ended up building the uranium types, and so you had the load dozens of bombs. But then in the '50s, we figured out smarter ways to build these things, and I'm going to use air quotes around smarter.

(00:15:49):

And so it ended up going from tens, then when the Soviet Union was able to explode their first bomb, a race got started. And in hindsight, it's insane the number of bombs that we have and continue to have, the focus tends to be on the strategic bombs, the really big ones. And that number hit the tens of thousands, but has come down now to the mere thousands. And the thing that gets overlooked is there are still tens of thousands of tactical nuclear weapons, the ones that are Hiroshima size or smaller. And those have never really been counted in treaties or looked at that closely, and that's actually where the biggest danger today lies. So in short, we went from dozens to tens of thousands on both sides, down to thousands of strategic remaining tens of thousands of tactical that are either in storage or easily assembled, and that's pretty much where we are today.

Nate Hagens (00:16:59):

I mean, this is the definition of an arms race in the purest sense. How similar is this to deer antlers and conspicuous displays of prowess in the biological world? And at some point, didn't people wonder, boy, at 10 and 50 and 100, and 1,000, and 5,000 we no longer are representing what's possible militarily to win a war, because we are now at the world destroying level. Did that ever come into the discussion and how is this different than a biological display of fitness and strength?

The Great Simplification

Chuck Watson (00:17:45):

Well, it's interesting because when you get in that world, you start to get focused on the very, very deep technical aspects. And we could go off on long tangents on why did you need 10,000 weapons? Well, you get into issues fratricide, which is where two bombs going off, well, is one going to interfere with the other or cause the other to not even go off? You then get into issues of counter force strategies, what kind of targets are you after? And you can talk yourself into tens of thousands of weapons if you're narrowly focused on the military mission and on targeting and those kinds of things, and completely lose sight of the big picture of, yeah, you just turned the earth into a wasteland with even 1,000 of these weapons, if those 1,000 go off and they almost certainly will. So making that better from a purely technical question standpoint is irrational, yet it's irrational rationality. I don't know if any other way to put it, is you get so focused on the technical problem, you lose sight of the fact that it's insane.

Nate Hagens (00:18:55):

So the nuclear experts back in the day were siloed, so to speak. They didn't look at this from a systems view.

Chuck Watson (00:19:03):

Yeah. If you're a bomb designer, you're trying to figure out how to build a better bomb. And it's a little bit psychotic, and it scares me when I think of my own career, looking back on getting focused on narrow technical issues because it's fascinating, the physics of it, the figuring out altitudes to set a bomb off at or looking at those kinds of things, it's a fascinating technical problem. You lose sight of the fact that you're talking about wiping out civilization, killing millions of people, because it's such a fascinating and difficult physics problem. And so you put the humanity out of your head because you wouldn't be able to solve the math if you didn't.

Nate Hagens (00:19:47):

Okay. Let's continue on comparing nuclear weapons to conventional weapons. How big are the bombs that are being used between Russia and Ukraine right now, back and forth, and how does conventional weaponry compare in magnitude to nuclear weapons?

The Great Simplification

Chuck Watson (00:20:11):

Yeah, that's a really interesting point. And you can get into an interesting technical discussion there too, because bomb yields, in other words, how much energy, how much blast gets generated, has actually declined over time, and that's a separate issue. But in terms of comparison to a bomb that, say the US used in Iraq or Afghanistan, or even today, the Saudis using in Yemen or Israel's using in Syria yesterday, and again, I'm pointing all that out because we focus on Ukraine, but people are bombing each other all over the world right now with conventional weapons. The biggest in the US arsenal is called the GBU 31. We love to have our acronyms on all of our systems, and it's a 2,000 pound explosive, so it's going to create a blast radius of about 60 meters, 70 yards or so. And that's the biggest bomb that we use routinely.

(00:21:08):

Now, to give you an idea of what happens when you talk about nukes, when you're talking about regular explosive, you talk about pounds of explosive, but with a nuclear weapon, you talk about tens of thousands of pounds of TNT equivalent. So the Hiroshima bomb, by comparison, was 14,000 tons, 14 kilotons of explosive energy equivalent. So that bomb that we routinely-

Nate Hagens (00:21:39):

And then GBU, that's one ton.

Chuck Watson (00:21:40):

That's one ton. And the biggest bomb the US has ever used, which was the MOAB, the Massive Ordnance Airburst Bomb in Afghanistan, was about 11 tons. The smallest weapon in the US arsenal today, nuclear weapon, is 300 tons. And again, that's a point that I think we need to talk about that's very different about nuclear bombs. If you've got a conventional bomb, it's pretty much a fixed explosive. But with nuclear bombs, there's something that we talked about before, dial-a-yield.

Nate Hagens (00:22:16):

Which I had never heard of, to be honest.

Chuck Watson (00:22:19):

The Great Simplification

And it was funny because you talk about silos, I was thrown off that you had never heard from that. And then I started asking around, and no one that I know has ever heard of dial-a-yield, which is no one that I know that's not in a business, has never heard of dial-a-yield. Essentially, you can program a nuclear bomb. So it's called a B-61 is our current airdrop bomb, it weighs 715 pounds. So compare that to the 2,000 pound, little over 2,000 pound GBU 31. So this B-61-

Nate Hagens (00:22:52):

So it's a third of the weight.

Chuck Watson (00:22:56):

And its smallest setting is 300 tons. So its smallest setting is 300 times as powerful as that 2,000 pound GBU. And just by changing the setting on that bomb, I can increase its yield to 170,000 tons, literally with a few keystrokes.

Nate Hagens (00:23:23):

Okay, so one bomb that weighs 700 some pounds can have an explosive impact of 300 tons or 300 times our largest bomb conventionally, or not 300, but 170,000 times, depending on how you dial it. And how does-

Chuck Watson (00:23:43):

Depending on how you dial it.

Nate Hagens (00:23:48):

... what happens? What's that?

Chuck Watson (00:23:52):

Well, yeah, just depending on the settings, literally with a few keystrokes and configuration changes.

Nate Hagens (00:23:57):

What is happening mechanically in that bomb to make that difference?

Chuck Watson (00:24:03):

The Great Simplification

A lot of that, of course, is classified. But one thing that is publicly discussed and known is our modern weapons are what are called boosted fission devices. And that is a fancy way of saying that normal, like the plutonium or uranium bomb, is fission, but what you do is you add a little bit of deuterium or tritium gas and when the bomb goes off, the fission bomb part goes off, that causes fusion, which is the process that goes on in the sun. And it's a little more technical than that because the fusion's only a few percent of the energy, but it's causing more efficient fission, that's what's called a boosted device. So basically by controlling how much of that tritium gas you're injecting into the core, you can change the yield from 300 to 170,000.

Nate Hagens (00:24:59):

So we are working, MIT and other places, to build fusion reactors for sustainability, low carbon energy depletion reasons, but we already are using fusion, or hopefully we won't be using it, but the technology exists in our nuclear weapons where we're dropping small suns on cities or whatever. Is that right?

Chuck Watson (00:25:24):

Yeah, essentially, yeah. Again, that's a little bit simplistic interpretation, but yeah, that's basically what's going on. And again, to be clear, the thing about fusion is that it's more controllable than fission in a lot of ways, and it's a harder problem to do it as a sustained reaction. But in terms of with nuclear bomb design, you can use that to control the yields by the amount of gas that you're injecting.

Nate Hagens (00:25:53):

So how big was Hiroshima bomb?

