Episode Book

EPISODE #5562

What "Heavy Industry" Actually Means

PUBLISHED	25 September 2026 at 23:20 UTC
DURATION	30:31
LISTEN	myweirdprompts.com/episode/heavy-industry-definition-explained/
HOSTS	Corn, Herman, Hilbert
SCRIPT MODEL	deepseek-flash
VOICES	chatterbox-regular (chatterbox-local)
PIPELINE	V5.2
BOOK GENERATED	19 October 2026 at 17:37 UTC

SYNOPSIS

Heavy industry" sounds like a description of big, heavy things. It isn't. The real definition is economic: higher capital intensity, deeper cyclical swings, and a place upstream in the supply chain. This episode pulls apart the term Daniel asked about — what counts as heavy versus light, when the vocabulary emerged, how it fits the standard sequence of industrial development, and why the countries that industrialized first eventually saw it decline. Along the way: why a semiconductor fab is heavy industry and a bakery isn't, how East Asian states turned heavy industry into policy, and what happens when a country tries to skip ahead to it.

TRANSCRIPT



Corn

There's a line from the IDA that's been sitting in my head since we did the Ireland episode. Ireland, they said, skipped the heavy industry stage. And the more I turned that over, the less I felt like I actually knew what it meant.



Herman

Because it sounds like a compliment until you ask what the stage was.



Corn

Right. So Daniel wrote in and said, let's zoom in on the term itself. What exactly is meant when we say heavy industry. What are examples of it versus its opposite. When did the concept emerge. How does it fit into the broader theories of industrial evolution. And why did it gradually decline in the countries that actually went through industrialization.



Herman

Five questions.



Corn

Five. And the thing underneath them is that this isn't just vocabulary. Heavy industry is a stage in a story people tell about how economies develop. It's got a beginning, a golden age, and a decline. So the word is carrying a whole theory.



Herman

Which is exactly why it's worth pulling apart.



Corn

So let's start with the definition, because it's sneakier than it looks.



Herman

It is. The standard description says heavy industry involves large and heavy products, large and heavy equipment and facilities, and complex or numerous processes. Blast furnaces, machine tools, shipyards, big dams. But none of that is the actual definition. The actual definition is economic. Heavy industry has higher capital intensity than light industry, and it's more cyclical, both in investment and in employment.



Corn

Cyclical meaning when the economy sneezes, it lays off forty thousand people.



Herman

Meaning when the economy sneezes, it cancels a two billion dollar furnace rebuild that was going to take three years. The employment follows the investment, not the other way around. That's the part people miss.



Corn

So it's not the weight.



Herman

It's not the weight. A semiconductor fab weighs almost nothing per unit of output. The product is a wafer you could hold in one hand. But a fab costs several billion dollars to build, takes years to bring online, and its economics swing violently with the demand cycle. By every meaningful measure, a fab is heavy industry. A bakery is light industry, and a bakery produces something you can also hold in one hand.



Corn

Same hand, different universe.



Herman

The textbook contrast is a blast furnace steel mill versus a bakery. Both are manufacturing. Both turn raw material into something people want. But one needs a billion dollars of capital before it sells a single thing, and the other needs an oven and a lease.



Corn

And light industry, the definition there.



Herman

Less capital intensive, more consumer oriented. It produces smaller consumer goods for end users rather than intermediate goods for other industries. There's a standard phrasing I like, a manufacturing activity that uses moderate amounts of partially processed materials to produce items of relatively high value per unit weight. Fewer raw materials, less space, less power. Which is also why zoning boards will let a light industrial building sit next to houses and will not let a smelter.



Corn

So the heavy light line maps onto something else.



Herman

Two things. Capital goods versus consumer goods, and upstream versus downstream in the supply chain. Heavy industry makes the machines and the materials that make everything else. It's the part of the economy that builds the tools.



Corn

Which is a nice way of saying it's the part nobody sees.



Herman

Until it stops.



Corn

Okay. So we've got the definition. Now the part I find interesting, which is that the vocabulary itself is young. This pairing of heavy and light isn't ancient.



Herman

It's twentieth century. The Oxford English Dictionary traces light industry from 1916 onward. The industries are older, obviously. Steelmaking is older. Shipbuilding is older. But the habit of sorting them into heavy and light, that's a formulation of the twentieth century, and it emerged because people needed a way to talk about development strategy.



