AFJAGS Podcast: Episode 5

Artificial Intelligence & Military Legal Practice with Colonel Frank Coppersmith – Part 2

HOST: MAJOR RICK HANRAHAN, USAF
GUEST: COLONEL FRANK COPPERSMITH, USAF

Part two of a two-part interview focuses on artificial intelligence at large, including what some of the leading minds think about AI, its history and development, capabilities, and computing power among other areas.

Maj Rick Hanrahan:
Welcome to another podcast episode from the Air Force Judge Advocate General's School. I'm your host Major Rick Hanrahan. Today's podcast is part two of our interview with Colonel Frank Coppersmith on the impact of artificial intelligence in military legal practice. If you didn't hear part one, I encourage you to listen to it first where we discuss AI at large. In this part two, we dive into AI's role in our military legal practice. Here are a few clips from part two.

Col Frank Coppersmith:
We're going to be the ones that'll be accountable and responsible for helping choose the data that we'll use to train the AI. People who don't make the jump to the next technology are simply left behind.

Announcer:
Welcome to the Air Force Judge Advocate General's Reporter Podcast where we interview leaders, innovators, and influencers on the law, leadership, and best practices of the day. And now to your host from the Air Force Judge Advocate General's School.

Maj Rick Hanrahan:
How do you see AI getting involved within the military context? And also I think you had mentioned in a paper that in 2015 the Air Force published **Autonomous Horizons** concerning autonomous systems, which is a form of AI. What is the significance of this document and what will be its role?

Col Frank Coppersmith:
Yeah, so a couple of different answers on that are from different pieces. The first day is that no one should be surprised that we are all rapidly developing autonomous weapons. The challenge of course is that everyone has a different opinion of what autonomous weapons are. So for example, and I forgot which of the great big defense contractors introduced it, but there's one where it will be a companion drone that will be able to keep up and follow along with that F-35s, F-16s, that will carry extra ordinance and extra to basically allow the F-16 pilots and the F-35 pilots to have other options if need be. And it will stay out of trouble and it will basically run itself. The pilots will not have to deal with it until they say that they want a mission package that maybe isn't available.

That's a really interesting autonomous weapon, but the pilot will remain entirely in control of that. We call that being on the loop, the human decision maker on the loop. There are others where we're going to use some tools that are going to make decisions, which we can kind of stop and this might be some of the technologies that we might be looking at in cyber where we actually have, where computers may take certain actions, but before it goes off the user, the commander of the warfighter can say, no, I don't want that to happen. That's being in the loop, in the loop. And the last one is when the machines are making their own decisions. When the machines are making their own decisions, the humans are out of the loop. When the humans are out of the loop, that is where I think things are going to start getting very, very interesting because when you look at all the of the potential speed that AI can produce, the pressure on our leadership, on warfighters, on combatant commanders to just turn the AIs loose, to turn the AI powered weapons loose will be enormous.

The Autonomous Horizons document put together by the chief scientists at the Air Force on this one, this is all about how AI is going to work synergistically with Airmen. And what that means is, it means human AI teams. It's that there are some things that humans are really good at, there are some things that AI are really good at. I mean, I think one of the things that's really fascinating about AI is their ability to just ingest enormous amounts of data and give you a response much faster than a human being can do. But AI are to some extent brittle. If they haven't seen this situation before, it's harder for them to improvise. Humans are great at improvisation. That's what we're best at. When a situation changes dramatically and we need to just step in and take over. It's why airline pilots are trained if something goes wrong with the airplane, you turn off the auto pilot and you take control of the plane. So that's really where I think we're going to be going initially based on that document.

Maj Rick Hanrahan:
I'm aware that in, I think it was in 2012 there was a crash at the stock market were dropped precipitously in a very short period of time, which was based on AI algorithms working quicker than humans could keep up with. So obviously I think as devil's advocate, one would ask, this does not appear, at least on the surface, to be a good thing or something perhaps that we want as humanity and what could we do to control that?

Col Frank Coppersmith:
Yeah, I think that's a great question and I think it's one that right now DoD policy is humans are either on the loop or in the loop in ALL decision making as it relates to AI. But some things are going to happen faster than humans can think. And we already have some of this AI out there, right? We have some AI in missile defense systems on ships and around our air bases that shoot down incoming missiles. Well there's no time for a human to target the missile. The AI has to spot the missile and fire. Of course we say that we know when we've turned it on and when we've turn it off and so we put some limits around it. I think one of the drivers behind it is going to be the decision making of our opponents, of our peer competitors.