Chuck Watson (00:25:57):

About 15 kilotons. 15,000-

Nate Hagens (00:26:01):

15 Kilotons. And now this dial-a-yield one you said is 170,000, so 12 times.

Chuck Watson (00:26:08):

Yeah, there are actually versions of the B61 that can go into the three hundreds.

The Great Simplification

Nate Hagens (00:26:14):

300,000 tons?

Chuck Watson (00:26:18):

Yes.

Nate Hagens (00:26:19):

So that would be 20 times a Hiroshima bomb.

Chuck Watson (00:26:23):

Yeah.

Nate Hagens (00:26:24):

And we have hundreds of those in the world.

Chuck Watson (00:26:27):

Yeah. Yeah. And they're stockpiled in Europe, for instance, which is... Just to mention, these are small devices. It's not like you've got a missile or a silo. It's just a... Looks like a bomb. You put it on any of the number of our airplanes, and you can go deliver a tremendous amount of destruction.

Nate Hagens (00:26:48):

Okay, okay. We're going to get to the destruction in a minute. Well, discussion of destruction. Why would someone want the ability to have an option of 300 tons or 170,000 tons of impact? Why is it important to have that dial as an option? What does that give you?

Chuck Watson (00:27:11):

It gives you a lot of flexibility. I'm going to put my Dr. Strangelove hat on here and talk about it gives you so much more flexibility. Let's say that your target is a missile silo. Well, what you want is the fireball of the nuclear explosion to hit that silo because it's hardened. In other words, a blast, just the pressure wave isn't going to destroy that silo. You have to hit it with that 3000 degree Celsius fireball. Well, that 300 ton device

The Great Simplification

would actually do that. The fireball's fairly small. The fireball would only be 50 or so meters across. So you hit that silo with that small device, you could actually destroy that silo, not cause a lot of surrounding damage. The same if you wanted to take out a communication center or some other very critical piece of military infrastructure. Well, let's say you want to destroy an airport.

(00:28:11):

Well, an airport, maybe you would want to use a wider setting to make sure you've destroyed and damaged all the runways or port facility, for instance. You don't want to destroy a hundred yard area in a port. The port of Savannah is several miles in size, so you don't want to blow up just one small part of that port. You want to take out the entire port. In that case, you may want to dial it up to 50. Well, if you've got a city, which we shouldn't do, we've signed treaties that says we're not going to firebomb cities, but let's say it reaches the point where you're in an all out nuclear war and you want to destroy a city, well, in that case, maybe you dial it up to 170. Or in military terms, let's say you've got a large formation of troops that you want to destroy. Well, in the open, well, maybe you use a 170. So it gives you a lot of military flexibility.

Nate Hagens (00:29:02):

We're going to talk about the impacts, but what about the perception? If a missile is launched and heading towards a country, they have no idea whether it's a small bomb or 170,000. They don't know what the dial is. So there's a game theory embedded in all this, right? And how does that play into this?

Chuck Watson (00:29:27):

Yeah. Oh, Nate, exactly. And as we are wont to say, it's worse than that. The US has just deployed a upgraded version of the W76 bomb, which is launched from the Trident missile on our missile submarines. Well, it is a dial-a-yield and it can go from 0.3 to 80 or so kilotons. And so right now by treaty, we're limited to four of those per missile, but those treaties are going to expire next year and we can actually get a 14 warheads on that missile, which means we can hit 14 targets. Well, put yourself in-

Nate Hagens (00:30:11):

How do you head 14 targets with one missile, or even four?

The Great Simplification

Chuck Watson (00:30:15):

Yeah, that's another piece of the wonderful world of nuclear weapons targeting. It's called a MIRV, multiple independent reentry vehicle. So what you have in the missile nose cone, you launch it ballistically, it's headed towards the target. You have what's called a bus, which is a device that holds both the bombs themselves, the warheads reentry vehicles, along with countermeasures because you want to throw out a bunch of noise and junk so that the other side's anti missile systems won't be able to maybe lock onto your incoming weapons.

(00:30:55):

So what it does is, at a certain point in the trajectory, the individual warheads detach. They have little motors and steering veins and can't go into too much detail on that, but they have mechanisms that they can steer. Today, they have GPS targeting so they can steer themselves so you can hit targets several hundred kilometers apart with a single missile.

(00:31:19):

And as of next year, our current treaty, which limits us to four per missile, expires, we can put 14. And of course the Russians can do the same, can put four 14 warheads on a single missile. So imagine you've just seen it. You have what's called a hot datum. You've seen a submarine fire it's missile. You don't know whether it's one 300 kiloton, or four 300 ton going after small targets, or 14 100 kiloton going after your major cities.

Nate Hagens (00:31:56):

So doesn't the mere existence of a dial- a-yield situation... It's almost like a cloaking device that no one knows what's inside that. Doesn't the existence of that lower the threshold for an escalation?

Chuck Watson (00:32:13):

It does, and I am adamantly opposed to those kind of systems. I think especially when you put them on strategic platforms, because it's bad enough that they're on aircraft, but when you put them on a missile submarine, it's extremely dangerous. And the game theory types, and when you get stove piped, you look at it and go, "Well, it's

The Great Simplification

strategic ambiguity and it gives us more flexibility." You don't want flexibility with nuclear weapons and there's a very strong reason for that.

Nate Hagens (00:32:43):

Why not?

Chuck Watson (00:32:45):

And that's the question. The reason is, every time we game this out, when you start with a small nuclear exchange, it ends up going and escalating. You get into a escalation spiral and you end up going all the way to strategic and you end civilization. And-

Nate Hagens (00:33:04):

Like the Matthew Broderick movie War Games?

Chuck Watson (00:33:07):

That movie was actually partly inspired by a real world event that in the early eighties, there was an exercise that was done during the Reagan administration called Proud Prophet. And you'll notice there was such a sea change in the eighties. You had Ronald Reagan, anti-communist. Go look at his speeches from the seventies. You're not going to find anybody more staunchly anti-soviet, anti-communist, evil empire, tear down this wall.

Nate Hagens (00:33:34):

The evil empire, right.

Chuck Watson (00:33:37):

All the rhetoric was extreme. Well, you had Reagan, Weinberger, the Secretary of Defense, you had Alexander Haig who came in as Secretary of State. They came in, you're ready just to show the Russians, the Soviets. And I try to make a distinction between Soviets and Russians because there is a huge difference. So they came in, they were going to show the Soviets what for. Well, they ran this exercise and their thinking was, "Well, we can use a nuclear weapon as a demonstration. We can use it and not escalate." Every exercise they ran ended up in a global exchange. And you'll

The Great Simplification

notice what happened. It scared the crap out of everybody, rightly so. The rhetoric toned down, and then we started talking. One of the best treaties this country has ever done was the Intermediate Nuclear Forces Treaty. It had a tremendous beneficial effect of deescalating the situation in Europe, and we abrogated it. We pulled out of that treaty. You look at... The only main-

Nate Hagens (00:34:40):

When did we pull out of it and why?

Chuck Watson (00:34:43):

Roughly four years ago. It was during the Trump administration, but the Obama administration set in motion pulling out of it. There's been talk of pulling... The W. Bush administration talked about it. There's been discussions of pulling out of it for at least 20 years, so you can't really blame Trump. He just did what everybody else was gearing up to do. And the reason is, again, based on military flexibility, so that, well, we want to be able to use for military planning purposes these small tactical nuclear weapons. And the other argument was, "Well, it's only the US and Russia that's involved in it. What about Iran? What about China? What about North Korea?" So the idea was that if not everybody was in it, then we're just going to pull out, which... We can get to the diplomacy side of that later, but I think it's certainly foolish because if INF were in play today, a lot of this rhetoric about using nuclear weapons over Ukraine or in Europe, we wouldn't be talking about it.