Corn

So the words came after the factories.



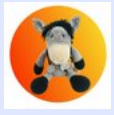
Herman

The words came after the factories, and they came from a specific argument about what a poor country should build first.



Corn

And there's a standard sequence, which is the thing that makes the Ireland claim land.



Herman

There is. Within the later stages of the Industrial Revolution, light industry development tended to precede heavy industry. Grinin's work on production revolutions lays out the sequence. First you get an industrial factory sector, mainly light industry, textiles and the like. Then comes the first processing cycle, steelmaking and iron smelting, plus transport. Then the second processing cycle, manufacturing, chemicals, heavy engineering, and that one develops especially rapidly.



Corn

Light first, then heavy.



Herman

And that pattern held across England and the other early industrializers. It's not a law, but it's a very strong regularity. You build the cheap, labor intensive, fast payback stuff first, because you're poor and you need revenue. Then you reinvest into the capital intensive stuff, because now you can afford to wait.



Corn

Which is exactly why the IDA line is interesting. Ireland didn't climb that ladder. They skipped a rung.



Herman

They claim to have skipped a rung. And that's a claim about a specific stage in a specific sequence. If the sequence is real, skipping it is a big deal.



Corn

Let's get concrete on what's actually in the heavy bucket, because the examples have shifted over time.



Herman

Traditional heavy industry, mid nineteenth to early twentieth century. Steelmaking. Artillery and weapons production. Locomotive manufacturing. Machine tool building. The heavier types of mining. Shipbuilding, once steel replaced wood. And large infrastructure, skyscrapers, big dams.



Corn

Shipbuilding is a good one because it's the purest example. You need a drydock before you can build anything.



Herman

You need the drydock, the cranes, the railway spur to bring in the plate, the workforce that lives nearby, and a decade of orders to justify any of it. Then the later additions. Chemicals, electrical, automotive, aircraft. And here's the nuance worth keeping. All four of those developed with components of both heavy and light industry. A car plant is heavy. The seat covers and the wiring harnesses are light. An aircraft program is heavy. The avionics boxes inside it can be built in a clean room by forty people.



Corn

So the categories blur as you move forward in time.



Herman

They blur badly. Which is a hint that the taxonomy is a tool, not a fact about the world.



Corn

Give me the light side properly.



Herman

Food processing, paper making, plastics, leather, textiles, household electric appliances, printing, kitchen and dining products, beauty and personal care, home textiles, clocks, watches, eyewear, packaging. Notice what's on that list. Almost everything a household buys.



Corn

Which is the consumer goods point again.



Herman

It's the consumer goods point again, and it's why light industry shows up near where people live and heavy industry shows up where people don't.



Corn

Now, the theoretical literature. There's one paper you keep gesturing at.



Herman

Morris Teubal, heavy and light industry in economic development, American Economic Review, 1973. It's the canonical economics treatment of this distinction. Teubal's question is basically the one Daniel is asking. What does it mean for a developing economy to have a heavy industry sector, and what's the relationship between the heavy and light sides as a country grows.



Corn

And what's his answer.



Herman

I'll be honest, I'm not going to do justice to the whole paper, but the core move is treating heavy and light not as labels for products but as different production functions with different capital requirements and different linkages to the rest of the economy. Heavy industry has strong backward and forward linkages. It buys from mining, it sells to everyone. That's why development planners loved it. It pulls a whole supply chain into existence around it.



Corn

That's the seduction, isn't it. It's not just that heavy industry is big. It's that it drags everything else along.



Herman

It drags everything else along, or it fails to, and takes the country's savings with it. Both outcomes are in the historical record, and which one you get depends mostly on whether the rest of the economy can absorb what the heavy sector produces.



Corn

So that's the definition and the standard sequence. Now let's talk about why heavy industry became such a central piece of development strategy, and what happened when it declined.



Herman

Because it wasn't just an economic category. It became a political one almost immediately.



Corn

East Asia is the clean case.



Herman

It is. Many East Asian countries relied on heavy industry as a key part of their development strategies, and many still do. And that reliance is a matter of government economic policy, not market accident. Robert Wade's Governing the Market is the book on this. The state picks the sector, directs the credit, protects the domestic producer until it can export, and then points it at foreign markets.



Corn

And the names give it away.



