

TARDIGRADES

Alt. Title: THE ENTROPY MODEL

LOGLINE: A whistleblower economist professor tries to inform the top levels of government that an environmental disaster will ruin the economy

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FADE IN:

ON THE SCREEN

"While economists [from about 1880 to 1970] ignored nature, ecologists pretended humankind did not exist. Rather than sully their science with the uncertainty of human affairs, they sought out pristine patches in which to monitor energy flows and population dynamics. Consequently, they had no political, economic - or ecological - impact."

- *An Environmental History of the Twentieth-Century World*, J. R. McNeill 2000

DISSOLVE TO:

"In theory, there is no difference between theory and practice; in practice there is."

- Incorrectly attributed to Yogi Berra

DISSOLVE TO:

INT. LARGE AUDITORIUM - DAY

JACK MCCULLOUGH (late thirties) is seated in the front row of a packed auditorium.

MASTER OF CEREMONIES

I am pleased to announce that Professor Jack McCullough is this year's John Bates Clark Medal winner.

Jack walks to the stage to accept the award.

MASTER OF CEREMONIES (CONT'D)  
Awarded to an American economist  
under the age of forty who has  
made the most significant  
contribution to economic thought  
and knowledge.

Audience applauds.

DISSOLVE TO:

INT. LARGE AUDITORIUM - DAY

ON THE SCREEN

NATIONAL ACADEMY OF SCIENCES INDUCTION CEREMONY

Professor McCullough's name is announced by an academic  
behind a podium as an inductee to the National Academy of  
Sciences. Jack proceeds to the stage to join the other  
inductees.

Applause.

DISSOLVE TO:

INT. COLLEGE OFFICE - DAY

Jack is sitting in his office working at his desk. He looks  
out the window at the green grass and trees on campus. He  
resumes work on equations:  $Y = f(K,L)$ , etc. He checks his  
watch, gets up and leaves his office. He walks down a  
hallway filled with university students and enters a  
classroom.

CUT TO:

INT. COLLEGE CLASSROOM - DAY - SAME TIME

Jack begins his lecture.

JACK

Alright class, please describe the linkages between macroeconomics and microeconomics?

STUDENT raises his hand. Jack sees the student and nods.

STUDENT

Excuse me professor, but how can you continue to teach this crap year after year?

JACK

(displays disbelief,  
irritation)

I'm not sure what you mean.

Student hesitates for a moment, then steps forward.

STUDENT

This is a course in economics, but you don't really talk about externalities. You don't mention natural capital or ecosystem services. Pretty messed up.

JACK

The material is straight out of the textbook. Actually from a lot of textbooks.

STUDENT

(defiantly)

The textbooks are wrong.

CUT TO:

INT. BAR NEAR CAMPUS - NIGHT

The bar is filled with local university students. Jack McCullough and HELEN CALLAGHAN (thirtyish) are sitting at a table.

JACK  
These millennials - such  
a pain in the ass.

HELEN  
What do you mean?

JACK  
I went round and round with a  
student today in class about basic  
economics.

Jack shakes his head.

JACK (CONT'D)  
I mean we were talking about the  
simple fundamentals of  
neoclassical economic theory.

HELEN  
(sarcastically)  
Oh, like the part that's says  
natural resources are the same as  
manufactured stuff? Or that  
consumers are perfectly rational?

JACK  
In theory, manufactured or built  
capital is perfectly substitutable  
for natural capital.

HELEN  
(raising her voice)  
In THEORY? What a crock. You know,  
I'm not sure how you can stand to  
teach that crap. It's so abstract.

JACK  
That's what my student said: 'it's  
crap,' he said. I mean he was  
actually questioning whether  
neoclassical economic theory has  
validity!

HELEN

Does it?

Jack starts to respond and catches himself, then looks puzzled, squints slightly.

JACK

You know, I think I've got a problem.

HELEN

You're telling me.

JACK

FUNNY. You'll be here all week?

HELEN

HA!

Helen smiles and then looks expectantly at Jack.

JACK

Let's assume that as economists --

HELEN

(interrupting)

That's you, not me. I'm an anthropologist.

JACK

(smiles)

That we've been assuming the world was going to run out of oil or whatever. But instead, what if we're running out of is places to put the GARBAGE?

HELEN

Your environmental SINK. You've mentioned this before.

JACK

I know, but that's the problem. Politicians and economists in a single-minded quest for growth.

HELEN

So what do you do now?

The noise from the crowd increases in volume.

DISSOLVE TO:

ON THE SCREEN

THREE YEARS LATER

INT. HELEN CALLAGHAN'S OFFICE - BUREAU OF ECONOMIC ANALYSIS  
- DAY

Jack McCullough walks into a waiting area headed for Helen Callaghan's office. Behind the open door, Helen is visible, working at her desk.

ON THE SCREEN

DR. HELEN CALLAGHAN, DIRECTOR  
SPATIAL-TEMPORAL ENVIRONMENTAL TRACKING  
U.S. GOVERNMENT ACCOUNTING OFFICE

CUT TO:

Helen's assistant, Greg, sees Jack walking past him and gets up immediately.

GREG

I'm sorry Dr. McCullough. Do you  
have an appointment?

JACK

Don't need one.

ON THE SCREEN

DR. JACK MCCULLOUGH  
DIRECTOR, ENVIRONMENTAL ACCOUNTS  
NATIONAL ECONOMIC ACCOUNTS  
BUREAU OF ECONOMIC ANALYSIS

GREG

Dr. McCullough!

HELEN

It's fine, Greg. Thank you.

Greg, the assistant, returns to his desk, somewhat put out.

JACK

Gatekeepers, huh?

HELEN

Comes with the job. People expect it. Except YOU.

JACK

You know, I was wondering why we gave up tenure as full professors to work for the government?

HELEN

It was your idea.

Jack shoots a hard glance at Helen.

HELEN (CONT'D)

(nods, unwavering)

Oh yeah.

JACK

Well, I guess I just wanted to try to marry economics with ecosystems.

HELEN

Yes, you did. By the way, be careful with that word 'marry.'

JACK

How about 'integrate?' Integrate economics and ecosystems.



HELEN

Not nearly as sexy, but okay.

JACK

So instead of teaching and independent research, you now spend your days tracking each and every environmental impact from industrial activity in the country...

JACK (CONT'D)

(very slowly)

...one TEDIOUS-SITE-AT-A-TIME?

Helen puts her hand to her chin, resting her elbow on the desk and sighs.

HELEN

Sounds exciting.

JACK

I'm sure you thought so when you started. So how's it coming?

Helen motions to stacks of paper on her desk, behind her.

HELEN

Perpetual information overload. Lots of data. New stuff coming in constantly. This will be a Big Data project soon.

JACK

It's not already?

HELEN

Soon. Then we'll need more funding.

JACK

Well, keep at it.

HELEN

Sure boss, but I don't work for you.

Jack walks to the blackboard (or whiteboard) and writes an equation:

$$Y = f(K,L)$$

JACK

That's a relief. Along those lines, can I get your thoughts on something? As a colleague, not a boss?

HELEN

Sure.

Helen stands, walks up behind Jack as he writes on the board.

JACK

I've been trying to put our empirical work into a theoretical framework.

HELEN

Yeah, I think that's a compulsion with you.

JACK

I know, sorry. But in their efforts to simplify the world, neoclassical economists have gone too far.

HELEN

How?

JACK

By only acknowledging two factors of production: labor and capital.

Jack motions to the blackboard.

JACK (CONT'D)

Simple production function, right?

HELEN

If you say so.

Jack looks back at Helen a little sheepishly.

JACK

Bear with me a moment. Y is GDP,  
which supposedly comes from  
capital, K and labor, L.  
Neoclassical economists assume  
that built capital and natural  
capital are the same thing.

HELEN

Yes, and of course, they're not.  
But it DOES simplify things.

JACK

Sure, but I say it's a little too  
simple. What about this?

Jack returns his attention to the blackboard and writes a  
new equation:

$$Y = f(E, K_B, L, W_\beta)$$

JACK (CONT'D)

We can't assume that BUILT capital  
is the same as NATURAL capital.  
There's not a one-to-one ratio  
between them.

HELEN

Because using natural resources to  
build something gives you BY-  
PRODUCTS?

JACK

Yes, but two kinds. If the waste  
is recycled, that's no problem.  
But the extra term, beta-waste ( $W_\beta$ )  
is un-recycled.

Helen crosses her arms, knowingly.

HELEN

Dirty diapers, coal slurry pits,  
cellophane packaging - more all  
the time.

Jack looks down at the floor, uncomfortable with what he is about to say.

JACK

Something else too. It's clear that ecosystems are like financial systems. They're both complex, both unpredictable, but I'm stuck.

Jack looks back up, then at Helen.

JACK (CONT'D)

We may have to do some field research.

HELEN

(big smile)

I'm in. Anything to get out of the office. Is that why you came by?

Jack looks at Helen, surprised, then laughs.

JACK

No, I stopped by to see if you wanted to go to happy hour.

HELEN

Is this a DATE? Are you edging toward commitment?

JACK

(touches chin)

Actually I was just hoping to edge toward a bar. You know I hate to drink alone.

HELEN

I'm not sure I believe that, but sure, let's go.

CUT TO:

EXT. FEDERAL RESERVE BUILDING, WASHINGTON, DC - DAY

CUT TO:

INT. LARGE CONFERENCE ROOM - DAY

MARGARET MELLOAN, Federal Reserve Central Bank Chair enters the room with an entourage of central bank governors, regional presidents and staff in tow. Her face is a mix of clueless assurance and urgency. She takes her seat at the head of the large, polished oak conference table. Only then do the others take their seats as well.

CHAIR MELLOAN

Alright, what's first up?

VICE CHAIR AND NEW YORK FEDERAL RESERVE PRESIDENT JOHN  
DISCH

Still trying to determine whether we should goose the economy. The markets look like they're about to slow down.

MELLOAN

(exasperated)

Here we go again. You know, I'm not convinced about the goddamned Philips Curve. Unemployment is down - where's the inflation?

DALLAS FED PRESIDENT RICHARD THRASHER  
(interjecting)

I'll tell you where the inflation is. It's in the ASSET prices in the stock market and overheated real estate. You're just looking in the wrong places. Inflation isn't showing up in consumer prices.

DISCH

President Thrasher, I'd like to remind you that as a regional bank president, you're a ROTATING - NOT PERMANENT - member of the committee.

Thrasher has a sour look on his face.

MELLOAN

(redirecting the  
conversation)

Where are interest rates now?  
We've driven them so low, they're  
practically at zero. What's next?  
We charge people to keep their  
money in banks?

DISCH

Sweden, Switzerland, Denmark and  
Japan are already doing that.

RICHARD

(very animated)

Yeah, and look where it's gotten  
them. In Japan, people are BUYING  
SAFES and putting their cash there  
instead of in the banks. Do you  
really want to start a RUN on the  
banks?

DISCH

We've got a prominent Harvard  
economist that thinks we should ban  
cash altogether - that will stop  
any run on the banks.

RICHARD

(louder)

GREAT, let me know how that works  
out for you.

MELLOAN

Look, okay enough of this. Start  
buying treasuries and investment-  
grade corporate bonds lightly.  
Let's see if we can keep the  
economy going without it crapping  
out again.

CUT TO:

EXT. BUREAU OF ECONOMIC ANALYSIS, WASHINGTON, DC - DAY

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - DAY

Jack's assistant, SHERI, pokes her head into his office.

SHERI

Jack, some people are interested  
in your theories.

JACK

What people?

SHERI

They wouldn't give me their names.

JACK

Fine. Can you transfer the call to  
my phone?

SHERI

They're not on the phone. They're  
here in person.

JACK

(surprised)

Really? Well, have them come in.

Sheri motions to the two men, who come through the door  
into the office. The first man (FRED CARTER) speaks for  
both men as they shake hands with Jack.

CARTER

Dr. McCullough, I'm agent Fred  
Carter with the NSA. This is agent  
Collins.

JACK

Gentlemen. What can I do for you?

CARTER

One of our analysts came across  
some of your recent theoretical  
work in an academic journal. We  
wanted to see if we could ask you  
a few questions about it?

JACK

Somebody actually read that journal? Wow. Okay, sure.

CARTER

Most of this kind of research is just theory. But YOU'VE actually started to collect data.

JACK

That's right. We thought it would be a good idea to take some ACTUAL measurements from the real world. UNUSUAL for an ECONOMIST, I know.