Nate Hagens (00:35:50):

So, right, exactly. So getting back to Reagan. Evil empire in the seventies, and all of a sudden there was a pulling back of that rhetoric and discussions started to happen, and here, 40 years later, the amount of nuclear weapons in the world is larger. They're bigger, they're more powerful, they have better technology. And the rhetoric has totally shifted. Yeah?

Chuck Watson (00:36:17):

Well, just to be really clear, the numbers in raw totals are down some. The problem is the ones we have left are more usable because of the technology. They're more accurate, which means you're more likely to use it because your thinking is, "Oh, I can

The Great Simplification

hit just what I'm shooting at." Of course, that's not taking into account things like fallout. It's not taking into account the psychology of it, and it's not... Again, the secondary effects we didn't talk much about, we talked about blast, but you look at radiation, you look at fallout, those kinds of things become important when we talk about consequences. But in terms of the danger, it's much worse because the frameworks aren't in place for the discussions. As you say, we're not talking, we don't have treaties. We also have a attitude that we can use these nuclear weapons and not escalate. And again, Proud Prophet showed very clearly in other exercises. I referenced that one because it's one that's known publicly. But all the analyses that were done looking at the big picture, it always ends the same way, and that's in a general exchange.

Nate Hagens (00:37:31):

If someone in our government, in the Department of Defense, is war gaming out these scenarios now, aren't they finding the same result that it's going to end in a general escalation? Or if they are, are they being shouted down or aren't there people that are doing that anymore? It blows my mind that that's not happening.

Chuck Watson (00:37:52):

I think we've lost a lot of institutional memory over time. And one thing to remember is that at the time of Proud Prophet, I was in my early twenties. I was one of those kids that got through high school and college a little bit early and ended up in government service. And I was, again, on the fringes of these things, but I was in a position with communications and everything. I had a pretty broad picture. And so I was in my early twenties. The principals were in their fifties, sixties. Even the people that were at the mid-level were in their late forties. Well, we're 40 years later, they're gone. They're not in government anymore. A lot of them are deceased. So that's where, again, I think I'm a little bit of a different voice in perspective because I was so young and seeing these things, and of course not so young anymore, but anyone who would've been our age more than likely would've not been in the room on that.

(00:38:53):

I was just lucky because of the position. So I think that there's a loss of institutional memory. I think within the Pentagon, but within the people who plan these sorts of

The Great Simplification

things, it is well known. The frightening thing is I don't know that the principals in this case, like our leadership in the State Department, the CIA, the executive branch, you notice how different the rhetoric is over Ukraine, for instance, between the State Department and executive branch are being more militant than the Pentagon's being much more reserved about a lot of issues and I think there's a good reason for that.

Nate Hagens (00:39:33):

Because they know the potential escalation and impact and civilization risk.

Chuck Watson (00:39:40):

They do. And I think too, I think people should be a little bit careful with the rhetoric around Russia right now. And I've heard in the last... As we've recorded this in the last day or so, there's been a lot of talk about, "Oh, Putin's threatening to use nuclear weapons." And again, this gets to the whole area of linguistics and understanding Russian culture and language, understanding anyone else's language. I'm sure we have the same problem with China and others. It's just I'm familiar with Russia.

(00:40:10):

What Putin is doing is, in my view, reminding us of the risks. Yeah, there's a little bit of an implicit threat underneath it, but he's reminding us that, look, this is dangerous brinksmanship. And if you look at his statements over the last few years, he has warned that escalations in Ukraine could lead to this point. So yeah, I don't want to get off on that tangent of how we ended up there, but I think it's important to realize that what I'm seeing is that from the Russian side, they are very aware of the dangers of this situation. And there's a myth. I know you've got questions about myths coming up and I don't know if you want to start hitting those.

Nate Hagens (00:40:53):

Well, I want to make sure that we articulate the actual risks from nuclear weapons and the impacts. Yesterday, you and I exchanged an email where you broke it into immediate and then longer term. And in the immediate there was shockwave, thermal, and radiation. And then the longer term there was delayed fallout and particulate. Could you just unpack this? We summarized it in a previous discussion that I will put in the show notes for people to listen to, but just give us an overview of the impacts from

The Great Simplification

nuclear explosion, and then I'm going to have a follow up question on a large exchange of lots of them, what that would do.

Chuck Watson (00:41:43):

Right. And so again, the two key differences really with nuclear weapons, dial-a-yield, I think that's critical. The other piece is if you look at a conventional explosion, that's 90 something percent of the energy goes into the blast wave, the shockwave that's destroying buildings, and you get a little bit of thermal heat and fires from it, but the vast majority of the energy is the shockwave.

(00:42:06):

Nuclear weapons are very different. The first that we tend to not talk about too much, but it's important, is the fireball. It's literally the temperature of the sun. It's going to vaporize anything within that range. Fairly small, few hundred meters across to maybe a kilometer across from the very large weapons. But I don't want to forget to mention that, because the fireball is what's causing all these other effects. So the shockwave, that blast wave, propagates out. At first, it's supersonic. It's actually moving faster than the speed of sound, so you can imagine. You heard a sonic boom. Well, you can imagine what that's doing on the surface from a bomb blast, and that causes most of the immediate structure damage.

(00:42:47):

The other thing that happens is the thermal radiation. That's burning, it's the temperature of the sun. You're taking a piece of the sun and putting it on the earth. So it's causing flash burns and fires of anything combustible, sometimes 20, 30 miles from the detonation site. So that's a huge thing. So the first thing is the blast wave tears up the buildings and stirs things up, then the thermal radiation sets everything on fire. So you're getting the worst effects of a shock wave and a firestorm.

(00:43:22):

And then the radiation. One of the scary, fascinating things about nuclear bombs, and particularly this gets to the small yield. So you look at, say, a B61 that's set for the 300 ton setting, the blast size is maybe 300 meters across, but the radiation is deadly out to 600 meters. So that's where some of your older listeners may remember the neutron bomb or enhanced radiation weapons. Those went out of fashion in the eighties, partly

The Great Simplification

for the reason that it's creepy that you can set this bomb off and kill people, but leave the buildings and tanks and things fairly much intact. And so that went away in the eighties. But just like fashion and MTV, we're back. It's back to the eighties and we've now built those weapons that at the time were speculative. So that's the key things. You've got the shockwave, you've got thermal radiation, you've got immediate ionizing radiation. That's your immediate effects.

(00:44:29):

Longer term. Well, those are delayed effects, things like the fallout. So a lot of material that gets sucked into the blast is irradiated, becomes radioactive. You've got debris from the bomb. Even at a high end nuclear blast, you're only consuming 30 or so percent of the material in the device, so the rest of that radioactive material just gets spewed all over the place. And so that becomes radioactive fallout. That can fall for hundreds of miles away from the site and last for hundreds of years. So you think about Chernobyl, we're still talking about the fact that people driving through that area stir up dust. You've got areas in Europe, hotspots where you can't drink the milk from the cows because the radioactive isotopes are still in the soil, it ends up in the grass. And this is not in Russia. We're talking about in parts of Poland, in parts of Germany where you still get radioactive milk from cows eating stuff that's left over from a nuclear reactor accident 40 years ago.