Herman

The names absolutely give it away. Mitsubishi Heavy Industries. Fuji Heavy Industries in Japan. Hyundai Heavy Industries, Daewoo Heavy Industries, Hyundai Rotem in Korea. And here's the detail I find telling. Those firms are frequently also aerospace manufacturers and defense contractors. Mitsubishi Heavy builds ships, power plants, and fighter jets. Hyundai Heavy builds ships and naval vessels.



Corn

So heavy industry and national security are the same building.



Herman

Often literally the same building. The shipyard that builds the tanker builds the frigate. The machine tool shop that makes the turbine blades can make the artillery. That's not a coincidence, it's the design. A country that wants to be able to defend itself needs a heavy industrial base, and a country that wants a heavy industrial base gets defense capability as a byproduct.



Corn

Which brings us to the communist model, where that logic got pushed to its limit.



Herman

Pushed past its limit. In twentieth century communist states, economic planning often focused on heavy industry for large investments, at the expense of consumer goods. That's the classic guns and butter tradeoff, drawn on the production possibility frontier. Every ton of steel you make is a ton of butter you didn't.



Corn

And the motivation was fear.



Herman

The motivation was fear of failing to maintain military parity with the capitalist powers. The Soviet Union's industrialization in the nineteen thirties favored heavy industry specifically to build capacity for trucks, tanks, artillery, aircraft, and warships. And it worked, in the narrow sense. The Soviet Union could outproduce Germany in tanks by the middle of the war.



Corn

At a cost.



Herman

At an enormous cost, paid by people who never got the butter. And then there's the case where it didn't work at all. China under Mao pursued the same strategy, and it culminated in the Great Leap Forward, fifty eight to sixty. An attempt to rapidly industrialize and collectivize at the same time, which led to the largest famine in human history. Up to fifty million people dead.



Corn

Fifty million.



Herman

Up to fifty million. And the industrial output they were chasing mostly didn't materialize either. The backyard furnaces produced pig iron nobody could use. Agricultural output collapsed because the labor was diverted. So you get the worst of both. Less food, and industrial goods that weren't usable quality.



Corn

That's the cautionary tale about forcing heavy industry.



Herman

That's the cautionary tale. Heavy industry is not something you can will into existence faster than the capital and the skills allow. If you try, you don't get heavy industry. You get a famine and a lot of scrap.



Corn

Okay. So that's the case for building it. Now the decline, which is where I think the standard story gets lazy.



Herman

Deindustrialization is defined as the removal or reduction of industrial capacity, especially of heavy industry or manufacturing industry. And the explanations come in about five flavors.



Corn

Give me all five.



Herman

First, automation and productivity. To the extent manufacturing has higher productivity growth than services, its relative cost falls and its share of the economy falls with it. Firms also downsize through outsourcing and contracting out, which reduces the measured manufacturing share without necessarily hurting anything real.



Corn

Second.



Herman

Offshoring and outsourcing. Breakthroughs in transportation, communication, and information technology enabled a globalized economy, foreign direct investment, capital mobility, labor migration. Manufacturing moved to lower cost sites and was replaced in urban areas by service sector and financial agglomerations. Bluestone and Harrison, The Deindustrialization of America, 1982, is the book that named it.



Corn

Third.



Herman

Preferences. Engel's law. A study of advanced economies from ninety five to twenty fourteen found the shrinking manufacturing share of GDP was mainly driven by relative price movements and shifts in final demand. Services became relatively more expensive



Herman (continued)

than manufactured goods, so manufacturing's share of GDP fell for largely nominal reasons. Services behaved as superior goods, meaning consumption rose faster than income, while demand for manufactured goods grew more slowly.



Corn

So a big chunk of the decline is a measurement artifact.



Herman

A big chunk of the decline is prices moving, not factories closing. Which is not the story anybody tells.



Corn

Fourth.



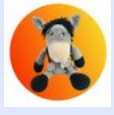
Herman

Inflation. George Reisman identified fiat money inflation as distorting the economic calculations needed to run capital intensive manufacturing. If you can't trust the long run value of the currency, you can't justify a twenty year investment in a furnace. So the investment doesn't happen, and the sector quietly stops renewing itself.



Corn

That one's underrated. Nobody blames the currency.



Herman

Nobody blames the currency, and it's one of the few explanations that predicts the timing rather than just describing the trend.



Corn

Fifth.