The men laugh.

CARTER

Well, we're intrigued. We were curious if you could share it with us?

JACK

Wait, you're with the NSA? How SERIOUS is this?

The two agents look at each other briefly.

CARTER

It's not really. We're just field agents.

JACK

I see. Well, actually the data collection process is still in the early stages. But I think it will give us some insight as we get FARTHER ALONG in the research.

CARTER

What kind of insight?

JACK

Linking financial market movements with environmental events as they develop.



CARTER  
Will you keep us posted?

JACK  
(uneasily)  
Sure, I suppose.

DISSOLVE TO:

EXT. CHACO CANYON NATIONAL PARK - NEW MEXICO - DAY

Park Ranger KARINA DIAZ drives up to the Park office in a dusty SUV. Jack is waiting outside, his compact rental car parked nearby. Diaz exits the vehicle.

JACK  
Ranger Diaz?

KARINA  
Yes?

JACK  
I'm Jack McCullough.

KARINA  
(smiles cheerfully)  
Dr. McCullough, YES. How are you?

JACK  
Good, thanks.

KARINA  
So, can I take you on a tour?

CUT TO:

EXT. CHACO CANYON NATIONAL PARK - NEW MEXICO - DAY MINUTES LATER

Diaz is driving the SUV on a dirt road very fast. The vehicle is bouncing around as the two talk.

KARINA  
First visit to Chaco Canyon?

Jack appears nervous, hanging on tightly to a handle above the door inside the vehicle.

JACK

Yes, although I've certainly read about it. In fact, I think it can help validate a theory I've been working on.

KARINA

What theory is that?

Diaz takes a sharp turn, still driving fast.

JACK

End of the world...

Diaz slams on the brakes, as the vehicle has arrived at their destination.

JACK (CONT'D)

...as we know it.

CUT TO:

EXT. PUEBLO BONITO - CHACO CANYON NATIONAL PARK - LATER  
SAME DAY

Diaz and Jack are walking at the base of Pueblo Bonito. The sides of the cliffs are lined with ancient Indian ruins.

KARINA

(motions to the cliffs)

You know, the Anasazi constructed what were the largest and tallest buildings in North America. Until the Chicago skyscrapers in the 1880s, that is.

Jack looks up at the ruins.

JACK

Really? How long ago was that?

KARINA

The Chaco Anasazi culture  
flourished from 600 A.D. to around  
1200 A.D.

JACK

Then they disappeared?

KARINA

Well, there are still descendants  
of the Anasazi. Modern day Hopi  
and Zuni tribes.

JACK

But the larger civilization?

KARINA

(interjects,  
correcting Jack)  
Society.

JACK

Sorry, yes society.

Diaz pauses before speaking, while taking a few steps,  
looking up at the abandoned residential ruins on the side  
of the cliff.

KARINA

Actually, there were several  
Anasazi cultures that are in  
what's now New Mexico and Colorado  
that collapsed, reorganized or  
were abandoned. At different  
times, different locations - all  
before Columbus landed in America,  
if you can believe that.

JACK

Did not know that. But what about  
the Chaco society in particular?

KARINA

Well, for nearly 600 years, it survived as a complex political and social system. But it was heavily dependent on importing food from nearby areas.

JACK

Didn't they grow their own food?

KARINA

At first, yes. But as the society became more complex, different social classes emerged. Over time, occupations became specialized, and the elite - chiefs, priests, craftsmen - didn't have to farm anymore.

JACK

So nearby farmers brought food into the canyon?

KARINA

Yes. Ultimately, the problem was that it was a fragile, marginal environment for agriculture - you know, like the earth. Part of it, they brought on themselves.

JACK

How did they do that?

KARINA

Look around this dessert valley. It used to be filled with trees. Pinyon pine and juniper. In the hundreds of years since it was deforested by the Anasazi, the trees still haven't grown back. The tribes permanently altered the landscape.

JACK

Then what?

KARINA

Somewhere between 1150 and 1200  
A.D., the entire society  
collapsed.

JACK

People moved away?

KARINA

Some did.

JACK

And the rest?

BEGIN FLASHBACK:

EXT. CHACO CANYON 900 A.D. - DAY

Shots of Chaco Anasazi society in forested area. Workers  
are building homes and public edifices. Elites are  
administrating, overseeing. Their activity is orderly and  
purposeful.

KARINA (V.O.)

At its height, Chaco society was  
kind of a mini-empire. The elites  
lived well in the Great Houses.  
Over time, the much larger working  
people class increasingly  
struggled to get by.

END FLASHBACK:

EXT. PUEBLO BONITO - CHACO CANYON NATIONAL PARK - SAME TIME

JACK

A familiar story.

KARINA

(laughs)

Eventually the society became a black hole. Food and other goods went in - nothing useful came out.

JACK

So, what is it you're NOT telling me? You said not EVERYONE left. What happened to the rest?

KARINA

The farmers (or peasants) got tired of paying tribute to the elites. So they revolted.

JACK

Pitchforks and torches?

KARINA

(smiles)

No pitchforks.

BEGIN FLASHBACK:

EXT. CHACO CANYON BETWEEN 1150-1200 A.D. - DAY

Anasazi tribal uprising. Workers are starving and angry. They are attacking the elites brutally. General chaos.

KARINA (V.O.)

The population had grown too large for the surrounding land to support. Deforestation only made the problem worse. The elites that couldn't or wouldn't get out retreated to cliff top homes that could be more easily defended. Of course, they were eventually attacked anyway.

END FLASHBACK:

EXT. PUEBLO BONITO - CHACO CANYON NATIONAL PARK - SAME TIME

JACK

So the elites that remained behind  
were killed?

KARINA

By that time, there was very  
little food left.

Diaz stops speaking, her expression solemn. Jack has a  
quizzical look on his face.

KARINA (CONT'D)

Yes, they were killed. Then they  
were eaten.

DISSOLVE TO:

INT. PLUSH, EXPENSIVE RESTAURANT - NIGHT

TIM PORTER and Helen Callaghan share oysters on the half-  
shell and drinks at a table.

HELEN

Jack and I are working on some  
research.

TIM

Interesting or boring?

HELEN

Endlessly fascinating. How's the  
hedge fund business?

TIM

Trying to stay one step ahead and  
not get my ass handed to me.

HELEN

I'm sure. Did you hear the President's speech the other day? He says we have to use monetary policy to prime the pump.

TIM

He must be fucking kidding. That's all the Fed's been doing since the last recession.

HELEN

What's wrong with that?

TIM

As a candidate, this president hated an accommodative Fed because it helped the incumbent. But now - just like Nixon, Bush, Bush, Obama, Trump - he loves low interest rates.

Helen looks the oysters over, as if to nibble, and then opts for a sip of wine instead.

HELEN

That's politics. Listen, Jack has been working on some economic models.

TIM

So it IS going to be boring.

HELEN

(laughs)

The models incorporate more variables into a description of the economy.

TIM

The Fed's already doing that. There are quants working on dynamic stochastic general equilibrium models though they might as well be driving by looking through the rearview mirror.



HELEN

Dynamic what?

Tim motions to the waiter for another drink for both of them. He changes his seating position to lean forward.

TIM

Dynamic stochastic general  
equilibrium. DSGE.

(beat)

Basically they try to cram every  
conceivable variable into sets of  
equations that can only be solved  
with heavy duty computer resources  
to make forecasts. Of course, they  
missed the 2008 crash.

HELEN

So they made changes to the  
models?

TIM

No, the Fed went right back to  
work as if nothing had happened.  
They'll miss the next crisis too.

HELEN

This is a different approach. It  
incorporates entropy into the  
models, you know, like the real  
world.

TIM

Oh, the REAL world? I'm surprised  
you two had heard about that.

Helen creases her eyebrows, annoyed, but continues.

HELEN

The model assumes low entropy  
inputs to the economy. Then high  
entropy out.

TIM

So you're measuring the outputs as  
well as the inputs.

HELEN

That's right. Basically it sets up a framework to gauge how much by-product leaves the system. It may give us better forecasts.

Tim leans back on the couch and considers for a moment. He waits several seconds before speaking, staring very intently at Helen and not in a good way.

TIM

Where is this taking you?

HELEN

The models can identify the limits on economic growth better than other models.

TIM

You're really going to suggest that the economy can't grow forever? That concept will never sell.

HELEN

Totally understand, which is why the research may not be well received. But as the complexity increases, conventional forecasting techniques will fail.

TIM

You MAY be chasing your tails on this one. Look, Helen, I've been in the markets a long time, and nobody ever sees a downturn coming.

HELEN

No, we think this time it's different.

Tim rolls his eyes, then quickly moves forward, speaking closer to Helen's face.

TIM

Famous last words. Look, the bubbles get larger and the crashes get more severe. Only the next time around, when a quadrillion dollars' worth of unregulated derivatives get called in and start to unwind, the counterparties won't be able to find each other fast enough. NO WAY.

HELEN

What are you saying?

TIM

(speaking loudly)  
I'm saying Fed officials and regulators think in terms of value at risk. As if derivatives can be neatly and orderly unbundled in the event of a crisis.

HELEN

Can't they?

TIM

It's true that most of the positions are offset by other trades that cancel out. But the net positions aren't the problem.

HELEN

What IS the problem?

TIM

(arms waving)  
Forget about value at risk. The problem is the gross overall value of derivatives. One swap here, another there, over and over and OVER.

HELEN

But...?

TIM  
(interrupting, with  
a hand motion)  
They can't grow indefinitely. At  
some point, everyone will want to  
cash out fast. That's when things  
get messy.

HELEN  
How can that happen?

TIM  
Same as in 2008. There are a  
QUADRILLION - that's a thousand  
TRILLION - dollars worth of  
derivatives in a completely  
unregulated market. No one knows  
WHO owes WHO or WHAT.

HELEN  
What would trigger the crash?

TIM  
Breakout of war, a debt default,  
environmental event - could be  
anything.

HELEN  
Environmental event?

TIM  
(lifting his chin)  
Sure, why not? See what THAT does  
to your model.

CUT TO:

EXT. MATT FRIEDMAN RESIDENCE - DAY

Jack McCullough and Helen Callaghan knock on the door. MATT  
FRIEDMAN opens the door.

JACK  
Hi Matt.

MATT

Hi Jack. Who's your friend?

JACK

(embarrassed at his  
oversight)

Oh, I'm sorry. This is Helen  
Callaghan.

HELEN

Pleased to meet you Dr. Friedman.

MATT

No, no, please call me Matt. Come  
in, come in.

CUT TO:

INT. MATT FRIEDMAN HOME - SAME TIME

Matt walks them through the entryway to his home library, a large room, but somewhat run down. Matt starts going through some of the books, does not sit down or offer a seat to his guests.

MATT

I'm glad you called - you very  
nearly missed me. I'm leaving for  
the airport shortly. Conference in  
Toronto. Hate air travel, though.

HELEN

Why is that?

MATT

Long security lines, long waits,  
TSA strip search, delayed flights.

Matt moves along a shelf at eye level, then stoops down to select a book.

MATT (CONT'D)

You know, air travel used to be more civilized. Before deregulation, you could arrive at the airport ten minutes before the flight, and there was actually service on the plane. Nobody got dragged off. NOW, commercial air travel is like taking a fucking Greyhound bus.

HELEN

Never thought about it like that.

MCCULLOUGH

(changing the subject)

Ah, yes, well we'll try to be brief, Matt. We're following up on some of your research that may fill in what we've been trying to piece together.

MATT

How?

HELEN

The thing is Dr. - uh, Matt - that you're a bit of a Debbie Downer with regard to prospects for the future.

MATT

Am I?

HELEN

Well, you SURE paint a bleak picture. You say that most of the big ideas in terms of innovation and economic growth are behind us?

MATT

Only for fifty to a hundred years, I think. Well, I hope so anyway.

HELEN

(aghast)

Fifty to a hundred YEARS? You're kidding, right?

MATT

(deadpan  
expression)

No, not at all.

Helen looks at Jack, as if to imply that Matt must be CRAZY. Jack appears uncomfortable mediating between Helen and Matt.

JACK

What I think Helen means is that folks in, say, Silicon Valley and here in Austin are pretty upbeat about the future of invention. You know: driverless cars, robots, AI.

MATT

Oh yes, wonderful toys. But they really don't do much for raising the standard of living. Or for productivity.

Matt moves to a table to grab a handful of books and stuffs them into an overnight bag. Then, he lights a cigarette, takes a couple of puffs, and considers his audience.