The more authority they give their AI, the more authority that we will almost certainly have to give ours. And that is simply because of the speed of decision making. An

AI that is actively working against us that is not having to wait on human input will be faster than our decision making, meaning it's inside our OODA [Observe, Orient, Decide, Act] loop. There's a great presentation that talks very much around the fact that we won't know the war has started against an enemy AI because the AI will be coming after our data systems, sucking down data, learning everything possible about us, learning everything about us as individuals, everything about us as commanders. With enough information can we predict the behavior of potential geopolitical opponents? The Chinese currently have a system where they are collecting data off of more than a billion people, their own, but how much can they learn about human behavior and all that? Will that make it better and easier for them to predict? And if they can, can they then turn that information over to their AIs for decision making? I think the answer is yes. I think the answer is very much yes.

And then the last piece on that I think is traditionally, we have had a AI that executes kind of a pre-programmed, we'll call it a flight plan. Whether that's a system designed to shoot down a missile or whether that's a cruise missile that's flying to try to find a target. What we're going to be building, the kind of AI we're going to be building is AI that is focused on mission goals. So it will be much more like humans. It will not be just, hey, go to this place and drop a bomb on this car. It's going to be go to this place, take out this enemy leader, this high value target, however, okay, he might be in a car, he might be inside a building. Okay wait, he's with his family. Is his family acceptable collateral damage? Okay, wait, he's, are they far enough away? I should switch targets. I should switch weapons from my JDAM to my onboard guns. Making the kind of mission decisions that we expect pilots to do everyday, that we expect AOCs to do every day. That's where we're headed from a standpoint of the kind of AIs that we'll be building.

Maj Rick Hanrahan:
I mean it sounds like this is almost a zero sum game with our adversaries in a way. And how can the legal community get involved to stop that or work in that context to avoid a zero sum game?

Col Frank Coppersmith:
Yeah, so I think one of the biggest challenges that we face and our adversaries will face as well is when it comes to deep learning, we're not really sure how much or how we will be able to trust the AIs that we're building. So if we build traditional software, I can you know much like we'll take DL Wills example, that expert system we talked about earlier. I can unpack that system. I can look at the code, I can follow the flow charts, I can understand exactly why and how it's making decisions it's making. With deep learning, deep learning is about, you know, a lot of linear algebra, a lot of different way, and we can talk about deep learning in more detail, but at the end of the day, I don't know, when I dig into deep learning exactly why the AI is making the decision it is. I can tell you given a set of test data and a set of validation data that it gets it right 99.999% of the time. Or maybe our standard is 100% of the time. So it gets it right every time we've tested it, but we can't entirely know why.

That's maddening for a Judge Advocate. If we're coming in and trying to understand why something is happening, that's going to be a huge challenge for us. But I think the other side is we're going to be faced with a world where maybe it's going to be even unethical. We're going to have legal questions of whether it's unethical to NOT use AI. You see humans get scared, right? They don't get the latest down brief, they miss out and miss the miss the latest ROE briefing or the change in the ROE. Presumably machines networked together won't miss those. They won't be afraid, they won't be tired, they won't be sick, they won't be angry that their buddy just got hurt or that they got hurt. So the question will become, I think one of the big questions that we're going to have to face is what happens when we look ahead and it is actually a challenge to put troops on the ground instead of putting machines? Because the machines, they won't get angry, they won't accidentally shoot the wrong people, they won't make the same kind of mistakes that humans make. They won't, they won't

commit those war crime style offenses. And so it will put us in a really interesting place. So those are the types of challenges on the JAG's side that we'll be dealing with.

Maj Rick Hanrahan:
Sir, would you anticipate a future with AI where you have groups of JAGs or lawyers working essentially with developers on programming AI's ethical behaviors?