(00:45:33):

Well, imagine you set off a few dozen or a few hundred nuclear weapons. Again, a limited exchange. You're going to have these hotspots all over the world for decades that's contaminating our food and water. And that's just the immediate radiation effects. The particulates, the dust, the soot, that ends up getting blasted into the stratosphere. It's going to hang out there for years. So you potentially can end up with... Even a small exchange of a few dozen weapons could cause cooling in the atmosphere which could impact crops. This particulates, the settling, the obstructing of the normal sunlight can interfere with the oceanic food chain. You collapse or damage the oceanic food chain, you've just caused a real problem for all life on this planet. And that's not even from... That's before we get to the really bad scenarios of thousands of nukes going off.

Nate Hagens (00:46:26):

The Great Simplification

You in a recent email to me said, "There are three countries that have the potential to destroy life on earth." That was your quote. Can you explain how that would happen?

Chuck Watson (00:46:39):

And to be clear, because I actually-

Nate Hagens (00:46:40):

Conceptually.

Chuck Watson (00:46:42):

There was an ecologist that corrected me on that. Of course, we're not talking about destroying life on earth. We are talking about destroying virtually anything bigger than a cockroach. So to me, that's-

Nate Hagens (00:46:54):

Right, right.

Chuck Watson (00:46:54):

Yeah. I mean, so to be clear, you're-

Nate Hagens (00:46:57):

Complex life.

Chuck Watson (00:46:58):

Complex life, yeah. So low level-

Nate Hagens (00:47:03):

That seems fantastical exaggeration to me, so I would like you to be explicit on how that could happen.

Chuck Watson (00:47:10):

It isn't. The reason being that, for twofold, first off, with a large scale exchange of, say, 3000... Again, remember that strategically, each side has on the order of 2000 strategic weapons. These are the big missiles, the submarine launch. Let's say that half

The Great Simplification

of those on each side get deployed and go off, so you have... That's 2000 nuclear weapons going off in the northern hemisphere, a few in the southern hemisphere. So the amount of radiation, the amount of material ejected into the atmosphere, roughly equivalent. We think that the problem with some of these is that the modeling tends to get into classified materials, but there have been some public studies. That kind of an exchange, you're talking same level of impact as the asteroid impact at the end of the Cretaceous that killed off the dinosaurs. So right there is your-

Nate Hagens (00:48:13):

Because of what? Because of the particulate in the atmosphere and shutting out the sun, or what else?

Chuck Watson (00:48:19):

Yeah, exactly. That's the nuclear winter scenario. You get particulates, you get soot ejected into the stratosphere. That causes a tremendous diminution of sunlight and energy reaching the surface. And we haven't even-

Nate Hagens (00:48:34):

And that's separate than the radiation?

Chuck Watson (00:48:37):

Completely separate from the radiation. You're talking about having 30% of the northern hemisphere uninhabitable for several centuries, not to mention all the radioactive dust blowing around and contaminating everything else. So even assuming you don't have catastrophic ecosystem collapse from the cooling and loss of sunlight, the radiation's going to be such a severe problem. And that's not even getting to some of the other issues that we talked about, that obviously that kind of exchange, you've just destroyed all of the mechanisms of human civilization. Forget economies and energy use and all those other things. When you've killed off 2 billion people and destroyed most of the functioning economies in the world, the people that are left, it's not going to be a pretty sight. But again, the most likely scenario is you have catastrophic nuclear winter. You end up with catastrophic ecosystem failures, and that's before you even get to the radioactive effects and radiation effects.

The Great Simplification

Nate Hagens (00:49:42):

I wanted to have this conversation with you because I think more people need to understand the seriousness of this risk, and I was hoping that people would listen to it and think about it and share it. My initial reaction is I'm going to lose listeners because of this conversation.

Chuck Watson (00:50:01):

But here's the thing, we can do something about this. We've already-

Nate Hagens (00:50:05):

Well, we're going to get to that. I know-

Chuck Watson (00:50:06):

We've already, and again, it is depressing, but we already did something about this once. In the '80s, we actually did significant deescalation, but back to the topic at hand, that big exchange, you get into arguments whether or not it's possible, I think it is because I think people in the heat of the moment get dumb pretty fast. In the past-

Nate Hagens (00:50:30):

At that point it's almost the evolutionary game theory of spite, which is, "Oh my God, all these missiles are heading our way. Those bastards, we're done. We better take them with us." If I can't win, I'm going to lose and make them pay more sort of thing.

Chuck Watson (00:50:49):

That's absolutely true, and although it does raise an interesting question of during the Cold War we came very close to exchanges, and they were prevented not by policy, not by brilliant technical systems, they were prevented by single moral and ethical individuals who said, "Wait a minute, I'm not going to follow instructions." That's the irony of preventing nuclear war. A lot of times it's people going against the rules and saying, "I don't want to end civilization."

Nate Hagens (00:51:23):

The Great Simplification

Isn't that just a profound insight that there's this tragedy of the commons and collective action problems, and the cleverness of our species, and nuclear weapons is the pinnacle of cleverness trumping wisdom, and the superorganism and all that, but the things that actually provide wisdom are at the individual human level, and that that's how this has been avoided in the past.

Chuck Watson (00:51:54):

It's individual human beings making the humane decision.

Nate Hagens (00:52:00):

Could that happen again?

Chuck Watson (00:52:03):

I think it could. I hope it could. I would like to believe that it could. It scares me that, unfortunately, part of the thing that we're discussing... I grew up with the threat of nuclear weapons. I knew what it would do. The young officers, the middle grade officers, and middle grade people in the state department, even at the upper levels, are they just going to let things go on autopilot? Are they as frightened of nuclear war as they should be?

(00:52:41):

And that's I think a very important point is that doesn't mean being paralyzed, it doesn't mean that you just give up, but what it does mean is that you understand at a deep human level... That's what I was referring to earlier. The problem is it's so easy as an academic exercise, it's horrific. I see it in myself how fascinating it is that you see the physics, you see the complexity of the problem and you start to go down those little rabbit holes, but we're talking about human life here and the life on earth, and I would like to think that is foremost in people's minds, but the guys making the decisions in the '80s had to do duck and cover exercises in elementary school. The guys making the decisions now didn't have to go through that, and I'm not sure that's a good thing.

Nate Hagens (00:53:43):

The Great Simplification

Two more questions on this topic and then we'll move on. Number one, you've just outlined a complex life ending scenario where thousands of these get exchanged from multiple parties, but what would a regional war, like say Pakistan and India with 100 nuclear bombs, not thousands, what would that do to our biosphere and our planet and our civilization, something that's not the worst case, but still a reasonably possible bad case?

Chuck Watson (00:54:20):

So again, to break it down, you've got roughly 10 nuclear countries in the world right now that have significant arsenals. Of those three, the big three have the capacity to have the big civilization ending thing, and those also have the potential to participate in regional conflicts. So, you could have scenarios where the US and Russia exchange a few dozen nukes and back off at some point. Again, the escalation spiral says that that's very risky, but it's possible. You've got, Israel of course is probably the number four in terms of number of weapons, even though they don't acknowledge it. You've got England and France both have significant arsenals. You've got India-Pakistan is the one that people have been looking at in particular. So, you do have these nations that are out there that have the few dozens to 100 scenario. There you get into, again, the prompt effects, obviously tremendous loss of life.