MATT (CONT'D)

You think a robot is going to be cleaning your home in the next few years? They're still trying to keep the damn things from falling over.

HELEN

Really? What about smart phone technology?

MATT

Well, maybe you think that the next smart phone is progress. Mostly, a lot of technology is an illusion. And let me tell you why.

HELEN

(thick with sarcasm)  
Yes, DO tell us why.

MATT

(continues unaffected)  
If you look back at history - economic history, which almost nobody does - and go back to say, the fall of the Roman Empire, nothing much changed for 800 years. Almost a MILLENNIUM. Standards of living stayed the same until 1700. And then, even after that, improvements were modest. It wasn't until around 1870 - not that long ago really - that productivity increases took off in a big way.

JACK

Starting with the industrial revolution.

MATT

That's right. No big secret. Unfortunately that only lasted until around 1970. For some reason, since then, productivity growth has been shrinking.

HELEN

So you're saying we've hit a wall?



MATT

In a manner of speaking. Sure, we have mobile phones and the internet. But those are toys compared to the more basic inventions that utterly transformed how people live.

Matt takes a last puff from his cigarette and mashes it out in an ashtray.

MATT (CONT'D)

Look, would you give up running water, indoor toilets and electricity in exchange for your smart phone? I don't think so.

JACK

But we don't know what useful technology might get invented tomorrow, or next week, or next year.

MATT

Actually, that's not as true as you think. I'll give you a perfect example. Do you know that at the New York World's Fair in 1939, the kitchen prototype displayed was pretty much the same kitchen in your house now? The only real change is that microwave ovens came along in the 70s.

Matt looks at Jack and Helen, both with quizzical looks on their faces.

MATT (CONT'D)

Another example: passenger cars and commercial jets don't go any faster today than they did in the 1950s.

Matt picks up a backpack and walks across the room, going between Jack and Helen to do so. He sets the backpack down and turns back to look at them.

MATT (CONT'D)

And the technologies that WERE really cool, we just put on the SHELF! Take space travel. We went to the moon...

Matt pauses and cocks his head.

MATT (CONT'D)

You do believe we went to the moon? That it wasn't a hoax?

HELEN

Hilarious.

MATT

(smiles)

Sorry, just checking. Okay, so space travel. Scratch. Sure we orbit around the earth now, we but we're not going anywhere. Not anytime soon.

HELEN

What else?

MATT

How about supersonic commercial air travel? The Concorde. Flies at twice the speed of sound. London to New York in less than half the time. Also VERY COOL. Scratch.

HELEN

I still think you're being pessimistic.

MATT

And I think you're a TECHNO-OPTIMIST. It's okay. I meet them all the time. But personally, I think we're going to spend the foreseeable future just trying maintain things the way they are.

Helen and Jack stand silently for moment.

HELEN

Hmm.

MATT

Maybe I'm wrong - wouldn't be the first time. Now look, I'm sorry, but I've really got to get going. See you in Dallas.

JACK

That's right. I'd almost forgotten, Richard's farewell.

MATT

Indeed. Should be fun. Ta ta.

CUT TO:

INT. DINNER PARTY, THRASHER RESIDENCE - NIGHT

Jack, Helen, Tim and his wife, Richard and his wife, and Matt Friedman are sitting around a large dinner table at a lavish residence in Highland Park in the Dallas area.

RICHARD

(raising his glass)  
I asked all of you over to celebrate my rolling off the Open Market Committee. Free at last!

JACK

Well, we're sorry to see you go. Who knows what idiocy the FOMC will engage in without you there.

RICHARD

Probably the same idiocy as when I was there.

Everyone laughs.

JACK

A toast! To good King Richard!

ALL  
King Richard!

Lighthearted cheers. Glasses clink.

MATT  
What was it like being the lone  
dissenter on so many votes? The  
gadfly

RICHARD  
Being right is a LONELY business.

HELEN  
So, Sir Richard, what will you do  
now?

RICHARD  
There are so many ways I can get  
into trouble. I'll be sifting  
through the offers.

More laughter

DISSOLVE TO:

INT. DINNER PARTY, THRASHER RESIDENCE - LATER THAT NIGHT

Alcohol has made the group more contemplative and  
philosophical.

JACK  
So, I wonder? How did economics  
and moral philosophy get so  
disconnected?

HELEN  
That's what I want to know. Adam  
Smith - the first great economist  
by the way - actually considered  
himself a moral philosopher.

Jack looks at Helen in surprise, confusion.

HELEN

What? I may be trained as an anthropologist, but I do read other stuff. Even classical economics.

MATT

Well, Dr. Callaghan, bravo. Yes, indeed. After all, Smith considered Theory of Moral Sentiments - his book on ethics - as his crowning achievement. Of course nowadays, people only quote from the Wealth of Nations. Selectively too, I might add. As a result, we have value-free economics. A thief steals your wallet and his income rises.

JACK

As long as he reports it to the IRS.

Laughter

TIM

So, the market has lost its conscience?

MATT

Yes.

Groans all around.

TIM

No offense Richard, Jack, but why do we even need economists? At some point should get to a steady-state. Keynes said that he looked forward to when economists would become as useful as dentists.

RICHARD

These days, the Fed's economists  
have more control than ever.  
Keeping interest rates  
artificially low, enticing  
consumers to buy more and buy  
sooner.

MATT

Ah, glorious consumption. I'm  
reminded of a Tyler Durden quote:  
'Things you own end up owning  
you.'

HELEN

Tyler Durden?

JACK and MATT

(simultaneously, as  
they glance at each  
other)

'FIGHT CLUB.'

JACK

You know it was the work of Alfred  
Marshall - who taught Keynes, by  
the way - that led to all of those  
math-laden economic models the Fed  
uses.

HELEN

Yes, sometimes I read those at  
bedtime. They help put me to  
sleep.

Laughter.

JACK

Well, Marshall said that the numerical models should be treated only as a means to an end. The math should be a shorthand language for developing hypotheses, but then translated into English. Then BURN the equations.

HELEN

Works for me.

JACK

Marshall also said that 500 pounds a year was enough for a thinking man. Virginia Woolf thought that a writer simply needed a room of one's own.

HELEN

A room of one's own? I like that. Yet we still want more.

MATT

People always want more. Though actually, the basis for happiness is not very complicated.

RICHARD

And what's that?

Matt looks around the table. The group is waiting for his response.

MATT

You just need basic network connections: running water, a toilet that works, electricity and telephone - now the internet.

(beat)

And yes, a room of one's own, food, and access to healthcare, education for both boys AND girls, and transportation. Simple and basic, in a way, but obviously not so simple.

HELEN

That's it?

Laughter.

RICHARD

More government.

Groans from around the table.

MATT

Richard, you're SO AYN RAND. Those network connections are always the product of government.

RICHARD

These days, the government is more interested in economic growth.

JACK

Are we growing, or just running in circles? During the financial crisis in 2008, an economist suggested that the Fed buy up all the vacant houses and BURN them to clear out the glut. BURN houses, BUY SUVs - is that how we should run the economy?

MATT

I've heard that story. Something ONLY an ECONOMIST would say.

HELEN

BURN the houses? That's crazy.

MATT

Economics is kind of crazy, when you think about it. PERFECT equilibrium, RATIONAL behavior, subjective utility. It's IDEOLOGY as much as it is a field of study.



RICHARD'S WIFE

But aren't we better off as a result of modern economic theory?

JACK

Materially, maybe. But we're not any happier. It's not that we're UNHAPPY. But measures of happiness haven't increased much over the past few decades.

TIM'S WIFE

So what DOES make us happy?

JACK

After a certain level, material gain - unless you're obsessed with status or psychotic - is pointless. Worse, it's self-destructive both at the MICRO and MACRO levels. At the MICRO level, it becomes an obsession with competition, a zero-sum game with winners and losers. A LOT of losers.

TIM'S WIFE

What about the MACRO level?

JACK

It brings us that much closer to tapping out essential ecosystem services.

TIM'S WIFE

Oh, POOH.

JACK

Either way, the consumption mindset pits people against each other. And we're not talking about a football game.

MATT

No, you're right. Important stuff.

RICHARD  
More important than FOOTBALL?

Laughter.

DISSOLVE TO:

INT. SENATE COMMITTEE HEARING ROOM - DAY

The chair of the Senate Banking Committee, ELIZABETH LAWRENCE is opening a hearing. Fed Chair Margaret Melloan has been called to testify.

LAWRENCE  
Thank you for appearing before the  
committee.

Chair Melloan nods politely.

LAWRENCE (CONT'D)  
The committee has asked you here  
to see if you can shed some light  
on how Fed policy is influencing  
corporate behavior.

MELLOAN  
I'm happy to help if I can.

LAWRENCE  
Of course, you know many of us on  
the committee have been concerned  
about the Fed's policy of keeping  
interest at historically low  
levels.

MELLOAN  
As I've testified to previously,  
we believe low interest rates are  
warranted and necessary due to the  
fragile state of the economy. We -  
-

LAWRENCE

(interrupting,  
patronizing)

Yes, I understand Chair Melloan. You are aware, however, that from a global standpoint, particularly with the decision of some central banks to set their rates below zero - negative interest rates - that they have never been this low across pretty much all of civilization. Since the fall of the Roman Empire. Since the end of the Bronze Age. Going back, say, 5000 years. Absolutely unprecedented. What are you hoping to accomplish, other than creating yet another stock market bubble?

MELLOAN

We have increased liquidity in the banking system in order to encourage banks to lend to stimulate business activity.

LAWRENCE

Well, I think that would be fine if corporations were using the money for research and development to create jobs. But the cheap money you're dishing out to banks is being lent to corporations to buy back stock and pay large dividends.

CUT TO:

SERIES OF SHOTS - SAME TIME (Dialog continues as V.O.)

CUT TO:

EXT. CORPORATE JETS (BOMBARDIER, GULFSTREAM, EMBRAER) TAXI  
AND TAKE OFF AT MUNICIPAL AIRPORTS - DAY

CUT TO:

EXT. GATED CEO MANSIONS IN THE HAMPTONS AND BEVERLY PARK -  
DAY

CUT TO:

EXT. CEO YACHTS ON THE OCEAN - DAY

MELLOAN (V.O.)

We don't control how banks lend or  
what their clients do with the  
money.

LAWRENCE (V.O.)

I'm sure it's all in the name of  
maximizing shareholder value. You  
know, I'm really getting tired of  
hearing that phrase. I sometimes  
wonder if CEOs are more interested  
in BUILDING their DREAM HOMES  
rather than BUILDING their  
companies?

SERIES OF SHOTS ENDS

CUT TO:

INT. SENATE COMMITTEE HEARING ROOM - SAME TIME

MELLOAN

Credit expansion is needed to  
stimulate the economy --

LAWRENCE

(interrupting)

I'd certainly feel better about that if corporations weren't paying out more than their earnings on dividends and buybacks. Since corporate buybacks were legalized in 1982, we've essentially legalized stock manipulation.

MELLOAN

I don't really see it that way.

LAWRENCE

No, I suppose NOT. What about the stakeholders beyond stockholders? All of those REGULAR PEOPLE who don't own shares?

MELLOAN

When shareholders benefit, part of the money circulates through the economy.

LAWRENCE

The part that let's rich people buy more toys.

MELLOAN

As you know, we don't have control over how the money gets spent.

LAWRENCE

(sternly)

Well, perhaps Congress can fix that.

CUT TO:

INT. DOWNTOWN BAR IN WASHINGTON, DC - NIGHT

Helen Callaghan and Matt Friedman are seated at a table in a Washington DC bar having drinks.

HELEN

So weird to see you here in Washington.

MATT

Why is that?

HELEN

I just don't see you as a DC person. There's a type.

MATT

True on both counts. No, you're right. I don't like this town.

HELEN

Why not?

MATT

Too many overpaid, self-absorbed lobbyists running around for one thing.

HELEN

And another?

Matt lights a cigarette. He sits back and surveys the room, takes a puff, then exhales.

MATT

Ever been to a party out here? Of course you have. The first part of every conversation is always about what you do. There's a real pecking order.

HELEN

Who's at the top?

MATT

Elected officials. I'm sure you know this. Then political appointees. Career staff are way farther down.

HELEN

Tell me about it.

MATT

See, you DO know.

HELEN

(changing the subject)

So Matt, I was really intrigued with our conversation at your house. What will the jobs of the future look like? Or will we all be replaced by robots and AI.