Col Frank Coppersmith:
Yeah, absolutely. And not just their ethical behaviors, but really their entire, we'll be doing in advance a lot of the things that we do in an AOC, from a Air Operations Center or whether it's training and target development in the and the like. We'll be doing that in advance, working with the artificial intelligence, but I really think it goes a step further. We're going to be the ones that'll be accountable and responsible for helping choose the data that we'll use to train the AI. We'll be the ones that will have to sign off on has the AI been validated to comply with whatever rules of engagement that we've set up? We will be the ones that have to work with leadership to come up with the test cases to apply to the nascent AIs to make sure that they work the way we need them to work. I mean, if a commander came to me and said, "Commander Coppersmith, I need you to make sure all of our folks are up to speed on the latest changes to the ROE." What would we do? We'd call a briefing, we get them all in a room. We make sure every single person in the unit got that training. And if people missed it, we'd go around and we find them on the back end and make sure everyone got it and everyone got signed off and then we know everyone has been trained.

Well you can't just pull the AI into a briefing room. You're going to have to build test cases. You're going to have to work with a programmer so that the right data is being surfaced that the validation cases are correct. We're going to have to bring all that together, and then at the end of the day the commander's still going to have the same question they have when we're training their troops. The commander is going to say, "Is the AI ready? Is the AI going to comply with the rules like we need it to?" And we're going to have to say yes because we're going to have to get the yes. But the question is how do we get to yes? How can we justify it? What test cases do we run, how do we know we're confident in it? Again, I can't crack it open the way I crack open DL Wills and make sure it's right. I can't say everyone's signed off on the briefing. I can't say I've checked the slides, I know all the slides are correct. So how are we going to know? I think we still haven't figured that out.

Maj Rick Hanrahan:
Sir, how far away do you think we are from AI having a more or less significant impact in the battle space?

Col Frank Coppersmith:
So I think AI is having a significant impact in the battle space today because we're already thinking about how all the systems we are building are going to be influenced by AI. If you're saying how quickly are we using before we start using AI in say mission planning and the like, I don't know that I haven't had visibility to give you an answer. But I will say that absolutely certain that our geopolitical opponents, especially the Chinese are all in on AI and all in on the military uses of AI today.

Maj Rick Hanrahan:
So this a little bit off the cuff question, but let's just say you're a JAG going to work 10 years from now and you come to the base legal office, what might it look like in 10 years? What might those touch points be with AI?

Col Frank Coppersmith:
Yeah, so I think it looks something like this. You walk outside and the self-driving car pod picks you up that always comes at 7:15 and picks you up. It takes you into work, drops you off and an AI at the entrance recognizes your stride, your height, your face, and lets you into the building. There's no key card anymore. It just lets you in. You then sit down at your desk, you also log in through the AI, recognizing your face, your gestures, whatever code gets you inside. Then once you're in, once you're on those systems, when you think about the work that you'll be doing, will you be reviewing contracts the same

way by reading them line after line? I'm skeptical. I think you're going to be looking at reports that the AI that we've written to help review contracts will be servicing the most interesting issues in for you to provide input for.

I think from a legal assistant standpoint, we'll be sifting through different kinds of AI guidance that's available to our users on their smartphone. I think from an operations law standpoint we'll be working much like I said, we'll be having teams of people who will be actually validating data, validating algorithms via test cases and that, that will really feel a lot like your day. I think you'll still be going in having one on one meetings with commanders. You will still be having one on one meetings with legal assistance clients, but the other piece is on the military justice side and I think one of the things that we haven't really talked about is the impact of AI in military justice because I think that's going to hit there too. We're really comfortable and used to having pretty much that being a full on human touch system, where humans touch it every stage. What we're already seeing in states like Wisconsin, they're using algorithms to make sentencing recommendations and their Supreme Court said that's absolutely fine. Now, a judge makes the final decision, but at the beginning of the process is an AI looking at untold thousands of factors of whether this person is likely to commit crime again.

And so that's really where we're going to be. We're going to see AI deeply integrated in all the things we do. But here's the thing, we won't really notice it that much because once AI gets adopted, it's just software. It's just software. It doesn't feel any unusual at all. If you log on today and you want to get some help from Amazon or some online customer support, it's almost certain when you log in that you are talking with a chat bot, with a piece of AI that's helping you get answers to your questions.

Maj Rick Hanrahan:
Sir, do you think that the AI ultimately will have an impact on our numbers or our manpower, and if so, how?