(00:55:28):

You get a lot of material ejected into the stratosphere. You're talking cooling of maybe five to 10 degrees. You're talking about changing Northern Hemisphere growing patterns. You're talking about radioactive hotspots. And one of the things that you've got to be careful with, a lot of the studies are assuming the old way of targeting with nuclear weapons where you're trying to maximize structure blast damage, more modern weapons and in counter force scenarios, you're actually detonating the device at the surface, and I realize that may sound technical, but it's important because a surface detonation, the fireball is vaporizing material and throwing it into the stratosphere. That's very different, so I've seen studies that are trying to use wildfire analogies, for instance, the big wildfires in Siberia and there are people saying, "Oh, well that's the equivalent of a few dozen nuclear weapons."

(00:56:27):

The Great Simplification

And actually no, it isn't because with modern targeting and the way that these various nations intend on using their weapons, that material wouldn't be in the troposphere low altitude, it would be ejected into the stratosphere, which causes a lot more of the cooling scenarios. So again, back to the focus on the point is you're talking about changing growing seasons. We see what happens when we've got problems with supply chain. Well, imagine a 30, 40% reduction in the amount of food that was grown in the Northern Hemisphere over two or three years, that would be ugly. Radiation hotspots, again, those are going to be a factor scattered a few dozen of those around the world. So it's even a small "exchange" has planetary consequences, and there, as we just said, the number of players expands from just the big three to 10, plus there's a few countries that are if not hours in one case that I'm not going to name, are months to years away from joining the nuclear club, and so that's where the diplomacy comes in.

Nate Hagens (00:57:38):

So here's a tangential question to the focus of today's conversation, which we're going to get to, which is how to avoid a near term nuclear exchange, but I'm just wondering with more and more people, and I'm happy about this part of it, becoming aware of the externalities of humanity functioning as a heat engine on climate change in the future, there's a lot of people who now and in the future are concerned that we're on a runaway greenhouse gas pathway and understanding the cooling effect of a couple of nukes, is it possible that that becomes some sort of a geoengineering path for crazy people or rational people in the future? What are these people missing? Can you speak to that or is that implausible? I've actually heard that in some discussions before, so I don't think I'm totally off base.

Chuck Watson (00:58:45):

No, and it's from people that don't understand the secondary and tertiary effects. To be just brutally honest, if they hear, oh, cooling, all right, well, what about radiation? What about particulate fallout? It is just an insane idea. There's geoengineering plans that don't involve vaporizing and killing millions of people. If you want to go down the geoengineering route, this isn't the way to do it, and I know there's people who look at it from population control or unintentional geoengineering, and I've seen those discussions and I would call them the more fringe environmental movement, and even from some people that I respect that I have to say, "Whoa, stop. Have you ever

The Great Simplification

thought about radiation? Have you thought about the fact that you're likely, even with a small exchange..."

(00:59:38):

I saw there was a cartoon of these dolphins watching a nuclear bomb, and they're like, "Hey, yay, we're free of the humans." It wouldn't work like that because again, you start changing the chemistry of the oceans and collapse the ocean food chain, who's going to go first? It's going to be the dolphins because that's their dinner being grown out there. So, it's just an insane thing, but it shows how little people today really understand about the consequences and impacts of nuclear war and why the first part of our discussion was so vital before we get to the second part is you've got to understand just how different nukes are.

Nate Hagens (01:00:14):

Well, why is that though? I'm a smart guy. I know a lot of smart people. I don't know crap about this situation until the last few months. We talked about this before, that it's risk homeostasis, things never happened, so we just adjust our behaviors to include the things that we shouldn't be doing, but how can the average person be aware of this? There's so few people that are as knowledgeable as you are.

Chuck Watson (01:00:46):

Well, a lot of it boils down to what happened with the collapse of the Soviet Union because when the Soviet Union collapsed, the US was left as the dominant unipolar force in the world. China was not yet a major power. They were still in at the very beginning of their economic boom and expansion. You had the Soviet Union broke up, the nukes all went back to Russia, but Russia was consumed with its internal economic issues and its political stability, so at that time there was, who was going to launch a nuke at us? There was some talk after the 2000s, well, of a terrorist, but a single terrorist bomb. It's like, "Oh, that's bad. It kills people in this one city," but clearly you're not discussing for one or even a two or three devices, you're not talking about the kinds of consequences we are now with a few dozen or much less hundreds of thousands.

(01:01:48):

The Great Simplification

So for a generation or longer, for 30 years, we have had a world where there weren't any real rational public scenarios to use... Before the Ukraine conflict, when did people really talk about there being a nuclear war? It just wasn't something that people talked about because there weren't any viable scenarios that they saw. So two things happened, it dropped off the public radar, but the other thing that happened was the change in our weapons mix that makes nuclear weapons more usable. So, those two things happen completely out of the public perception.

Nate Hagens (01:02:30):

Here's the next question. Why do we need nuclear weapons at all?

Chuck Watson (01:02:35):

That's an interesting question. First off, it's the kind of thing that once they were developed, then it develops an internal logic and an internal self-sufficiency. So, I think that the talk about banning nuclear weapons, I have sympathy for it, it's very idealistic. It's completely, utterly impractical. We have them, we need to learn how to live with them and manage them because it's just not going to happen to get rid of them. So as we talked earlier about history, we can see how they got developed and it made sense. At the time in the '40s, we didn't really understand radiation and secondary and tertiary. We didn't really understand thermal effects. That was something that didn't really start to develop until we actually did testing with nuclear bombs, so we backed into it. We stumbled into a world with nuclear weapons. And so once we were there, then the logic of the Cold War took over and we put air quotes around logic, and so we ended up with these tens of thousands, and so we hash through that.

(01:03:46):

Where we are now is there's a narrow technical case to be made for them, and you'll see things like, "Well, they have military utilization," and I have a real problem with the military utilization because of the escalation spiral. I would ask two key questions for people that believe that there is a first use case for nuclear weapons, which is, first off, what's the moral case for using a nuclear weapon against a non-nuclear adversary? Again, the destruction, the secondary effects. How do you justify using a nuclear weapon?

The Great Simplification

(01:04:27):

I've never seen a good ethical argument. Forget international law, it would also be illegal under international law, but that doesn't stop countries, so what's the use case where it makes sense to use them against a non-nuclear adversary? Against a nuclear adversary, the problem is, well, how do you avoid an escalation spiral? And so, it's almost like nuclear weapons are not usable as long as you have them, and so that seems to be where we're at with we need them because we have them and because it's almost impossible for everyone to agree to get rid of them, then we need to figure out how to reduce the risks and manage them rather than try to figure out how to get rid of them because that's not going to happen.

Nate Hagens (01:05:19):

But militarily, are there reasons that are budget related or effectiveness related where a small nuclear tactical nuke is the correct military option? I don't even understand how to phrase the question.

Chuck Watson (01:05:40):

No, that's actually correct. Is there an operational application where a nuclear weapon has a unique role that no other weapon can perform? Today, the answer to that is very different to what it was 10 years ago, much less 20 years ago. And so, I'm going to skip over all that history. If anybody cares, we can discuss that or go through... Ask me a question on the blog and I'm happy to go into it. Today, the range of applications is extremely narrow, and what the main thing that you get from a nuclear weapon right now is the fireball, which can vaporize even the most hardened target. So, if you've got a missile silo with the reinforced concrete shell that a normal bomb would not penetrate and you want to disable... There's a nuclear weapon in that silo or missile in that silo that you want to make sure can't be launched, you could fire a nuclear weapon at that, vaporize that silo and disable it. That's still-

Nate Hagens (01:06:46):

Dumb question, when you do that, does that detonate the opposing nuclear weapon simultaneously or not?