Matt doesn't speak for a moment, looks down at his lap.

MATT

(still looking down)

I told you that you shouldn't worry about that.

HELEN

Why not?

MATT

No matter how much we automate, there will still be lots of things for people to do.

HELEN

Read and write great literature?  
Become artists?

MATT

Wouldn't that be nice. Yeah, maybe that too.

HELEN

So, new technology will also create new jobs?

MATT

Yes, but not in the way you might think. By 2050, there will probably be ten billion people wandering around on Planet Earth. Can you imagine that? A world with that many people? It will have to be managed very differently.

HELEN

You think people will change?

MATT

Not by choice. But at certain points throughout human history, change becomes inevitable.

HELEN

So what WILL we be doing?

MATT

(gesturing with his arms)  
Frankly, I think we'll be spending a lot of time just trying to maintain basic standards of living. It's going to be not-very-glamorous stuff.

HELEN

What about gene therapy, fusion power or space travel?

MATT

Like I said, maybe in fifty or a hundred years. But frankly other issues are more pressing. And I don't just mean global warming. That's so FASHIONABLE. What about industrial agriculture, where literally tons of unused fertilizer runs off into lakes and rivers, creating dead zones where fish can't live? Nobody talks about other stuff like that now, but they will.

They each sign their own check and get up to walk to the exit.

CUT TO:

EXT. BAR - NIGHT - SAME TIME

Helen and Matt are waiting for separate cabs.



HELEN

Well thanks for the insight. Once again, it's like drinking from a fire hose talking to you. Can't say it was that uplifting.

MATT

I KNOW what you were expecting. Professor Emmett Brown comes back from the future in his DeLorean powered by Mr. Fusion, which uses banana peels, stale beer and aluminum cans as fuel?

HELEN

Yeah, something like that.

MATT

When I was a kid, I used to think that by now we would actually be using fusion power - that we would have given up coal and fossil fuels. We would have colonies on the moon and Mars. We would live to be 150 years old.

HELEN

That sounds really nice.

MATT

(laughs)

Says YOU! Who would want to live on Mars?

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - DAY

Office telephone rings.

JACK

(answers phone)

Hello?

INTERCUT WITH:

INT. ALBUQUERQUE AIRPORT - SAME TIME

Karina Diaz is wearing her Park Service uniform. The airport is crowded. She is walking with a small traveling bag to the security line entrance.

KARINA  
(on a cell phone)  
Dr. McCullough?

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - DAY -  
SAME TIME

JACK  
Yes.

CUT TO:

INT. ALBUQUERQUE AIRPORT - SAME TIME

KARINA  
This is Karina Diaz, National Park  
Service. We met a while back.

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - SAME TIME

JACK  
Chaco Canyon. How could I forget?

CUT TO:

INT. ALBUQUERQUE AIRPORT - SAME TIME

KARINA

Yes, well, I'm flying to Washington right now for a last minute meeting at Park Service Headquarters. Not sure what's going on, but I'm at the airport, and wanted to see if I could meet at your office? Wanted to get your take on something.

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - SAME TIME

Jack listens intently on the phone for several seconds.

CUT TO:

EXT. BUREAU OF ECONOMIC ANALYSIS - LATER THE SAME DAY

Jack meets Diaz outside. They walk into the building.

CUT TO:

INT. BUREAU OF ECONOMIC ANALYSIS, JACK'S OFFICE - DAY

Jack sits on the front of his desk, as Diaz sits down in chair.

KARINA

By the way, I never asked you exactly what you do here.

JACK

National Bureau of Accounts. Who better than an economist to quantify the actual cost of industry externalities?

KARINA

Externalities?

JACK

Full cost accounting for industry processes. As economists, we've had a real tendency to track only the material increases in wealth. But nobody tracks what goes into the trash can.

KARINA

I see.

JACK

Actually, measures of GDP give you a really DISTORTED view of things. It's more a measure of how much we spend. The BP Horizon cleanup was a HUGE BOOST to GDP.

KARINA

(registers surprise)  
That IS messed up.

JACK

We also try to understand how economic and environmental systems are becoming increasingly complex.

KARINA

Why is that important?

JACK

COMPLEX systems start to do weird shit.

KARINA

'Weird shit?' Is that an academic term?

JACK

(smiles briefly)  
People are comfortable with linear systems. Linear thinking. Cause. Effect. That's it. FIRST-ORDER effects ONLY.

KARINA

But complex systems?

Jack stands up and begins walking around the room.

JACK

Their properties change. You start to have SECOND-ORDER effects that are harder to forecast. What's becoming clear is that financial systems and ecosystems are becoming more complex. And they both have three things in common.

KARINA

(her eyes follow Jack walking)  
And those are?

JACK

Number one: they're highly ADAPTIVE, always changing. Like the Borg.

KARINA

The Borg?

JACK

Star Trek. Not important. Number two: they're NETWORKED and they communicate. Lots of interaction, which fuels adaptation. Actually, also like the Borg.

KARINA

I guess I should watch Star Trek.

JACK

I thought everybody DID. Anyway, number three: they're DIVERSE.

KARINA

Like the Borg?

JACK

No. The Borg assimilate all other life forms.

KARINA

(rolls her eyes)

Of course.

(beat)

You said financial markets and ecosystems are similar in some ways. How are they different?

JACK

The timescales are different. Financial markets have SHORT cycles - months or a few years, but no more than ten years before a downturn or crash.

KARINA

What about ecosystems?

JACK

The cycles for ecosystems are MUCH LONGER. After we tap ecosystems, either by harvesting or using them as a sink, it takes time to replenish, recover - usually a decade or longer. Ten years for a pine forest, for example. Sometimes a HUNDRED years or more for significant harvesting or degradation.

KARINA

Interesting stuff.

JACK

Nice of you to say so. Most people don't.

KARINA

Well, I spend most of my time out in the Wild West. Or what used to be the Wild West, I guess.

Diaz stands up and walks over to the window in Jack's office. She looks out at the DC landscape. People walk briskly and drive hurriedly to their next destination or appointment. Life as usual.

KARINA (CONT'D)

So how long does it take for  
financial systems to RECOVER?

JACK

(speaking quickly)

The short financial cycles come  
and go, and so far we've survived  
all of the downturns. Financial  
systems have always been able to  
regenerate themselves, largely  
because they've been able to  
depend on the ready availability  
of free or nearly free natural  
resource and the ecosystem  
services they generate. But what  
if both cycles came to a peak at  
the same time? Followed of course,  
by both systems CRASHING  
SIMULTANEOUSLY.

KARINA

A perfect storm?

JACK

Let's not talk in clichés. Okay,  
yes, a perfect storm.

KARINA

What does the ecosystem collapse  
look like? Floods, drought,  
wildfires, melting ice caps,  
rising sea levels?

JACK

A disaster of biblical  
proportions? Real wrath of God  
stuff? Rivers and seas boiling?  
The dead rising from the grave.  
Human sacrifice. Dogs and cats  
living together. MASS HYSTERIA!

KARINA

Ghostbusters.

JACK

Very good.

KARINA

I DO get out once in a while.

Jack looks down at some papers on his desk and shuffles through them.

JACK

So yeah, maybe. But people have been predicting stuff like that for a while. None of it is really new, and we have mechanisms to deal with most natural disasters.

KARINA

What then?

JACK

Relatively boring shit, like food and water supply shortages. Mostly food.

KARINA

Agriculture?

JACK

Yes. And ranching. Domesticated animals will be at risk.

KARINA

How?

Jack looks at the ceiling before speaking.

JACK

Warmer temperatures are good for germs and parasites. The first victims will be large mammals of all types. Little known fact: worldwide, there are only FIVE commonly domesticated large mammals over 100 pounds. Horses, sheep, pigs cows and goats. It's a short list and they're vulnerable, especially since they're so critical to food supplies in developed countries.



KARINA

What about agriculture?

JACK

Crop yields will start to DECLINE. That will have a cascading effect on domesticated animals - which by the way - consume more than half of the grain grown in the U.S. But wild animals are more vulnerable in fragile ecosystems. So how it plays out is a little uncertain.

KARINA

That's what I wanted to talk to you about. It's why I was called up here to DC. Some of the parks are seeing odds changes.

JACK

Like what?

KARINA

Evidence of local wildlife either dying from disease or being overrun by predators.

JACK

You know, I'm really concerned about how some of these things seem to be coming together. I want show you something.

Jack walks over a projector and turns it on. Images display on the blank wall.

JACK (CONT'D)

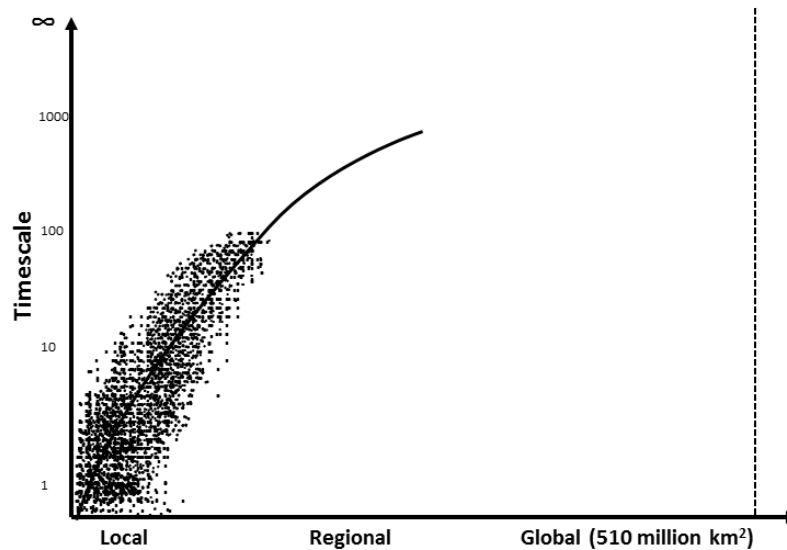
Have a look at these charts.

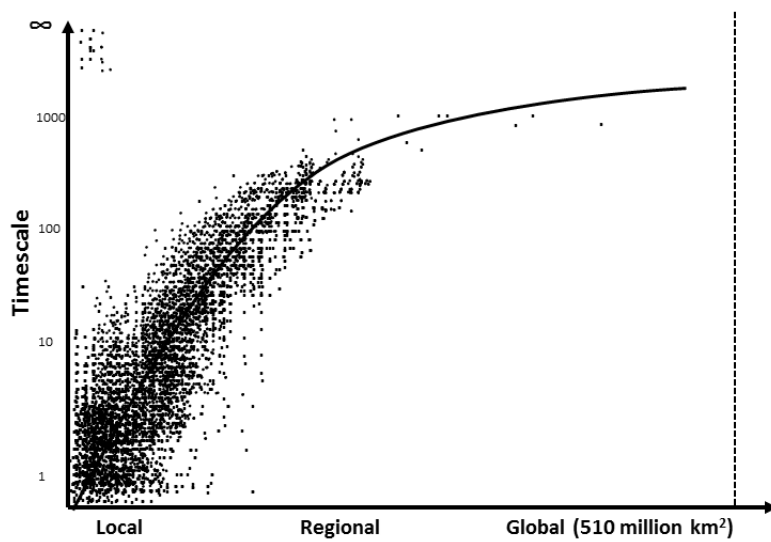
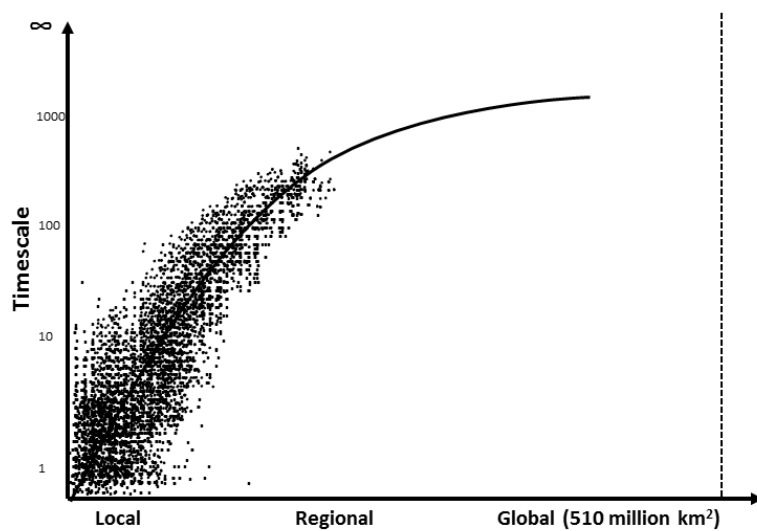
KARINA

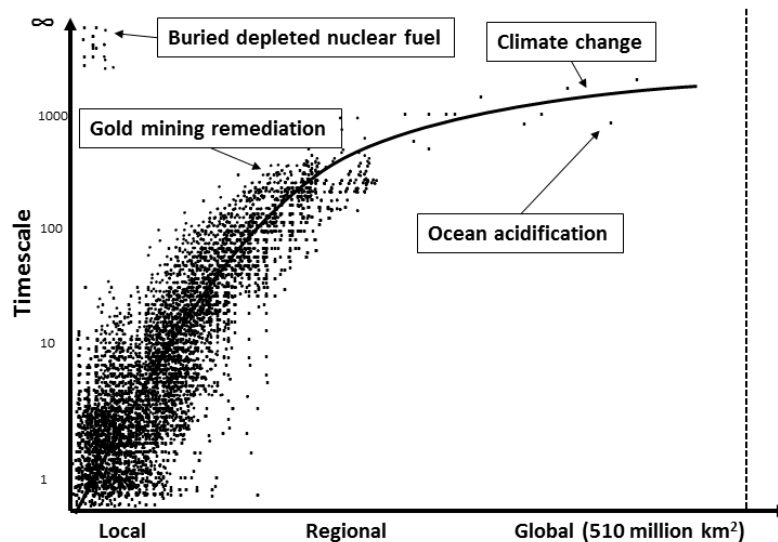
WHERE did you get these?