Col Frank Coppersmith:
So, I think there's two ways to look at it. The first is, it can really help our manpower because AI could dramatically disrupt many other entry level and bluntly middle class jobs from vehicle operations, which employs somewhere like 15% of everyone in America, between truck drivers and taxi drivers and the other, and it's almost all certainly to be automated. Which means we'll actually be able to find people who may be looking for, it's a little bit cynical, but looking for work and the military will remain a consistent place for people to go when they're trying to get a job. I think on the flip side it may reduce the demand that we have for people, because I think we're going to find a huge desire on the part of decision makers, a part of leaders, on the part of honestly the American public to replace their children and their fellow citizens with machines. If they can do that, they're going to be very happy to do that and we should celebrate that, right?

Less risk of harm to us. The types of skills that we're going to need are going to be dramatically different, dramatically different. I think we have relied heavily on the sense that we could bring people in and train airman up to and officers up to anything we needed them to be. I think we're going to really have to be smart about finding people who have a natural interest and inclination for these types of technologies and we're going to face a big challenge in that from Microsoft and Google employees who have written that they do not want to work on AI that serves the military. That's the struggle. If we can't recruit the experts in this space.

Maj Rick Hanrahan:
From your standpoint, sir, being in this industry for as long as you have and having your expertise, what are some of the, maybe the top three biggest takeaways that our listeners can take from this topic?

Col Frank Coppersmith:
Well, I think my first biggest takeaway is artificial intelligence is going to have an impact much like the way the World Wide Web and the Internet had. You know, you

have to realize I started practicing law before Internet usage was in place and yet today I sit here connected to you with multiple computers and screens around me with my email up and this teleconference system up. No one would have believed that this is how we were going to practice law in 15 years, 20 years. So the impacts are going to be that dramatic. It will change everything. The second I think is that it, in much like when the Internet came along, people who don't make the jump to the next technology are simply left behind. I mean, we all knew lawyers who just could not make the transition to DL Wills, could not make the transition to doing everything online, could not make you have to print everything out. I don't run into those folks anymore. They have just had to retire.

So you either are going to get on board with this or you're going to really struggle in your practice. Then the last takeaway might be this, when we think about who's going to win the next war, we think about the next conflict, either deterring it or fighting it. There's an anecdote I want to give us. So as we think about the start of the Second World War and the fight between the Germans and the French, the expectation was the Germans would much like the last war, be bogged down for years at the national line and or even if they breached it, it would look exactly like the First World War, the war that had come before and that's what they thought was going to happen. And so there was lots of time, lots of time to get troops over to France. Lots of time for the Brits to reinforce. This is going to take years to fight. And I think it was only about six to eight weeks before the Germans were marching in Paris. And they did that not just because they've had some new technology, but because they had seen the connectivity between radios and mechanized infantry and aircraft and brought it all together in a consolidated doctrine and strategy that just rolled over the French Army.

The risk we run because we like things like aircraft carriers and F-35 fighters and because we love those things because we have total dominance in them. Is that a peer competitor could look at the world and go wow artificial intelligence is cheap. What if I'm just smarter than the Americans in all of my decision making? And when I say smarter than us, imagine a world because this is the world we live in today, imagine a world where the Chinese are watching all of the actions that our senior leaders are taking. They know everything about it. They know the conversations they have, they read all of their email, they listen to all their telephone calls, they know everything about their families, they know everything about their lives, and they add to that all the data they can get that we just exhaust off everywhere about how our aircraft fly, and how we make decisions. And then they put that into their own simulations powered by our artificial intelligence and they can war game against that as much as they want, as long as they want, and they can constantly keep tweaking those. Well, what if this particular senior officer is unavailable? What if this senior officer relies on their exec? What about this person's spouse?

And they can use all of this information, all this processing power to war game, complex, smart, things we're not even beginning to think about. Then you leverage in cyber, which we didn't really talk about the sense that all this is tied together and while we have great cyber capabilities, we are also greatly vulnerable on cyber. And you bring all of that together into a single plan, one that they can practice over and over against an AI that they've trained on our data, so it behaves like we behave. Now, are we prepping for that war? Are we the French? Are we the Pols, riding our last cavalry charge into the German tanks? I don't know. We might be, we didn't talk about it here when we think about artificial intelligence, one of the things we also have to talk about is the sense of I can use AI to then take action. I can have it do things and we are adding new capabilities to things like drones and smart weapons.