Chuck Watson (01:06:55):

The Great Simplification

Generally not. Nukes are designed in a way that it's hard to make them go off accidentally. There's a lot of technical reasons that I won't go into on that, but they're intentionally and just by the physics of it, a lot of things have to go right for a nuke to go off, and we've dropped nukes before. There's actually a nuclear bomb sitting in the ocean probably five miles from where I'm sitting. Nobody knows where it is. It was accidentally dropped in a collision. There was an exercise and there was a nuclear bomb on the aircraft and it was a midair collision and it's somewhere off the coast of Tybee, but anyway.

Nate Hagens (01:07:36):

It's armed, but no one's going to detonate it because they don't know where it is.

Chuck Watson (01:07:41):

Well, whether it's had the pit or not is... The paperwork is not clear, which in itself is scary. There have been live bombs dropped and they don't go off. It's hard to make it go off accidentally, so the answer to your question is no.

Nate Hagens (01:07:57):

What are the social and geopolitical risks or interactions currently that increase the risk of a nuclear exchange? You can talk about Russia and the US and NATO and Ukraine, but just generally, what is the situation? Maybe you could just briefly describe what is the first use doctrine and how has it been used and start there.

Chuck Watson (01:08:22):

That's a great point, Nate, and it's one that I would bet most Americans don't realize that we are the only country in the world that has never had any kind of a no first use. And in fact, we say that we can use nuclear weapons against non-nuclear adversaries. We've said that we can... There's the Nuclear Posture Review is currently going on, the classified version has been released. Hopefully, the public version will be out here in a few weeks. Basically, the one that's currently enforced says that we would use a nuclear weapon in response to a cyber attack that took down our electrical grid. Literally, that is US policy. Biden people are hopefully going to change that and rethink it, but we've said that we'll do it for biological warfare attacks, for all kinds of non-nuclear. And again, to me that's irrational for all the reasons we've just gone

The Great Simplification

through because nukes are different, yet it's US policy. Oh, if there's a major terrorist attack, we'll nuke your country. We're the only country in the world that says that.

Nate Hagens (01:09:33):

Is this because we want to scare people into doing what we want or does this just people off internationally? I know nothing about this. Why is it that we're the only country that's not in that club that says we're not going to do first use?

Chuck Watson (01:09:56):

It's arrogance and we've already used them. Hubris I would say rather than arrogance to be really pedantic, but there is that fear factor. It's like strategic ambiguity is a concept, and I mentioned that word before, but just to be clear, what that means is in game theory, if you don't know exactly what I'm going to do and you think I might do something crazy, it's going to limit your actions, that's the simplest phrase. Well, the problem is you're talking about strategic ambiguity around an issue that has the potential to end civilization on this planet. I don't think that's a place where you want to have ambiguity because ambiguity works both ways. You're saying maybe I will, maybe I won't. Well, the other side and they go, "I'm going to roll the dice that maybe you won't."

(01:10:48):

So, I think that's an incredibly dangerous thing. It may work for some kinds of conventional scenarios, and I can see where it is useful. You look at the whole Taiwan issue. The ambiguity may have been beneficial because it gives both sides some room to maneuver, but when it comes to nuclear weapons use, I think you need very bright lines that says, "Here is where we will use them." And in effect, that's pretty much what Russia has done. It's certainly what China has done. Russia has been modifying their nuclear use doctrine, and you get into these chicken and egg arguments, but largely based on our changes. So, we've escalated and put nuclear weapons into Europe that under INF were actually previously banned. And so now Russia has said, "Well, we're going to respond in turn," and so you get into this... We've been in a soft escalation spiral probably since the mid-2000s, 2005, or so. It got worse after 2014, and now we're in a very dangerous place in that spiral.

The Great Simplification

Nate Hagens (01:11:56):

How does using a small nuke automatically or likely lead to using big nukes? In other words, how do things escalate like that?

Chuck Watson (01:12:07):

Well, first off, you run the... I'm going to say accidental. As we discussed earlier, let's say that you have decided to use a nuclear weapon to disable... Let's use this scenario. You've got big Russian formations have swept through Ukraine, they're on the Polish border. You're afraid they're going to cross the border and you want to stop it, and you know that NATO conventional forces aren't sufficient to the job. Well, maybe you say, "Well, we will use tactical nuclear weapons to break up those formations." So you activate, you launch weapons against that way.

(01:12:47):

Well, obviously Russia's going to say, "Well, we want to disable the storage sites for those nuclear weapons to stop you from using them again or in the first place." Now, Russia's got some additional flexibility because of their hypersonic weapons, but if we used a nuke on them, it would be very logical for them to respond by hitting those air bases. Well, now you're starting to get cases where there's going to be secondary effects. You have a nuke go off, there's going to be fallout, you're going to have civilian casualties.

(01:13:25):

The time to respond gets shorter and shorter because you're using missiles with five minute flight times or aircraft with 15 to 30 minute flight times. You see activity and you start shooting at it, and you start to get where there's an exchange, then you get popular pressure of, "Wow, we've just lost now two or 3 million civilians from a limited nuclear exchange, maybe we should go ahead and do a counter force strike," the technical term saying, " We're worried the other side's going to launch their strategic weapons or their city destroying weapons. Let's hit them first."

Nate Hagens (01:14:07):

The Great Simplification

So if there's a missile that goes across a country's border, like between Russia and Germany, or I don't know, pick your destination, how do people know that it's not just a conventional bomb or it has a nuclear warhead on it?

Chuck Watson (01:14:23):

Right now for ballistic missiles, only nuclear weapons are on ballistic missiles. The long range, like submarine launched. Now, there are theater ballistic missiles that... We use cruise missiles mostly, but there are tactical ballistic missiles that are conventional, but generally like a submarine launch missile or an ICBM, those are all nuclear because it's an expensive piece of hardware. You're not going to put-

Nate Hagens (01:14:56):

So, if there's a submarine launched missile somewhere, the actors involved can assume it has a nuclear warhead?

Nate Hagens (01:15:03):

The actors involved can assume it has a nuclear warhead on it.

Chuck Watson (01:15:04):

Right, and what you don't know is how big that warhead is, and you don't know... Initially you know the general area it's going. Right now, you-

Nate Hagens (01:15:13):

Does it matter? Does it matter, seriously? Does it matter if it's at the lower end of the dial yield or all the way on the higher end?

Chuck Watson (01:15:23):

It depends on who you are. If I'm the decision-maker, I may look at it and decide to ride it out, and then respond once I know... If I know my force is survivable, maybe I decide to let it ride to see what actually happens, and then use other means. This is another thing where you get into deterrence, and the reason why I think Russia is not likely to be used first. It's not their doctrine to use first, except in an existential threat to the Russian nation.

The Great Simplification

(01:16:03):

The other reason is, they've got so much moral authority on this. They've never used a nuclear weapon. The U.S., we've used nukes. We're the bad guys, and in the international community that carries quite a bit of weight. People don't trust the U.S. to not use a nuclear weapon, because we've demonstrated the ability. You look at all the arguments. Now people say, yeah, we were right to do the Hiroshima and Nagasaki blasts, but there's a pretty big body of literature which says it wasn't really necessary.

(01:16:39):

Just to be clear, I think it was probably the right thing to do at the time, because we know a lot more now than we knew then. Still, just from a credibility standpoint, again, we have a explicit first-use doctrine, which outlines all kinds of things. There are people right now saying, well, we need to fire a nuke at Russia to show them serious. My God, you're saying use a nuclear weapon to make a point. You hear those discussions, I'm sure you've seen and read it, some of them by members of our Senate. So it's crazy.