JACK

The data came from the GAO, my friend, Dr. Callaghan, who is tracking environmental incidents by geography, along with estimates of how long it will take for them to be reabsorbed back into the environment. I started plotting the events in terms of whether they were local, region, or global against the timeframe for remediation. The progressions are estimates from the past few decades, but we continue to try to fill in the picture.







KARINA

So the dots are environmental events?

JACK

That's right. As more data comes in, you can see the pattern emerge over time. But the pattern isn't linear. They start locally, with short remediation periods. Over time, the geography gets larger and remediation takes longer.

KARINA

The worst ones take a thousand years to remediate?

JACK

Pretty depressing, huh?

KARINA

What does it mean? Aside from the fact the environment is about to flatline?

JACK

They're building up to a CRITICAL phase. And it looks like they're starting to INTERACT.

KARINA

So what now?

JACK

You should get to your meeting. I need to pay a visit on a wise man.

CUT TO:

INT. PROCTOR THORNTON'S HOME - DAY

Jack McCullough is admitted to former Federal Reserve Chairman PROCTOR THORNTON's home by a servant. Jack greets Thornton in a living area. Thornton shakes Jack's hand and motions for him to sit down.

JACK

Good to see you, Mr. Chairman

THORNTON

Likewise. But please don't call me that. I'm not the chairman anymore. You know, nobody comes to see me these days. Guess they think I don't have anything interesting left to say. Maybe I never did.

Thornton chuckles. Jack just smiles dimly.

JACK

You seem to have settled into retirement pretty well.

THORNTON

It's not really retirement. I'm on several boards. And another book deal for my memoirs. There's always something to do if you have the energy.

JACK

I suppose you're right.

THORNTON

So, what brings you by?

JACK

I'd like to get your take on Fed policy and where you think the economy is headed as a result. Did you have a chance to look at the entropy model I sent over?

Thornton's expression turns more serious. He pauses before speaking, looks thoughtful.

THORNTON

Yes, I did. Quite some imagination you have, Jack.

JACK

Is it?

Another long pause.

THORNTON

Jack, most of the people at the top - the White House, the Federal Reserve - know what's in the cards long-term. Of course they continue to hope that someone will pull a technological rabbit out of their ass to keep the system afloat.

JACK

Uh huh.

THORNTON

And the ones that haven't figured it out, the ones that are still true believers in neoclassical or neo-Keynesian or whatever economics have too much invested to start fresh.

JACK

Invested?

Thornton is clearly annoyed.

THORNTON

In their CAREERS! In their tortured general equilibrium models. It's the foundation their REPUTATIONS have been built on. Their NOBEL PRIZES. You think they're going happily let you tear that all down? Why do you think nothing really changed after the 2008 crash? Sure, some kids and average Joes protested. But there was too much money still to be made. So the system was tweaked, papered over, and then things pretty much went on as usual.

JACK

But the model I sent you. It demonstrates some pretty fundamental flaws in neoclassical theory. The current financial structure is unstable.

THORNTON

Like I said, the smart investment bankers know it. So do a lot of politicians. Even some of the staff people at the Federal Reserve. But nobody wants the bottom to drop out on their watch. And after all, that's what you're talking about here. A fundamentally restructured economic system. That's called a revolution, by the way.

Both men remain silent, letting the implications sink in.

JACK

Something else I wanted to tell you. I've been offered a senior post at the Fed.

THORNTON

I know.

Jack's expression changes to dumbfounded surprise.

JACK

You what? How?

THORNTON

I still have connections. You should take the job. It's a plum appointment.

JACK

And then what? Keep my mouth shut?

THORNTON

I thought you would be happy about the news. Most people would jump at the opportunity.

Jack is silent.

THORNTON (CONT'D)

You should TAKE the job, Jack.

JACK

I should, shouldn't I?

CUT TO:

EXT. WASHINGTON DC STREET - DAY

Jack walks down the street slowly, thinking. He stops for a moment and looks up. Aside from the usual traffic and crowd noises, there is something else in the background.

Like the dull roar of cheering from a sports stadium in the distance, but more downbeat, ominous. Then it fades out. Jack looks back at the street and continues walking until he reaches the entrance to a television studio. He goes in.

CUT TO:



INT. TELEVISION STUDIO - DAY

Jack is seated across from a POLITICAL CORRESPONDENT for an interview. Introductions and pleasantries have been traded, and the conversation is well underway.

JACK

Our research at the Bureau of Economic Analysis tracks the national accounts for environmental externalities. The intent is to finally link the actual costs of industrial processes in order to fully allocate them. Of course, we're still in the early phases.

CORRESPONDENT

Most corporate cost accountants would say that's already being done.

JACK

You're right, they WOULD say that. But let's take a simple example to show why that's not true. Something we can all relate to. The trash in your home.

CORRESPONDENT

(smiling)

I recycle.

JACK

Sure, a lot of us do. Although believe it or not, some of what you recycle ends up in the landfill anyway.

CORRESPONDENT

No way.

JACK

WAY. But okay, you recycle. That's at least a partial solution.

CORRESPONDENT

Why only partial?

Studio cameras change to close-up on Jack.

JACK

Because until we get to the point where everything we discard returns to the environment in a usable form, we degrade ecosystem services by filling up the environmental sink.

CORRESPONDENT

You also claim that filling up the sink creates an unstable economy as well.

JACK

Yes, that's correct.

CORRESPONDENT

What's your evidence?

Jack is very comfortable, as he is knowledgeable with the subject matter.

JACK

We work with the GAO Spatiotemporal Environmental Analysis group. They actually track and map individual environmental events or incidents.

CORRESPONDENT

What qualifies as an environmental incident?

JACK

Anything from used motor oil dumped in the backyard (that will eventually make its way into the water supply), to big oil spills in the Gulf, to abandoned gold mines - all the way to atmospheric CO2 levels.

CORRESPONDENT

What is spatiotemporal?

JACK

Every environmental event has an impact on space and time. How much of an area is affected - local, regional, global. Also is it just land based? Or does it get into lake and river systems? Or is it atmospheric. That's spatial.

CORRESPONDENT

And temporal?

JACK

How long it takes to remediate. A day, a week, a year or even longer. Gold mining remediation can easily take over a hundred years.

CORRESPONDENT

I see. Complicated.

JACK

Well, it gets worse. There are at least two-hundred thousand abandoned mines in the U.S. alone. Some estimates put the number at nearly half a million.

CORRESPONDENT

But if they're abandoned, what's the issue?

JACK

The by-products - hydrogen cyanide used in gold mining as just one example - get into the soil and water.

CORRESPONDENT

Really?

JACK

Most people don't know that. What's worse - and weird - is that migration of the toxins is increasing over time.

The Correspondent cocks his head skeptically.

CORRESPONDENT

That's weird? Why?

JACK

It's weird because we would normally expect animal and plant populations to be affected - and most ARE. Evidence of their mortality rates is high in some areas. But some species don't appear to be affected.

CORRESPONDENT

Why not?

JACK

Their physiology has adapted. In some cases, their body surfaces become resistant to what would otherwise be lethal substances. Or their bodies learn to store or convert cyanide or other toxin into a harmless form.

CORRESPONDENT

How can they do that?

JACK

These species replicate quickly.  
Their genes mutate. They adapt.

CORRESPONDENT

But you're an economist, right?  
What does this have to do with  
economics?

JACK

We've been tracking the costs of  
environmental events. As the  
toxins from the sites migrate, our  
friends at Spatiotemporal Tracking  
noticed something odd. The sites  
are starting to interact with one  
another, as well as plant and  
animal species.

Correspondent puts his hand on his chin as he contemplates.

CORRESPONDENT

That doesn't sound good.

JACK

What that suggests is the first  
indicators of a systematic  
collapse of large areas that  
provide ecosystem services. As the  
effect spreads, grain harvests may  
be threatened. Fishing stocks will  
decrease. At least with the kinds  
of fish we would want to eat.

CORRESPONDENT

Of course, we've heard these kinds  
of warnings before.

JACK

That's true. What may be different  
this time is that the early  
warning indicators are becoming  
more pronounced. The data are not  
comforting.

CORRESPONDENT

So, what's the upshot?

JACK

The real problem from an economic standpoint is that while we've had financial crises, we have always bounced back pretty well. But as those financial or economic crises continue to migrate from local to region to global, it will get harder to recover. The same problem is now happening with the ecosystem.

Correspondent looks confused, trying to sort out what Jack is saying.

CORRESPONDENT

I don't think I follow you.

JACK

What would happen if an unprecedented ecosystem shock coincided with a cyclical financial shock? Particularly a severe one. In good economic times, we might be able to marshal the necessary resources to respond. But if both systems crash simultaneously...

CORRESPONDENT

Well, at least as far as the economic side, the latest Federal Reserve forecasts for economic growth are positive.

JACK

Seriously? Would you care to discuss the Fed's track record on forecasting the next quarter? The next year?

CORRESPONDENT

Can we roll the tape?

CUT TO:

VIDEO CLIP(S) OF BEN BERNANKE'S FAILED FORECASTS  
PRIOR TO THE 2008 FINANCIAL COLLAPSE.

CUT TO:

INT. TELEVISION STUDIO - SAME TIME

CORRESPONDENT

I'll concede, the Fed has a spotty  
track record at forecasting.

JACK

The follow-on effects could even  
worse.

CORRESPONDENT

How so?

Jack gestures with his hand as he speaks.

JACK

Look at Syria. We think their  
civil war was simply a revolt  
against the Assad regime or  
because of the Arab Spring. But  
the reality is more complicated  
and tied to the environment. The  
event leading up to the 2011  
uprising in Syria was the worst  
drought on record.

Jack pauses for a moment to regard to correspondent.

JACK (CONT'D)

Families were forced to move to cities because they couldn't make a living on their farms. In desperation, they moved to cities where there was no work. What started as an environmental effect - the Syrian drought - escalated into civil war because a lot of unhappy people were bunched together in the same place. The proximate cause was the lack of food, loss of livelihoods and poor governance.

CORRESPONDENT

Okay, but that's just one example.

JACK

Take the Somali pirates. They didn't just one day decide to start ransoming transport tankers in isolation. After its own civil war, foreign fishing fleets were able to illegally operate in Somali waters, decimating the country's fish stocks. Piracy was the logical result.

CORRESPONDENT

So, the environmental effects drove the economics and led to civil war and piracy?

JACK

Evidence from our investigation into the interaction between economics and the environment suggests more trouble in the future. Maybe even GLOBAL WAR. From both an environmental and economic perspective, we are conducting an unprecedented uncontrolled experiment.

The Correspondent stares blankly for several seconds.



DISSOLVE TO:

EXT. HAVEN FOR THE HOMELESS - NIGHT

A young woman, homeless is walking along an urban street. She looks tired. The wind picks up, causing her to lose her balance. She regains composure and continues walking slowly, apparently without a specific destination in mind. Sounds of young men talking loudly and laughing, coming closer. They are dressed in upscale, hip attire. One is white, one black, and one Latino. As they get closer to the woman they slow down.