Herman

The Marxist explanation, Rowthorn's version. Marx's theory of declining industrial profit may be one of the earliest explanations for deindustrialization. Technological innovation replaces people with machinery, the organic composition of capital changes, and the average rate of industrial profit declines over the long term. So the sector starves itself of profit and shrinks.



Corn

Five explanations, and they're not mutually exclusive.



Herman

They're not. Most real cases are three of them at once, and the argument is about proportions.



Corn

Now the imagery, because this is where the story gets its emotional force. Bethlehem Steel.



Herman

Bethlehem Steel was one of the world's leading steel manufacturers for most of the twentieth century. Discontinued most operations in 1982. Filed for bankruptcy in 2001. Dissolved in 2003. And that arc, from world leader to dissolved, in twenty one years, is the whole deindustrialization narrative compressed into one company.



Corn

And the Packard plant in Detroit.



Herman

The abandoned Packard Automotive Plant is the symbol of the decline of Detroit's automotive industry. You've seen the photographs even if you don't know you've seen them. The collapsed roof, the trees growing through the assembly floor. That image is doing an enormous amount of work in the public imagination.



Corn

It's the Rust Belt in one frame.



Herman

It's the Rust Belt in one frame, and it feeds the sacrifice zone narrative, which is a term we should come back to.



Corn

But here's the counterpoint, and I think it's the most important thing in this whole episode.



Herman

Go on.



Corn

The output numbers don't show decline. Heavy industry output is still growing even as heavy industry employment shrinks.



Herman

That's the distinction that trips everybody up. Jobs are no longer in industrial companies, and that isn't where the growth is, but the physical output keeps climbing. American steel production today is not far off its historical peaks, with a fraction of the workforce.



Corn

So when people say heavy industry declined, they usually mean heavy industry employment declined.



Herman

They usually mean employment, and they're usually not distinguishing it from output. And then there's the energy version of the same point. Deindustrialization and offshoring of heavy industry has allowed G7 countries to decrease their energy intensity per unit of GDP, but the total amount of energy consumed globally keeps increasing. The energy didn't go away. It moved.



Corn

So the rich countries got cleaner by exporting the smokestacks.



Herman

They got cleaner by exporting the smokestacks. Which is a real achievement for their air quality and a bookkeeping trick for the atmosphere.



Corn

And that brings us to the environmental dimension, which is where this whole thing lands in the present.



Herman

As of twenty nineteen, heavy industry emits about twenty two percent of global greenhouse gas emissions. High temperature heat for heavy industry is about ten percent of global emissions on its own. And the steel industry alone was responsible for seven to nine percent of global CO2 emissions, which is inherent to the process. You're reducing iron with coal. The carbon isn't a fuel choice, it's chemistry.



Corn

That's the hard part. You can swap a power plant from coal to gas. You can't swap the carbon out of iron reduction without changing the process entirely.



Herman

You can't, which is why steel is one of the hard decarbonization problems. There's one advantage, though. Heavy industry is a point source. It's a handful of enormous facilities, not a hundred million tailpipes. So carbon capture is far cheaper there than direct air capture, because you're capturing a concentrated stream instead of filtering the atmosphere.



Corn

And the sacrifice zones.



Herman

Geographic areas permanently changed by heavy environmental alteration or economic disinvestment. A twenty twenty two UN report highlighted that millions of people globally live in pollution sacrifice zones, particularly around heavy industry and mining, and that it disproportionately affects already marginalized communities.



Corn

There's a thing I keep circling here, and it's the taxonomy question. The heavy light distinction was invented by development economists who needed a stage theory. And now we're using it to describe environmental harm, which is a completely different question.



Herman

It's a different question, and the category doesn't map cleanly onto it. A semiconductor fab is heavy industry by capital intensity and it's not a sacrifice zone in the same way a smelter is. A cement plant is heavy industry and it's a sacrifice zone and a half.



Corn

So the word is doing too much work.



Herman

The word is doing too much work.



Corn

One small correction. You said the steel industry's carbon is inherent to the process. It's inherent to the dominant process. There are routes that use hydrogen instead of coal, they're just not cost competitive yet.



Herman

That's fair. Inherent to the blast furnace route, which is essentially all of it today. Hydrogen direct reduction works, it's just expensive and it needs a hydrogen supply chain that mostly doesn't exist yet.