Nate Hagens (01:17:17):

So there's dozens of additional things we could talk about here. Let's first acknowledge that the world would be better off with no nuclear weapons, but also that realistically that's not going to happen anytime soon. There are long-term solutions, there are transition solutions, but given the stakes that we face, and I think both explicitly and implicitly in this conversation, you have articulated how fucking dangerous, even small nukes because of the escalation potential are to our civilization, our biosphere, our oceans, et cetera.

Chuck Watson (01:18:00):

Don't forget the effects of even smaller weapons.

Nate Hagens (01:18:01):

So what are the things...

Chuck Watson (01:18:04):

The Great Simplification

Don't forget the effects of even-

Nate Hagens (01:18:05):

What do you mean?

Chuck Watson (01:18:06):

Again, as we've discussed, even a few weapons, even one, you're creating Chernobyl type radioactive hotspots. So nuclear weapons, even small weapons, are such a leap in effect. Conventional war is bad enough, and I know. I've been in a few. You can't imagine the horrors of places like Beirut or Sarajevo. I'll get choked up over it, even just thinking about stuff. That's nothing compared to what one nuclear weapon can do and when you start to look at the secondary effects. So that's why I keep telling people, you can get overwhelmed by the big nuclear exchange, but we've got to make sure that not even one of these things get used.

Nate Hagens (01:18:55):

I think you've made that clear. So the rest of this discussion, I would like to talk not about the long term and the transition, but specifically in the short term, how can we as a world, as a nation, and even as individuals, minimize the risk of horrible outcomes in the coming months or year? So let's unpack this. First of all, what could we do at an international level? I know you have some suggestions.

Chuck Watson (01:19:27):

Well, I'd actually like to start with what individuals can do and the first thing and-

Nate Hagens (01:19:34):

Yeah. What can individuals do?

Chuck Watson (01:19:36):

I got to say it, and we talk in social movements and in different things, you talk about, well, awareness. Okay, you're taking the first step if you're listening to this podcast. If you're thinking it through and saying, yeah, these guys have a point. This is scary. I need to do something. Okay, that's step zero. If not aware of the problem... As we've

The Great Simplification

just discussed, hadn't been a problem for 30 years. So there's no blame to go around to say why you don't know. Okay, now you've got to do something about it.

(01:20:08):

So there are things that the US can do immediately to reduce the risk of a nuclear war. Some of them aren't terribly popular with some people within the military complex and within the decision making, but there's a lot of actions that politicians are encouraged to take because people tell them, no, you're not going to do this bad thing in our name. So I would start with, we need a clear nuclear use doctrine. I have not seen the current NPR, the Nuclear Posture Review, but I'm not expecting, from what I've heard, that there's going to be significant changes in that regard.

(01:20:51):

We need to have a very clear no first use policy. We need to have a very clear deterrence policy, of saying, here's where we will be willing to use a nuke and make it very clear that our force posture, in other words, the weapons we have, fits that doctrine. Part of the problem right now is we like to sign UN declarations saying that nuclear weapons should never be used, but then we develop these weapon systems that make it easier for them to use. So that would be my first point, we need to have a solid, clear, publicly known nuclear use doctrine.

Nate Hagens (01:21:31):

If that was created, if the US did that, would that minimize the risk of other countries actually cheating on first use and would that lower the temperature on this whole thing?

Chuck Watson (01:21:46):

I think so, because right now it is ambiguous. So the potential adversaries may say, well, maybe we need to get the first lick in. Well, if you've said we're not going to use them this way and you've changed your weapons mix to make it clear that it's a retaliatory force, not a first use course, I think it is tremendously stabilizing.

(01:22:13):

Which brings me to the second point. There's no military reason for the W76-2. That's the submarine launched missile. The submarine launched small nuclear platform. It's

The Great Simplification

just insane. It's destabilizing. It's pissed off the Chinese and the Russians. Militarily, it makes very little sense for a lot of reasons. Happy to go into technical details at some point.

(01:22:42):

I think the third thing is we can deescalate by reducing. We started this modernization program, I think we do need to modernize our so-called land-based deterrent, the ballistic missiles. I do think we need to make sure our nuclear deterrent is solid, but making more tactical nuclear weapons that are easier to use in a lower threshold, we could stop that. President Biden could stop that tomorrow, or as soon as he hears this podcast. He could sign the executive order saying, I'm going to withdraw the W76s and we're going to suspend the B61 upgrades, pull the tactical yield weapons out of Europe.

(01:23:27):

You do that, it does two things. It hasn't really hurt us that much from a military flexibility standpoint. The second thing it does is sends a very clear message to Russia that, okay, we may be willing to fight you conventionally. We will fight you with nuclear weapons if we have to, but it isn't going to be a first resort. So that cools things off. Given how bloody, messy, and slow conventional wars are, people really don't want conventional wars. So even Russia, all the demonization talk about Russia, I think, it's helpful rhetoric if you're trying to gin up support for a policy. I know the Russians. I know some of these people. They don't want this war anymore than we did. They just feel painted into a corner. So that's where diplomacy comes in.

(01:24:16):

One of the things that I've said to a couple people lately is the only thing worse than not recognizing the next Hitler is calling somebody the next Hitler when they're not. Unfortunately, I feel like that's where we are with Russia and we're bordering on that with China as well. You demonize people, you can't talk to them. If you look at what happened in the eighties, Reagan said horrible things about communism and about the Soviet regime, but when it came down to it, he did business with them. Trust, but verify, all those things that came out of the eighties. If a hard-nosed cold warrior, rabid anti-communist like Ronald Reagan can step forward, shake the man's hand and do the INF Treaty, well, we can do that with Vladimir Putin.

The Great Simplification

Nate Hagens (01:25:08):

So your three ideas are, number one, a crystal clear, no first use doctrine that rejects the escalate to deescalate theme. Secondly is discontinue the W76-2 program, which are these missiles launched from subs with dial-a-yields. Then the third, and presumably more controversial, advice would be remove the small tactical nukes from the arsenal, which don't have any realistic use anyways. How would at least the first two of those things be initiated? What's the path to making those happen?

Chuck Watson (01:25:59):

The technical path is the President signs an executive order, and it happens. Now, obviously it's a little more complex than that, but basically that's just political will on the part of the senior leadership of the country. Now, the way it happens in the real world is people listening to this podcast contact their congressmen and their senators and say, look, we've got this huge problem. We need you to deescalate. We need you to listen to us that we are afraid of a potential nuclear war. We need you to become informed, because I've had conversations with elected officials and they don't know any more about dial-a-yield than you did three weeks ago. That's kind of scary, but it's also understandable, because it hasn't been at the forefront for 30 years.

(01:26:44):

So the way it starts is the public tells their elected leadership, hey, we need to deal with this. Then the pressure builds and hopefully it causes them to reevaluate where things are. If they don't, well, you look at what happened in the eighties. You had protests in the streets over it. You had the nuclear freeze movement in Europe. Again, the first step is contact our elected officials and push them to study this problem and to make sure they get multiple opinions, not just from those that are in the nuclear establishment that is so invested in all kinds of these weapons. Again, I don't object to nuclear weapons as a deterrent force. I think it's actually an important part of our weapons mix. I just think we need to be very clear how we're going to use them. Then have the weapons systems mixed that is not going to be more dangerous than not having them.

Nate Hagens (01:27:45):

The Great Simplification

So if we were to sign a no first use doctrine and discontinue the W76 missiles, how would that impact our military ability to still do our objectives and how would that be perceived in the international community?