WHITE MAN  
(to the homeless  
woman)  
Hey good looking!

LATINO MAN  
Pretty lady.

BLACK MAN  
Hey come on, leave her alone.

WHITE MAN  
I just want to talk.

The woman tries to walk around them, but they block her.

LATINO MAN  
Whatcha doing out here?

WOMAN  
Please leave me alone.

WHITE MAN  
Come hang out with us.

LATINO MAN  
Yeah, we have a hotel room.

WOMAN  
No, please.

BLACK MAN  
Where are you going?

The woman tries to force her way through. One of the men grabs her. She starts to struggle and cries out softly. Suddenly the men look up and stop moving.

Several yards away, behind the woman is Helen Callaghan, just standing on the sidewalk staring at them - with a look that would melt copper. The men hesitate, as if about to speak. Several seconds pass as Helen continues to glare silently.

The men remain motionless for a few moments more, then let go of the woman gently and walk away together at a ninety-degree angle (left or right). As the men move down the street, out of sight and out of earshot, the woman turns around. Helen has walked up to her.

HELEN

You alright?

WOMAN

Yes, thanks.

HELEN

Do you have someplace you can go?

CUT TO:

EXT. HAVEN FOR THE HOMELESS - LATER SAME NIGHT

Raj Chandra, director for the Haven for the Homeless and Helen Callaghan walk along a street on the outskirts of an urban center. One side of the street is thick with homeless people leaning against buildings and talking among one another.

HELEN

Raj, HOW do people end up here? I mean REALLY?

CHANDRA

Of course, everyone has a different story. People play the hand they're dealt. Sure, they've made mistakes, but the odds are stacked against them.

HELEN

I'm not sure I really believe that.

CHANDRA

(smiles)

I understand. By the way - been on any corporate jets lately? Beats flying commercial, right?

HELEN

Ha, ha. I'm just an underpaid government employee.

CHANDRA

Okay, seriously. Do you know how stressful it is for people here compared to someone from a middle class life?

HELEN

Tell me.

CHANDRA

Let me give you an example. In fact, you should try this as an experiment. Ask someone coming out of a grocery store what they just bought. They'll remember some of the things, but certainly not all of them.

HELEN

I wouldn't be able to remember everything either.

CHANDRA

Of course not. But ask the same question to one of these folks. They'll be able to tell you what's in their bag down to the last item. Why?

HELEN

Because they had to make choices.

As Helen looks around at the homeless people standing along the street, Chandra puts his finger near Helen's face.

CHANDRA

Exactly. Hard choices. That takes time. It also causes them to expend a lot of mental energy.

HELEN

Not sure I understand.

CHANDRA

It's one reason poor and homeless people have trouble getting ahead, getting a job, or even just getting by. They're burning up so many mental cycles trying to survive day-to-day. It makes it hard for them to focus on much else.

HELEN

(clearly moved)

That's interesting. And sad.

CHANDRA

It is. But really, the whole economic system is out of whack, at the expense of many of these folks. The poor and the middle class aren't even holding their own. And they see how wealthy people live.

HELEN

What's the solution?

Chandra stops walking and turns to Helen.

CHANDRA

Maybe CEOs shouldn't get paid a thousand times more than entry level employees. But our sense of community is being destroyed. Upper classes are insulated. There's no commonality of interests anymore.

HELEN

I guess that explains some of the train wreck politics the last few years.

CHANDRA

It would. With more to come, I imagine. And not just here but lots of places too. I've seen first-hand - remember, I'm not from here.

Chandra resumes walking. Helen walks along side.

HELEN

Des Moines, right?

CHANDRA

(smiles)

Mumbai. Let me ask you a question.

HELEN

Sure.

CHANDRA

What makes a terrorist?

HELEN

(cocking her head in surprise)

Wow, that's a change of subject.

CHANDRA

Not really. Terrorists don't consider themselves terrorists. They would say they are freedom fighters.

HELEN

I wouldn't.

CHANDRA

Of course not. You have a vested interest in the system.

HELEN

Not really. I'm a bit of a rebel.

CHANDRA

(impatiently)

Oh sure you do. Face it, you have a lot to lose if the current economic or political system were turned on its head.

HELEN

Maybe, but what does that have to do with terrorism? Or homelessness.

CHANDRA

A lot. How do you suppose someone ends up as a suicide bomber?

HELEN

I have no idea.

Chandra stops and spreads his hands out in exasperation.

CHANDRA

Come on, you said you're an anthropologist. You can do better than that.

HELEN

What then?

CHANDRA

It's the same as what you see out here. Hopelessness. Desperation. Nobody wakes up one morning and decides to go blow up a marketplace.

HELEN

It's ideology.

Chandra points at Helen, wags his finger at Helen.

CHANDRA

No it's not. Maybe for elites who spent their trust fund studying Karl Marx. But all the heavy lifting is done by volunteers who lost their farms or their families, or both. They want somebody to pay. And they see the extravagant lifestyles that wealthy people have.

HELEN

You believe that?

Chandra pauses for moment and looks at crowd.

CHANDRA

All the while, industrial economies continue to extract as much resource as fast as possible in order for corporations to meet quarterly profit projections. Or so government creates more jobs. Everyone trying to hold onto what they have.

HELEN

It's kind of an old story, isn't it?

CHANDRA

Yes, and it usually ends badly. The more things become unequal, the more people will notice. The poor SCHLUB in the street, with no prospect knows he or she will never have anything like that. So, they figure they have nothing to lose. The reality is that most people want the same things.

Helen appears thoughtful, as if in a daydream.

HELEN

A room of one's own...

CHANDRA

How's that?

HELEN

Just thinking out loud.

DISSOLVE TO:

INT. OFFICE OF THE COUNCIL OF ECONOMIC ADVISORS, WHITE  
HOUSE - DAY

CEA Chair CLARK WARNER and New York Federal Reserve  
Governor and Fed Vice Chairman John Disch are seated across  
from each other in the Chairman's office. There is coffee  
on the table between them. The two men are conversing  
casually, sipping coffee from embossed fine china.

WARNER

How's the family?

DISCH

Good, thanks for asking Clark. How  
are things with you?

WARNER

No complaints. Just trying to  
muddle through, as always.

DISCH

Have you seen McCullough on the  
media circuit?

Warner leans back on the couch and crosses his legs. He  
waits a moment to respond.

WARNER

Yes, interesting fellow. Some  
pretty wild theories.

DISCH

That's one way to put it.

WARNER

I guess he's not taking the job  
you offered, is he?



DISCH

No, and that's a problem. Usually we can bring people in line by giving them a post any economist would be glad to get.

WARNER

But not McCullough?

DISCH

It would seem not.

WARNER

So, what's the Fed going to do about it?

Disch pauses for a moment, choosing his words carefully.

DISCH

Well, his departmental function in environmental accounts is new. Really just in the early data gathering stages. More or less unproven - including his bizarre theory. But it's not a Fed function.

WARNER

Okay, so?

DISCH

It's no secret that the President is looking for ways to reduce the federal budget - at least in unpopular areas. NSF. NIH. EPA. There are other areas that could be cut.

WARNER

Indeed, the President's focus is on increasing employment. We've all heard it. Jobs, jobs, jobs - that's the mantra.

DISCH

National accounting doesn't create jobs. It kills them.

Warner leans forward, clearly more engaged in the conversation now.

WARNER

(excited)

That's a good point. Besides, they're the new kids on the block. Nobody at the BEA and GAO likes them anyway.

DISCH

This sort of budget saving measure should help your stock go up with the President I would think.

Warner smiles warmly.

CUT TO:

INT. WHITE HOUSE CABINET ROOM - DAY

The President has called a special meeting of economic advisors, including the Chair of the Council of Economic Advisors Chair Warner.

PRESIDENT

Did you see what that asshole, McCullough is saying? I just saw him on CNN again. More fucking doom and gloom from another fucking economist.

President looks around the room, filled mostly with economists.

PRESIDENT (CONT'D)

Present company excepted, of course.

Genial laughter.

ECONOMIST 1

Mr. President, it's just one opinion.

PRESIDENT

Yeah, but have you seen the ratings this guy is pulling? I mean some people actually believe what he's saying.

ECONOMIST 2

Drivel.

ECONOMIST 3

Pure dreck.

Murmurs of agreement all around.

WARNER

Mr. President, although he does work in an official government capacity, there's no conflict of interest. I may have a solution.

PRESIDENT

Conflict of interest? For what?

WARNER

The point is that it's NOT an ENFORCEMENT agency. They just develop data. Many of us believe that this newly created department of national environmental accounts is really unnecessary.

PRESIDENT

Sounds like it to me. Certainly NOT CREATING JOBS.

WARNER

Excellent point, sir.

PRESIDENT

You know, I promised fiscal responsibility. We'll take all the savings we can get. Let's remove that department from the proposed budget. Also, what about that spatio-WHATEVER department?

WARNER

Spatiotemporal Environmental Tracking. It's also a relative new function in the Bureau of Economic Analysis.

PRESIDENT

Yeah, that one too. They are both holdovers from the previous administration. No great loss.

Murmurs of assent.

PRESIDENT

Okay, good. I guess that's it.

President motions to a female aide, who is standing against the wall. She comes forward to within earshot of the President.

PRESIDENT

When is my tee time?

CUT TO:

INT. JACK MCCULLOUGH'S APARTMENT - NIGHT

Jack is sitting on the couch in his apartment, drinking beer, watching television wearing a t-shirt and boxers. There is a knock on the door.

JACK

(shouting)

The door's open.

Helen walks in, looks around uncertainly. Not many lights are on. She continues forward through the apartment.

HELEN

Jack? Where are you? What are you doing?

JACK  
Watching the end of the world on  
TV.

HELEN  
In your underwear?

JACK  
Hey, I'm an economist WITH  
PERSONALITY. Look.

JACK (CONT'D)  
(points to  
television)  
Maybe the revolution  
WILL be televised after  
all.

HELEN  
Don't let this get you down. The  
accusations don't have any basis.

JACK  
Have you seen the talking heads?  
I'm Mr. LOONEY TOONEY.

HELEN  
Bates Clark Medal winner. One of  
the youngest inductees into the  
National Academy of Sciences...

Jack takes a sip of beer and changes position, looking away  
from Helen.

JACK  
Don't forget 'quack.' 'Fraud.'

HELEN  
(angrily)  
Pity party! Oh that's fucking  
great. Just remember, my  
department is on the chopping  
block too. While you're wallowing  
in your own juices, let me share  
something with you.

JACK

What's that?

HELEN

You know those contaminated sites  
we've been tracking?

JACK

(smiles)

It's what you DO.

HELEN

Well, we noticed something odd.  
The interns sending us data said  
that around the contaminated  
sites, the mix of animal and plant  
populations are changing. Some  
species are literally overrunning  
others.

JACK

In what way?

HELEN

For plants, the CANARIES are  
disappearing.

Jack turns to Helen, fully attentive.

JACK

What do you mean by canaries?

HELEN

SLOWLY replicating, WEAKLY  
competitive species. They're being  
displaced.

JACK

What's displacing them?

HELEN

At first, it was KEYSTONES.

JACK

Keystones?

HELEN

Slowly replicating BUT STRONGLY competitive species.

JACK

You said 'at first.'

HELEN

That's right.

Jack is very interested now, responding quickly with additional questions.

JACK

What's happening now?

HELEN

Basically the weeds are taking over. WEAKLY competitive BUT FAST REPLICATING. Both plants and animals. Both VERY fast.

JACK

Animal species too?

HELEN

Yep. Pretty much the same patterns as vegetation.

JACK

So, it seems that biodiversity may matter after all.

HELEN

Yeah, well we kind of already KNEW that. But now it looks like we may end up with a short list of highly adaptive - and perhaps not all that attractive species - and maybe not much else.

Jack pauses for a moment to take this in. Then he begins speaking more contemplatively.

JACK

Specifically, which species WOULD survive?

HELEN

(glib and angry)

Oh, I don't know. Rats, sharks, skunks, cockroaches, jackrabbits, crows, tardigrades. And some humans, of course.

JACK

TARDIGRADES? What the hell are those?

HELEN

Highly resilient, microscopic creatures. They can survive a thousand times more radiation than humans. They can even live in outer space.

JACK

Seriously?

Jack stands up and start pacing, but says nothing.