Corn

Which is a capital intensity problem again.



Herman

The reason steel is hard to decarbonize is the same reason it was hard to build in the first place. The capital is enormous, the assets last forty years, and nobody wants to write off a working furnace.



Corn

So the definition, the sequence, the strategy, the decline, and the climate problem are all the same story about the same thing. Capital that's too big to move.



Herman

Too big to move, too big to abandon, and too big to build from scratch if you're poor.



Corn

Okay. I want to pull on one thread before we get to the end, which is the Ireland claim specifically. If the standard sequence is light then heavy, and Ireland skipped heavy, what did they actually skip?



Herman

They skipped the phase where the state pours its savings into steel mills and shipyards and gets a defense industrial base as a byproduct. Ireland never had a Mitsubishi Heavy. They went from agriculture to electronics and pharmaceuticals, which are capital intensive in the fab and the plant, but they're not the same thing politically.



Corn

Because a pharma plant doesn't build you a frigate.



Herman

A pharma plant doesn't build you a frigate, and a semiconductor fab doesn't either. So Ireland got the capital intensity without the strategic industrial base. Which is a perfectly good outcome if nobody's invading you, and a very uncomfortable one if somebody is.



Corn

And that's the part of the IDA's boast that's actually a brag about a choice, not just luck.



Herman

It's a brag about a choice. They chose the sectors where the foreign investment would come, and they chose not to build the sectors that require a domestic state to fund them for thirty years before they pay off.



Corn

Which is a reasonable choice for a small country on the edge of Europe.



Herman

It's a reasonable choice, and it's also a choice that only works because somebody else built the heavy industry. The fabs Ireland hosts were designed by companies from countries that did build it.



Corn

So the skipped stage didn't disappear. It got outsourced.



Herman

It got outsourced to the countries that climbed the whole ladder. Which is a very neat way of saying that no country skips industrialization. Some countries just pay somebody else to do the ugly part.



Corn

I want to go back to the measurement thing for a second, because I think it's the most underrated piece here. You said a big chunk of the decline in manufacturing share is relative prices moving.



Herman

That's the Engel's law finding. Services got relatively more expensive than manufactured goods, so manufacturing's share of GDP fell for nominal reasons even when the physical output was flat or rising.



Corn

So if you'd measured it in tons instead of dollars, the decline would look completely different.



Herman

Completely different. In tons, heavy industry in the rich countries is roughly flat to up. In dollars, it's collapsed. In jobs, it's collapsed harder than either.



Corn

Three different answers to the same question, depending on the unit.



Herman

Three different answers. And most public argument about deindustrialization is people using different units and not noticing.



Corn

Which is the same problem as the heavy light distinction itself. It's a category that hides a choice.



Herman

It's a category that hides a choice, and the choice is what you're actually measuring.



Corn

There's one more thing I want to flag before we hand over, and it's the Soviet comparison specifically. You said the Soviet heavy industry strategy worked in the narrow sense.



Herman

In the narrow sense that they could outproduce Germany in tanks by the middle of the war. And that narrow sense is not nothing. If they hadn't built those plants in the thirties, the war goes differently.



Corn

But the same strategy, applied to a country that wasn't facing an invasion, produced the Great Leap Forward.



Herman

The same strategy, applied without the same urgency and without the same industrial base to build on, produced a famine. The difference is whether the heavy sector could actually absorb the resources being poured into it and turn them into something usable.



Corn

So the strategy isn't good or bad. It's conditional.



Herman

It's conditional on the rest of the economy being ready to receive what the heavy sector makes. If you build a steel mill and nobody needs the steel, you've just spent the country's savings on a very large object.



Corn

And that's the real lesson from the whole history. Heavy industry is a bet on the future being able to use what you're building now.



Herman

It's a bet with a thirty year settlement date. Which is why it's so easy to get wrong and so hard to unwind.



Hilbert

It's twenty two percent, not twenty five.



Corn

Sorry?



Hilbert

The greenhouse gas figure. You said about a quarter earlier. It's twenty two percent as of twenty nineteen.



Corn

Noted. Twenty two.



Hilbert

I spent about eight months in the circulation department of a trade publication. Not writing, just circulation. Which meant I read every back issue that came through, because there was nothing else to do while the labels printed. Steel Furnace Monthly and two of its competitors.



Herman

So you know the trade press.