There is an amazing article about how we lost the Great Pacific War. I encouraged to everyone, it opens up with a very simple thing. We lose the Great Pacific War because with some very simple AI and some very inexpensive drones, our Asia competitor lands drones with explosives

on all of our aircrafts and all of our ships all throughout the Pacific and the west coast and says, we're invading Taiwan today. It shows up on all of our text messages. If you go outside, if you don't do anything, we won't blow up everything on your entire Air Force. Drones are cheap, AI is cheap, explosive are cheap. F-35s cost $90 million or something, 90 million a piece? Could we be intimidated by that? Could they war game that? Are we war gaming that? We're probably not. Those are the threats that I worry that as we think about what people should take away from this, AI is changing everything but we have to be thinking about that.

Maj Rick Hanrahan:
Anything that individual practitioners or anyone within our JAG corps can do today in preparation for AI?

Col Frank Coppersmith:
I think for a lot of them, I think it's just coming in with an open mind. I'm talking to a number of people who have told me very clearly that no machine can replace their judgment. No machine can replace my judgment, I have 30 years experience in this practice area. No one, no machine can give advice better and faster than I can. And I go, I understand and I respect that position. I totally respect it and I totally understand it. What has changed that they don't quite get or what I think people don't have quite articulate is the machine can get that 30 years of experience in a few days, weeks, worst case months, and while our AI are still fairly narrow in their focus, inside those narrow areas of focus, they're incredibly effective.

The example I use oftentimes is TurboTax. TurboTax, most people are familiar with it. It's an expert system, you come in and helps you file your taxes. It's terrific, right? Very easy to use. Everyone uses it. When you get to the end of your TurboTax, you can ask it to give you a rating on your tax filing before you submit of how likely you are to be audited and then what your chances are of winning that audit. That's pretty neat. That's the kind of thing an experience practitioner would do except here's the thing. How many, how many tax returns have gone through TurboTax? Who knows? Millions, hundreds of millions, billions. I can't guess. I don't even have a beginning number and it's immaterial because TurboTax has read all of them. TurboTax has read all of them. No human practitioner could have read every one of those tax returns. It's prediction is better than any human practitioners. Certainly on the base question of, based on the selections you've made, how likely am I to get an audit? Am I going to trigger an audit? It's smarter than you. It is better. It's giving you a better recommendation. I'd trust that recommendation way over any human's recommendation.

Maj Rick Hanrahan:
So sir, it sounds like having an awareness and an open mindedness to AI.

Col Frank Coppersmith:
Yeah, absolutely. Absolutely.

Maj Rick Hanrahan:
Could you recommend any good resources on this topic for our listeners such as good books or other podcasts or online resources or offline?

Col Frank Coppersmith:
Sure. Obviously my paper [**Autonomous Weapons Need Autonomous Lawyers**] would be their first, but after that one, anything by **Kurzweil** is terrific. The book he has is, I'm looking on my bookshelf and I don't see it right now. We can add it to the back of the podcast.

Maj Rick Hanrahan:
And sir, we'll add that to our show notes for our listeners.

Col Frank Coppersmith:
Got it. I just can't come up with the name of his book right now, but anything, but he's got a book on super-intelligence that is right on the money and admittedly it's a little dated, but everything that's dated about it, everything he's predicting has come to pass quicker. He underestimated how fast technology was moving.

Maj Rick Hanrahan:
Where can listeners, if they were looking to contact you, where could they find you at?

Col Frank Coppersmith:
I think the easiest way to get me is via email **Frank@smarterreality.io** or on our website, our company's website, **www.smarterreality.io**.

Maj Rick Hanrahan:
And we will also add those to the show notes. Sir, last question. Any final insights or parting words for our listeners before we wrap up today?

Col Frank Coppersmith:
I think we've hit a lot of great things today. I think for most people it is things are going to change, they're going to change just as fast as they changed when we came from WebFlight, I was there in 1994 and 1995 and then 1996. In 1994 we have no Internet and no email and no webphone line and by 1996 we could not live without email or WebFlight. That's what's going to change here. That's what's going to happen. When it hits, it's going to be that transformational for our practice.

Maj Rick Hanrahan:
Thank you sir. Thank you for your time today. We really appreciate your time and that'll be it for today.

Col Frank Coppersmith:
Great, Major. Thank you so much. I really enjoyed it.

Maj Rick Hanrahan:
All right, thank you sir. Well that was an in depth two-part interview with a lot of AI tech packed into it. If you need to re-review any of the interview, please do.