HELEN

(sullen, contemplative)

Maybe it's what we're coming to.

Jack stops pacing and looks at Helen, but still doesn't speak.

HELEN (CONT'D)

Jack, why did you become an economist? And then give it up to become an ecological economist?

Several moments of silence, then Jack finally speaks.

JACK

I didn't really look at it like giving up being an economist. I just wanted to improve the quality of the science.

HELEN

Why?



Jack looks out the window even though it's dark and he can't see anything outside.

JACK

When I was a kid, I spent a lot of time at my grandmother's house in New Iberia, Louisiana. I used to go into downtown New Iberia a lot, which was within walking distance of her house. Watched a lot of movies at the Essanee Theater.

HELEN

Sounds nice.

JACK

It was. Was a lot of fun. But when I would walk back to Mom's house, I noticed that there were two other nice, large theaters that had been closed down since before I was born.

HELEN

A lot of old theaters closed down as small towns lost population.

JACK

Yes, but in New Iberia, the population hadn't changed over the years. In fact the town had grown. So I wondered why New Iberia used to have three operating movie theaters, but later only had one.

HELEN

Did you figure it out?

Jack demeanor is more animated, as he recalls his childhood. He is talking to himself as much as he is to Helen.

JACK

I DID. My uncles and aunts owned a drugstore downtown. They told me that in the 1930s and 1940s people used to go to the movies at least once a week, sometimes two or three times a week. The movie theaters were air conditioned - most of the houses weren't yet. Did you know each Hollywood studio would crank out a new movie every week? Like a factory. Some great films, though. Plus the theaters would show newsreels. And there weren't any television sets - only radios back then.

HELEN

So the town could support three movie theatres?

Jack looks back at Helen, neither smiling or frowning.

JACK

That's right. Of course, after everyone bought TVs and home air conditioning, people stopped going to the movies. Hollywood had a rough time in the 50s.

HELEN

So that's why you became an economist?

JACK

Actually, it had more to do with your field - anthropology.

HELEN

(taken aback, surprised)  
How's that?

Jack sits back down on the couch, motioning Helen to do the same, which she does.

JACK

Well, before home air conditioning and television sets, people would see their neighbors downtown. They would sit out on their front porches across from each other and talk because it was so hot indoors. Nobody wanted to go in until later in the evening. Remember, this is South Louisiana we're talking about.

HELEN

(edges closers to Jack)  
No wonder you like the heat!

JACK

(smiles)  
Adaptation by my forebears, though I guess life AFTER home air-conditioning seemed better.

Jack starts to put his arm around Helen, then thinks better of it and reaches for his beer instead.

JACK (CONT'D)

But a real sense of community was lost. After that technological transition, no one sat outside much. And cars made walking mostly unnecessary.

HELEN

(seductively)  
I see.

JACK

So, I thought about what had been lost. I thought about how sustainable the new order of things was. I've always been interested in the TRANSITIONS.

HELEN

I think we're in the middle of one  
now.

Jack's demeanor suddenly changes to a sense of urgency. He  
stands up quickly and starts to get dressed.

HELEN

(surprised, disoriented)  
Jack, what are you doing?

JACK

Gotta go.

CUT TO:

EXT. HELICOPTER SHOTS OVER THE NEW MEXICO DESSERT NEAR  
CHACO CANYON - DAY

Inside the helicopter with Jack and Diaz looking down on a  
desert landscape. They don't see anything at first. Then as  
they look closer, a herd of large rats in the distance  
covers portions of the hilly ground.

KARINA

(pointing down)  
There, do you see that?

JACK

No.

KARINA

Just above that ridge

JACK

Okay, yeah. Now I see it.

KARINA

There are movements like that all  
over the park.

JACK

Not good.

KARINA

No, it's not

JACK

How long has this been going on?

KARINA

We're not sure. But the swarms are getting bigger and more numerous. It's like they've gone crazy, eating anything in sight.

JACK

I've got to get back to the office.

Diaz signals to the pilot. The helicopter turns sharply and heads back to the landing pad.

CUT TO:

SERIES OF SHOTS

EXT. EAST HAMPTON BEACH, N.Y. - DAY

Swimmers on vacation, splashing in the water. Schools of sharks start agitating the water, coming closer to shore. Suddenly, the swimmers start screaming, running out of the water. Some fall down while still in the water and are dragged back out to sea by the sharks. After the trashing stops, the water is calm. People continue screaming.

DISSOLVE TO:

EXT. SUBURBAN LANDSCAPE - DAY

A blue jay is perched on a tree branch. Without warning, a crow flies in from off screen and attacks the blue jay, tearing it apart with its claws, then dismembering and eating it. Other crows circle, rattling and cawing as they search for other prey.

CUT TO:

EXT. URBAN LANDSCAPE, WASHINGTON, DC - DUSK

Helen is walking back to her DC apartment. She hears a sound in the distance, like a muffled hum. She stops and looks around, trying to figure out what it is. Suddenly a swarm of insects comes around the corner of a building. At first, she can't tell what kind of bugs they are. Then she realizes that they are flying cockroaches. They swirl around her and get caught in her hair as she waves her arms wildly while running inside her apartment building.

DISSOLVE TO:

DAYS LATER

INT. JACK'S OFFICE - DAY.

Jack is sitting behind his desk, disheveled, drowsy. He is on the phone as Helen walks in.

JACK  
(into the  
telephone)  
No, you don't understand. This is  
happening NOW.

Jack listens to the person on the other end of the phone.

JACK (CONT'D)  
No, it can't wait.

Listens again.

JACK (CONT'D)  
Yes, I know your plate's full  
but...no wait. Please don't hang up.  
Just...

JACK  
(to Helen)  
He fucking hung up on me.

HELEN  
Jack, you look like shit.

JACK

Thanks. Of course, you look good  
as always.

HELEN

So, how are things going?

JACK

Not good. Nobody wants to hear  
this.

HELEN

I know. Everyone is pretending  
that nothing's happening. That the  
events were an anomaly.

JACK

(smiles)

Oh sure. How about them flying  
cockroaches.

HELEN

Ew, gross! Don't remind me.

JACK

(more serious)

I don't know what to try next.  
I've talking to everybody I know.

HELEN

Maybe we should try someone you  
don't know.

CUT TO:

EXT. WHITE HOUSE, WASHINGTON, DC - DAY

CUT TO:

INT. WHITE HOUSE, CHIEF OF STAFF ANTEROOM - DAY

Richard, Helen and Jack are standing, waiting.

JACK

Richard, I really appreciate you getting this appointment for us.

RICHARD

Wasn't easy. I had to call in some favors. I just hope this goes well.

The President's chief of staff, Dale Lonergan opens his door and steps out.

DALE

Hi, Richard.

RICHARD

Dale. This is Dr. McCullough and Dr. Callaghan.

They shake hands.

DALE

Nice to meet you. Come in.

INT. WHITE HOUSE CHIEF OF STAFF'S OFFICE - SAME TIME

Everyone sits down, except Richard. Dale sits with the group, not at his desk. He looks at them expectantly.

RICHARD

Jack, it's your show. I've got to run.

Richard turns to leave, closes the door behind him.

JACK

Okay, thanks Richard. Mr. Lonergan, thank you for seeing us.

DALE

(nods impatiently)  
Dale.



Jack realizes his time is limited, has to get to the point.

JACK

Thanks. Dale, these environmental anomalies - they're NOT anomalies. We're bumping up against inherent environmental limitations. It was bound to happen sooner or later. They will start affecting the economy soon.

DALE

I get that, and we know we could see a downturn in the economy. It's on our radar. It's a concern. But, you know, farming only contributes one percent to GDP. Food and related industries combined are only five to six percent. They're just not significant chunks of the economy. Besides, things have settled back down.

JACK

Maybe you would like to try to run the economy without the agricultural sector? Who needs to eat, right?

Dale does a slow burn.

JACK (CONT'D)

The lull in the so-called anomalies is only temporary. After that, you'll see a lot more than a slight downturn.

DALE

(motioning with his  
hands saying to  
hurry up)  
You had something to tell me?

JACK

Dale, the problem with long range forecasts is that they are usually way too aggressive. It's not that they're wrong. They just forecast TOO FAR AHEAD. So after a while, nobody believes them anymore.

DALE

(unconvinced)

Ah huh.

JACK

Ecosystems are intertwined. And financial systems not only depend on those physical systems - they're becoming part of the mix. The impacts are going global. Not just air, not just climate, but land and water systems too. This has been occurring in locations in the developing world for years, but now it's happening here. As the ecosystems collapse, they will take the markets and their neoclassical underpinnings down with them.

Jack edges forward on the couch, trying to paint a picture with his hands.

JACK (CONT'D)

The financial sector is just a subcomponent of the larger system.

DALE

That's YOUR opinion. I can turn on CNBC and ten other different ones.

JACK

Look at it like this. It's the difference between Newtonian physics and modern physics. Time, space, energy, matter - Einstein showed they all interact. Economic systems and ecosystems have the same properties.

DALE

(angrily)

Jesus, you're starting to sound like Carl FUCKING Sagan. What do you want me to do Jack?

JACK

TELL the President. Give him some advance warning.

DALE

(laughs derisively)

There is NO WAY I'm putting this shit in front of the President. NO FUCKING WAY. I've seen you on TV, Jack. So has the President. He wasn't impressed.

JACK

You're making a mistake.

DALE

Yeah, we'll see. Call me after the Apocalypse.

Dale stands up and walks to his desk, presses the intercom button. Helen is clearly uncomfortable.

DALE (CONT'D)

(very loudly, into  
the intercom)

Grace!

DALE (CONT'D)

(to Jack and Helen  
harshly)

We're done.

DALE (CONT'D)

(to Grace, polite,  
but pointed)

Grace, please show these folks out.

CUT TO:

EXT. DC, WHITE HOUSE IN THE BACKGROUND - DAY

Jack and Helen are walking away from the White House, talking.

HELEN

Did you really expect to get a meeting with the President?

JACK

Not really. But I had to try.

HELEN

I suppose people will only respond after a crisis has occurred.

JACK

I guess we'll see.

Voice from off camera.

CARTER (O.S.)

Dr. McCullough.

Jack and Helen turn in the direction of the voice.

JACK

Hello Agent Carter. GEEZ, that sounds funny.

CARTER

I know. I get that all the time. SO, it looks like you've made some progress on your empirical research?

JACK

We have. Not that anyone cares.

CARTER

Mind if we have a look?

JACK

Six months ago, I would have told you to piss off.

Carter's face is stoic but not angry, as he takes a moment before speaking.

CARTER

Six months ago, I thought you more or less DID.

JACK

(penitently)

Yeah, sorry about that. Give me your card - I'll email the summaries to you. Maybe you can put them to some use.

DISSOLVE TO:

MANY DAYS LATER

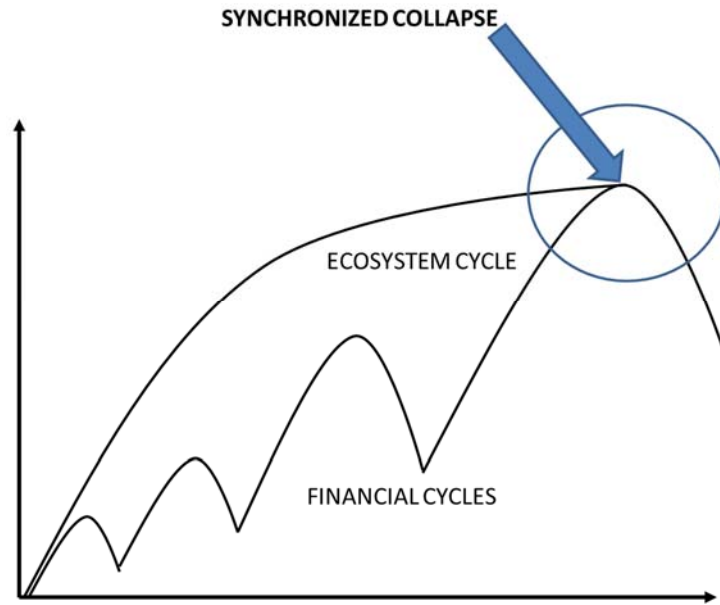
INT. TRADING FLOOR - DAY

Traders are panicking as all major indexes are fall. Dow hits 6000. The environmental collapse is coinciding with the most recent financial system collapse. Global stock exchanges go into full free fall.