Hilbert

I know the trade press. And here's the thing you two have been circling without landing on it. The industry never called itself heavy industry. Not once. Not in fifty years of back issues.



Corn

What did they call it?



Hilbert

The basic materials sector. Or primary metals. Or just the mills. That's it. You'd read a hundred pages of a trade journal and never see the phrase heavy industry.



Herman

So where did the term come from?



Hilbert

From outside. From economists and policy people who needed a taxonomy for their stage theories. The men running the furnaces didn't think of themselves as a stage. They thought of themselves as people who made steel.



Corn

That's a real problem for the Ireland claim.



Hilbert

It's a real problem or it's nothing at all. Depends how you want to use it. If the IDA says Ireland skipped heavy industry, they're using a category the industry itself never used. So the question is whether skipping a category is the same thing as skipping the thing the category describes.



Herman

That's the whole question, isn't it.



Hilbert

It's the whole question. And the answer is that the category was invented to describe something real, and then it took on a life of its own. The people inside the blast furnace never signed up for the story. Somebody else wrote it about them.



Corn

So the taxonomy is retrospective.



Hilbert

The taxonomy is retrospective. Every stage theory is. You look back at what happened and you draw lines and you name the sections. The lines are real in the sense that the factories were real. They're not real in the sense that anybody was standing there thinking, ah yes, the heavy industry stage.



Herman

That's a useful correction.



Hilbert

It's not a correction, it's just what the back issues said. Anyway. The levels on Herman's mic are running about two decibels hot on the plosives. I'll fix it in the edit.



Corn

So if the category is retrospective, then the Ireland claim is a claim about a story, not about a thing.



Herman

It's a claim about a story. And the story is useful, because it lets you compare countries. But you have to remember that the countries didn't experience themselves as chapters.



Corn

Which loops back to something we said earlier. The taxonomy is a tool, not a fact about the world.



Herman

A tool, not a fact. And the people who built the tools were trying to answer a specific question, which was how does a poor country get rich. Heavy and light was their answer. It wasn't the industry's answer.



Corn

And now we're using the same tool to talk about carbon, which is a completely different question.



Herman

Which is a completely different question, and the tool doesn't fit it well. A cement plant and a chip fab are both heavy industry by capital intensity and they're nothing alike environmentally. The category is doing work it wasn't built for.



Corn

So the misconception, the one I'd name, is that heavy industry means heavy products. That's the thing most people carry around.



Herman

It's the wrong belief, and it's wrong in a specific way. Heavy industry is about capital intensity and cyclicality, not weight. A semiconductor fab is heavy industry and it weighs nothing. A bakery is light industry and it weighs plenty. The weight is a coincidence of the early examples, and it got baked into the name.



Corn

And the second one, which is almost as common, is that deindustrialization means output fell.



Herman

Output in most rich countries is flat to up. Employment collapsed. Those are two different facts and the public conversation runs them together constantly. If you want to understand what actually happened to heavy industry, the first thing you have to do is



Herman (continued)

decide which number you're asking about.



Corn

The category was invented by economists, the industry never used it, and the decline is mostly a story about jobs and prices rather than tons.



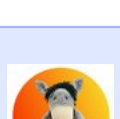
Herman

That's the episode.



Corn

There's a question I want to leave people with, and it comes straight out of what Hilbert said. If the heavy light distinction was always more analytical than real, then the Ireland claim isn't about skipping a physical stage at all. It's about a country that declined to perform a chapter in somebody else's book.



Herman

The chapter got written anyway. Just not there.



Corn

Which raises the thing that's unresolved. If heavy industry output is still growing while employment shrinks, and the emissions are concentrated in a handful of point sources in countries that climbed the whole ladder, then the climate problem and the development problem are the same problem wearing different hats. The countries that need to decarbonize are the ones that built the sector, and the countries that skipped it are the ones now buying what it makes.



Herman

That's the open question. Nobody has a clean answer to it, and the category we've been using all episode doesn't help much, because it was built to describe growth, not to describe who pays for it.



Corn

Thanks as always to Hilbert Flumingtop for producing.



Herman

If you enjoyed this deep dive into the vocabulary of industrial evolution, subscribe and leave a review. It helps other listeners find the show.



Corn

This has been My Weird Prompts.



Herman

The human-AI collaboration podcast. We'll be back soon.