TAKEAWAYS:

My five key takeaways from the full interview with Colonel Coppersmith include, **one, the growth of computing power today is truly remarkable.** According to Colonel Coppersmith, one of the ways in which computing power is measured is in the number of calculations that can be accomplished for a certain amount of money. The modern standard is one million instructions or calculations per second for $1,000. It took humanity from the invention of the very first mechanical computers at the turn of the 20th century until around 1990 or 90 years to create a computer that could compute one million instructions per second for $1,000. But in 2019 modern computers add that much computing power every hour. So what took 90 years of innovation to achieve, we achieve every hour of every day. It's hard to even get one's head around this rate of advancement, but that is our current computing power growth rate. Clearly an exponential rate in orders of magnitude higher than we've ever achieved.

Further, Colonel Coppersmith estimates that within the next few years, computers will reach the computing power of the human brain, and by 2050 a computer will have more processing power than all of humanity combined. If this holds to be true or even close to true, AI will be more relevant and dominant than most of us can likely imagine.

Number two, the creation of new digital data is also remarkable. Colonel Coppersmith mentions that almost all the digital data that has ever been created, or approximately 90% of all digital data has been created in approximately the last two years. Think about it. Every text, tweet, Facebook post, Instagram photo, instant message, YouTube video upload, FaceTime, and Skype video stream and the like leads to an enormous amount of data creation that is stored on massive servers. The advancement and adoption of smartphones by the world at large has been one of the biggest drivers of this digital creation supernova.

Then when you take the convergence of massive computing power growth coupled with this massive amount of digital data creation, you are left with a treasure trove haven for AI to roam, scour, analyze, synthesize, forecast, and eventually one day impact its decision making abilities into how we live and act in an ever increasing, interconnected digital world.

Number three, deep learning is poised to create a world where computers make decisions like a human. Deep learning, which is a subset of machine learning, learns much like humans through innumerable experimentations with massive amounts of data to find what works and doesn't work. As AI continues to get better in its decision making abilities, AI will play an equally larger role with everyday life. Perhaps AI will fit into the future world similar to the Internet—i.e. where it becomes part of normal everyday life without too many negative repercussions.

However, I personally find some of the potential implications of AI is downright troubling. To live in a world where computer can make life death decisions in lieu of any human involvement and is programmed to do so within seconds, is to ultimately put our trust in technology on a scale well beyond what humanity has ever done. While we do quote unquote trust technology with our lives today in many ways, there is a human there to intervene and make the ultimate decision. To hand over the decision-making authority to AI is a leap of faith that the military and society at large must approach with great precaution and care.

Number four, the practice of law is ripe for disruption. As Colonel Coppersmith states, technology has historically served as a breaker of intermediaries. For example, Amazon and other online retailers have replaced a large portion of brick and mortar retail establishments. Online ticketing marketplaces have all but replaced most travel agents. Lawyers serve as intermediaries between their clients and the law, but the cost of a lawyer is becoming increasingly expensive for the average middle class person, and a majority of people that have a legal problem cannot realistically afford counsel. At the top of the market some lawyers are charging upwards of $1,500 an hour. This is a market screaming for a new solution. As Colonel Coppersmith states, the law is set up perfectly for AI. It is structured almost like code, routine legal practices are going away. AI can do document review better than humans. **Kira Systems** is one example and has won numerous awards for its revolutionary work. Other legal AI systems such as **Lawbot** and **DoNotPay** have shown how AI can up end certain legal practices. Further, AI is poised to not just apply in civil matters, but criminal matters as well. This may be the inevitable wave of the future, but with that in mind, this leads me to my last point, which I pose as a question.

Number five, how will we as humanity and as a JAG Corps, react or proactively engage the AI revolution that seems inevitable? Will we work to create laws that regulate AI? Will we foster best practices to ensure AI works for the betterment of our national security, society, military, and world over? Will we anticipate the ethical dilemmas that AI won't inevitably trigger? Will we lead in the AI revolution like we led in the space race, or will we more or less react to it? Trying to keep up with its unparalleled pace? We can't entirely know all these answers, but we should definitely begin to discuss them and learn to adapt this anticipated tsunami change.

Thank you for listening. If this show sparked any thoughts or comments, which I'm sure it did for most, please engage in the discussion. And if you liked this show, please subscribe on **iTunes** and leave a review. Until next time.

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