DISSOLVE TO:

EXT. LARGE BANK BUILDING(S) - DAY

Depositors line up outside banks to try to get their money. Full-blown run on the banks in the U.S. and other developed countries (e.g. Europe, Japan).



DISSOLVE TO:

INT. GROCERY SUPERSTORE - DAY

Long, slow moving lines in front of checkout stations. Carts are overflowing with bottled water and non-perishable food - whatever is still available to buy. People are agitated, complaining. Some pushing and shoving.

DISSOLVE TO:

INT. LARGE CONFERENCE ROOM, FEDERAL RESERVE BUILDING,  
WASHINGTON, DC - DAY

Emergency FOMC meeting in response to falling stock markets. There is a much greater urgency to this meeting. The group enters as previously, with Melloan in the lead, but not so confident as before. FOMC members are talking among themselves in whispers.

MELLOAN

Okay, what the hell is going on?

FED GOVERNOR I

Financial markets are in free fall.

MELLOAN

(turns to speaker  
in deadpan; not  
happy)

Yes, I DID notice that. What I want to know is what the FUCK are WE going to DO about it?

FED GOVERNOR II

We've got to inject liquidity into the banking system.

MELLOAN

Oh, great, AGAIN? What other options do we have?

FED GOVERNOR III

Interest rates have been lowered to zero. We COULD implement negative rates. It would get people to stop saving and start spending.

DISCH

THAT won't work.

Everyone stops talking and turns to listen to Disch.

MELLOAN

Why not?

DISCH

If you take interest rates negative, we can control corporations and the banks, that's no problem. The banks are under our authority and corporations can't convert their deposits to cash. The sums are too large. But individual depositors will start taking their money out. In fact, they're already doing that. Negative rates would just make it worse. People won't pay banks to hold their money.

Disch pauses and looks around the room. All eyes are focused on him. He continues.

DISCH (CONT'D)

They will buy safes or dig holes in the back yard or stuff cash into mattresses. And there will be an all-out run on the banks.

MELLOAN

(winces)

Ugh!

DISCH

If you close the banks or limit cash withdrawals, the price of gold will spike. If you try to cap the price of gold by making owning it illegal again, you'll have to restrict access to safe deposit boxes in banks so that people can't retrieve their gold and use it as currency.

FED GOVERNOR I

One restriction leads to another.



DISCH

That's right. It becomes a giant game of whack-a-mole. The only way negative rates work is to freeze the whole system. The President would have to declare martial law, at least for a while. He may do that anyway.

MELLOAN

Other ideas?

The room is silent.

MELLOAN

Okay, let's start buying bonds to inject some cash into the system and create liquidity.

FED GOVERNOR III

QE Next?

MELLOAN

I don't give a shit if you call it QE Infinity! Or QE Infinity plus one. Start buying up to FIVE TRILLION...

There is an audible gasp around the room.

FED GOVERNOR II

We already have nearly FIVE TRILLION the balance sheet now!

MELLOAN

Start buying, even if it means below investment grade.

FED GOVERNOR II

(incredulously)

Junk bonds?

MELLOAN

Whatever it takes, just FUCKING DO it!

CUT TO:

INT. HELEN'S APARTMENT BUILDING - DAY

Helen looks out the window of her apartment. The streets have become increasingly empty. After a while, small groups of looters can be seen. She turns on the television. All of the stations are broadcasting news of the increasing levels of social unrest and disorder.

CUT TO:

EXT. URBAN STREET, DC AREA - DAY

Jack is driving in his Hummer. His cell phone rings and he answers.

JACK

This is Jack.

HELEN

(muffled, on phone)

Jack?

JACK

Helen?

HELEN

Jack, have you seen the news? This whole town has gone crazy.

JACK

Not just here. We need to get out for a while.

HELEN

Well, unfortunately, my car has been stolen. Can you get here?

JACK

Working on that now.

Through the phone receiver, Jack hears a LOUD THUD. Then a CRASH.

JACK

What was that?

HELEN

Jack, I think people are trying to get in.

JACK

Be there soon. Hold on.

Jack hangs up his cell phone and start driving FASTER.

CUT TO:

INT. HELEN'S APARTMENT - DAY

Helen's apartment has been broken into. A man and a woman are sifting through drawers and cabinets. Helen is hiding.

She keeps low as she tries to sneak by the woman; the man is off screen somewhere. Helen gets by the woman and is nearly to the open front door when the man grabs her from behind.

As Helen struggles, she reaches down and removes a stun gun from her pocket. She jams it into the man's side. He falls to the ground, shaking uncontrollably.

Helen starts to run to the open door, but the woman appears, runs after Helen and grabs her hair, pulling her back. Helen spins around and the two struggle. The woman intruder is screeching as she wrestles.

Helen is being pulled closer. As they are face to face, eye to eye, struggling tensely, Helen cocks her head back slowly, as if she is starting to tire out, and then swiftly, without warning drives her forehead forward, VERY FORCEFULLY, into the woman's nose (head butt).

The woman drops to the ground, her nose bleeding as she curses, then falls unconscious. As Helen runs out, other looters see her and give chase.

CUT TO:

EXT. URBAN DC STREET - SAME TIME

Jack is driving frantically, swerving around debris in the street trying to reach Helen.

CUT TO:

EXT. OUTSIDE HELEN'S APARTMENT BUILDING, TRASH SWIRLING IN THE STREET - SEVERAL MINUTES LATER

Helen runs out her apartment building, chased by a mob of mostly men, but some women. Jack sees her through the windshield of his Hummer and accelerates. After Helen passes in front of his vehicle, Jack hits the first two people leading the mob (a man and woman, both of them grimy and dirty, like homeless people). The two people BOUNCE off and ahead of the Hummer as it brakes to a quick stop. The rest of the mob stops and then backs up slightly, their eyes on the Hummer.

Helen looks at Jack through the passenger side window, her mouth open, eyes wide in disbelief. The man and woman who were hit by the vehicle start to move, and slowly try to get up. The mob of looters sees this, and regains their courage. They start to approach the Hummer. Jack rolls down his window and smiles. The crowd continues to approach. Jack then displays a .45 automatic (or Glock 9mm). The crowd stops moving, many surprised faces.

JACK

(to the crowd)

What are you? Fucking zombies?

JACK (CONT'D)  
(then to Helen,  
through the glass,  
speaking loudly)  
You coming?

Helen unfreezes and quickly gets into the vehicle.

HELEN  
(pointing to the  
two people hit by  
the Hummer)  
Weren't you afraid you would kill  
them?

JACK  
Not really.

Jack then rolls up his window and as if to make a point,  
very slowly drives around the injured man and woman, as  
they get to their feet gingerly, clearly shaken up.

Jack drives the Hummer down the street before turning at  
the next corner. As Jack and Helen drive away, the mob  
turns slowly, more or less in unison to watch. Buildings on  
both sides of the street frame the scene.

DISSOLVE TO:

EXT. EMPTY HIGHWAY OUTSIDE OF WASHINGTON, DC - DAY

Jack stops the Hummer and turns the off the ignition. He  
looks over at Helen with relief. She smiles. They both get  
out of the vehicle.

HELEN  
So, Dr. McCullough. What do we do  
now?

JACK

Well, in my experience, people go insane as a mob. But they only recover their senses as individuals. One person at a time. So it'll be best if we wait things out away from the city for a while.

HELEN

I like the idea, but we need to go shopping for supplies.

JACK

Got that covered.

Jack walks to the back of the vehicle and opens the rear hatch. The vehicle is loaded with food and supplies. Helen is surprised, impressed.

JACK

What good is being able to see the future if you can't use it to your advantage?

HELEN

I take back all the bad things I've said about you.

JACK

(in mock horror)  
Like what?

The two get back into the Hummer and continue driving.

DISSOLVE TO:

INT. INSIDE THE WHITE HOUSE - DAY

Chair Melloan enters the oval office confidently. She takes a seat in front of the President, who is behind his desk. Senator Lawrence is off to the side, standing.

PRESIDENT

You bought up another FIVE trillion dollars in bond debt? A lot of it is pure SHIT. To say it was junk would be kind. We now have what, TEN TRILLION dollars on the Fed balance sheet now? Jesus! And Congress went on an emergency spending spree to try to keep the economy from collapsing - not like they needed an excuse to start spending again.

The President shakes his head in disgust. He starts to get to up, but then retakes his seat.

PRESIDENT (CONT'D)

So thanks to your brilliance, it's gonna take, what, a decade for the Fed to clear its balance sheet? In the meantime, the value of the dollar will sink like a rock. All in the name of supposedly rescuing the economy. You know, you really FUCKED THINGS UP!

MELLOAN

(suddenly nervous,  
looks around)

Mr. President, the decisions that were made reflect the vote of the entire Open Market Committee - the Federal Reserve Governors and voting regional bank presidents. We...

PRESIDENT

(interrupts)

Chair Melloan, you and I both know that the committee defers way too much to your judgment. The same as they've done with your predecessors. And as far as I'm concerned, the whole lot of you have made some really shitty decisions.

MELLOAN

I --

PRESIDENT

(interrupting)

As a result, I have decided to dispense with your services.

MELLOAN

My term is for four years. It's not yet up.

PRESIDENT

Oh yes it is. In fact, I've already decided on your successor.

MELLOAN

You what? You can't do that.

PRESIDENT

Sue me. I would charge you with gross negligence, if I could. Unfortunately, the Justice Department says it can't do that. There's no law against gross incompetence, I guess. Good afternoon, Ms. Melloan. You're back in the private sector - or academia, if they'll still have you.

With a look of both uncertainty and anger, Melloan remains seated and stares furiously back at the President for several seconds.



CUT TO:

EXT. CHACO CANYON NATIONAL PARK - CHETRO KETL RUIN - DAY

Jack is examining an artifact on the ground. He hears footsteps, looks up and sees Richard Thrasher, dressed in a dark suit, clearly out of place in the desert.

JACK

So, you've been appointed Fed  
Chair? A controversial move,  
considering your reputation.

RICHARD

These are EXTRAORDINARY times.

Jack smiles and then resumes sorting through artifacts as he speaks.

JACK

(looking down at  
the ground)

You know the Hopis and Zunis that  
still live around in these parts  
are descendants of the Anasazi.  
They can scarcely believe American  
profligacy.

JACK (CONT'D)

(looks up and out  
at the landscape)

The tribes were here long before  
Columbus arrived, and they say  
they'll still be here long after  
we're gone.

RICHARD

They may be right, though I'd like  
to try to prove them wrong. At  
least on my watch.

JACK

You always WERE ambitious.

RICHARD

Jack, you did a good job. You were right. No one else saw this coming.

JACK

You stuck your neck out too. I was impressed.

Jack pauses for a moment, then smiles.

JACK (CONT'D)

By the way, did I ever tell you that I LOVE mutual admiration societies?

RICHARD

(smiling)

Speaking of that, the president is impressed as well. The NSA briefed him last week. Agent Carter, do you know him?

JACK

I do indeed.

RICHARD

Sounds like a comic book character to me.

JACK

Does, doesn't it.

RICHARD

Anyway, the President has had a change of heart. In fact, he has nominated you as vice-chair of the Federal Reserve. I agree with his decision. We're going to set up a new department inside the Fed with a nearly unlimited budget.

JACK

(laughs)

That reminds me of a funny story.

RICHARD

Another Hollywood anecdote? Jack,  
I think you watch too many movies.

JACK

After the huge success of 'The  
French Connection,' director  
William Friedkin was brought on  
board to direct 'The Exorcist.'  
Lore has it that he was given an  
unlimited budget to make the film,  
which he promptly exceeded in the  
first week.

RICHARD

You'll have to work overtime to  
exceed this budget.

JACK

(smiling)

Now that's a challenge I can step  
up to.

RICHARD

Good, because going forward we're  
going to need full life cycle  
accounting for all industry  
sectors. Overdue, I know, but  
better late than never. We're  
going to see if we dig our way out  
of this mess and be a little more  
systematic next time.

JACK

Ain't gonna be easy. May not even  
be possible. You sure you want to  
do this? I'll probably just make  
trouble.

RICHARD

(smiles)

What a surprise. Actually I'm  
counting on it.

Helen Callaghan emerges from off screen, from inside one of  
the ruins.

HELEN

Hello, Richard.

RICHARD

(acknowledging with  
a nod)

Helen.

HELEN

I'm afraid we're a package deal  
these days.

Richard looks at Jack, who nods in agreement.

RICHARD

(smiles again)

Oh yeah. This WILL be trouble.

FADE OUT:

THE END