Chuck Watson (01:28:04):

How it would affect it in concrete terms is absolutely not at all. It would've absolutely zero impact. You would get some people that would argue around the fringes, but I would be more than happy to have that debate, particularly if we could have it in a room with no windows and lead lining where it wouldn't be overheard for classified information reasons. I'd be happy to have that discussion. So I would argue that would cause no harm.

(01:28:32):

Now, the second point is interesting, because that's where it gets more into diplomacy, international law, U.S. credibility, all those kinds of things. I think it would be a positive, because we can go out and say, look, we're being responsible here. We recognize there's a problem. Our past policies may have made things a little bit worse. So we are now saying we're going to step back and now it is up to you, Russia and China. We want a new INF treaty.

(01:29:04):

That's really my third point, is more on the negotiation side. We can then have the credibility to go to the international community to work within these institutions and say, hey, we want treaties. We want verification. We pulled out of Open Skies. We've pulled out of a number of these verification treaties that were in place during the Cold War, which is another thing I think the majority of people may not realize. So those are things we can do.

(01:29:36):

I think that taking those initial steps unilaterally, first off, it doesn't really hurt us much, if at all, from a military capacity standpoint. It gives us enormous leverage to go to the international community and to put other countries, like Russia and China, on the spot and say, look, we want to deescalate here. We want to make sure that we do that in a way where you don't take advantage of the situation, but also that we're not playing games with the end of the world.

The Great Simplification

Nate Hagens (01:30:04):

So you and I often talk about systemic risks to our system and we look at what might happen and worst case things. There may be a silver lining, and of course I'm being utopian here, but there may be a silver lining in the Ukraine-Russia situation, in that it may defacto act as a modern Proud Prophet if things get scary in the rhetoric and it accelerates conversations of the type that you just advised and suggested. That it refreshes our memory of the dangers and the long-term permanent dangers to our planet and our civilization from an exchange of nukes, and gives us a chance of grasping towards wisdom instead of this cleverness, dopamine, power feedback loop that seems to have been ongoing for the last couple decades. You have any thoughts on that?

Chuck Watson (01:31:05):

In fact, you just reminded me of what I think is a very important point. People say, oh well, Ukraine, if we don't draw the line here, if we're not strong, then Putin's going to take over Europe or whatever. Remember during the Cold War, and of course you don't, it's before my time too, you think of Czechoslovakia. You think of the Prague Spring, on the Soviets going and using military force invading, taking over. You look at Afghanistan, the multi-year war in Afghanistan, the multi-year wars in Vietnam. We had wars where Americans and Soviets were shooting at each other, yet we managed to avoid a nuclear war. Part of the reason for that is we were aware of the risks and consequences and we took deliberate steps to deescalate.

(01:31:52):

So there's a track record here. There's nothing new, and guess what? The Soviets didn't take over Europe, because they knew the risks. We knew the risks. We made it clear. So I don't buy these arguments that say that, oh, we have to act strong. We have to engage in brinksmanship in order to prevent Russian aggression. That's just history shows otherwise, and I think that's just posturing. So to get to your point, I think that we can be rational about this. We can look at it in a hard-nosed way and not lose our humanity, and we have to. The stakes are too high not to.

Nate Hagens (01:32:31):

The Great Simplification

I agree with that. Simultaneously, I wonder, especially in your case, how can a human being study this subject and be an expert and discuss it calmly? It's just so freaking overwhelming and frightening.

Chuck Watson (01:32:48):

It is interesting, and I look at myself sometimes. I backed into this in a way, ended up in this world. What's interesting is I, of course studied, my main research area is natural disasters, although lately, it seems like humans have been competing with Mother Nature for that. So when I got started, emergency management was known as civil defense. so the thinking was, hey, we didn't get blown up by nuclear bomb today. It's a good day. So you had a very relaxed attitude about hurricanes and tornadoes.

(01:33:28):

You learn pretty quickly in all of these fields that you have to shut your humanity off or else you can't think rationally. The problem is if you do shut your humanity off, then you have to end up going down these rabbit holes where you're doing target planning and looking at over pressures and fireball heights, and all of these things that go into it. It's a fascinating technical problem. So somehow, every few minutes, you have to remember that you're talking about human beings, you're talking about the natural world, and it's a hard problem. It's a frightening bit of our nature, that you talked about in biological terms, that our brains are wired this way, that we're fascinated by the problem and lose sight of what should be the humanity.

(01:34:35):

It's scares me, Nate. It really terrifies me how my brain works and how the brains of people I know and respect end up going down these same kind of rabbit holes. I think that in my case, what snapped... I won't say snapped me out of it, but put me into perspective, was going to places like Beirut and seeing the horror of even a little war and realizing this is nothing. This is trivial compared to what a nuclear exchange could do.

Nate Hagens (01:35:08):

So I in seven minutes have to do a lecture to a hundred college students on ecological economics, so I'm going to need to shift gears in a couple minutes. Based on what you just said, I'm thinking ahead to this lecture. One of the slides I have is I talk about

The Great Simplification

supernormal stimuli and that the dollar is the biggest supernormal stimuli. In other words, a modern invention that hijacks our brain in a deleterious, maladaptive way relative to our ancestral environment. I've always said that the dollar is the biggest supernormal stimuli there is. Now after talking to you, I actually think it's nuclear weapons are the biggest supernormal stimuli. It's something that it's not a spear or a knife from our ancestral time, because it's many, many orders of magnitude larger in impact and scale than weaponry in our tribal past.

Chuck Watson (01:36:09):

Yeah. The power is intoxicating, in the sense that I know things about... I know how to configure a B61 to destroy a city block or a city. You talk about the dopamine and the adrenaline and the testosterone hit from having that kind of power and awareness. It's why young men and women now go off to war, because they think they're invincible and they can get the other guy without the other guy getting them, but you don't have to look them in the face.

Nate Hagens (01:36:44):

That's what worries me the most, is in the moment, we've never had this happen in our lifetimes. It's just almost a matter of time before something escalates. That's why I think you work, and thank you for sharing your wisdom on this, because I have no idea what to do, but at least you've given us a framework for how to think about it and to get people involved. Because we have a lot of these things that are real, pressing risks to our futures and our presence. So thank you for your concern and patriotism and knowledge and expertise on this. Do you have any closing thoughts, Chuck?

Chuck Watson (01:37:28):

I'll say it with feeling, whereas Scrooge said it jokingly, but humanity is... Not Scrooge, but humanity is my business. You said patriotism. Patriotism is so important and the most patriotic thing you can do is making sure your country doesn't do something wrong or get wiped out. Carl Schurz, the senator, very famously said, "My country, right or wrong, if she'd be right, I stand by her. If she'd be wrong, I set her right." So that's kind of how I see this. People want to talk about, oh, Russia did this, Russia did that. Yeah, I'm not a citizen of the Russian Federation. I'm a citizen of the United States. I want to make sure we're doing what's right. We can deal with Russia and deal

The Great Simplification

with them on their terms, but we got to take care of ourselves and do the right thing first.

Nate Hagens (01:38:22):

Thank you, my friend, always a pleasure. I always learn a lot. I always leave a little shaken up, but I appreciate you and your wisdom.

Chuck Watson (01:38:31):

Thanks. I hope that people don't get scared by this, but get stimulated and start thinking about it and start asking questions, because that's how this is going to end up being resolved.

Nate Hagens (01:38:43):

If you enjoyed or learned from this episode of the Great Simplification, please subscribe to us on your favorite podcast platform and visit thegreatsimplification.com for more information on future releases.