Hobbit Conversation
on Earth's Reboot
and a Critical Path

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Bilbo Baggins is talking to Thorin about the possibility of a collapsed AMOC. Thorin has never heard of the AMOC and Bilbo needs to provide him with details before they can start their talk.

“I've never heard of the AMOC,” said Thorin.

“That's because the information is somewhat hard to obtain,” said Bilbo. “The AMOC is related to climate change and Greenpeace\(^1\) discovered 84 organizations accepting money from the Koch brothers who asked them to become climate change deniers.”

“That's a large number,” said Thorin.

“The story about the Koch brothers is told in a documentary\(^2\) called *The Doubt Machine: Inside the Koch Brothers' War on Climate Science*,” said Bilbo. “Part of the documentary is on YouTube, but it's not finished.”

“So it's a cover up,” said Thorin.

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\(^2\) *The Doubt Machine: Inside the Koch Brothers' War on Climate Science*, [https://www.youtube.com/watch?v=8cIEp_JiMPA](https://www.youtube.com/watch?v=8cIEp_JiMPA)
“When you watch the unfinished documentary, you'll understand,” said Bilbo. The filmmakers mentioned the Koch family's oil business, but they did not mention that they own the third largest synthetic fertilizer company.

“Synthetic fertilizer?” asked Thorin.

“For the climate change problem to stop, all synthetic fertilizer needs to be banned,” said Bilbo. “It's another by-product of oil besides fuel and plastic. When I dowse, the numbers for contribution toward climate change are 50%, 40% and 10%.”

“Synthetic fertilizer, carbon-based fuel and plastic?” asked Thorin.

“Yes,” said Bilbo.

“You still have not explained the AMOC,” said Thorin.

“AMOC stands for Atlantic Meridional Overturning Circulation,” said Bilbo. A writer named Rachel Becker wrote a very clear article titled, "Climate change may shut down a current that keeps the North Atlantic warm."

“Is that the AMOC?” asked Thorin.

“Yes,” said Bilbo. “There are recent scientific studies that show the AMOC collapsing in climate models. Dr. Wei Liu's 2017 study at Yale University’s Department of Geology and Geophysics is an example.”

“If the AMOC collapses, won't that mean colder weather?” asked Thorin.

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“Yes,” said Bilbo. “I did not understand it entirely until I was looking at the latitude of Rome, Italy. Rome is located at 41.9028° N, 12.4964° E and it rarely snows. Baltimore, Maryland is at latitude 39.2904° N, 76.6122° W and averages 19 inches of snow. In February 2010, the snow in Baltimore was so severe, the media called it ‘snowmageddon.’”

“London and Paris don't seem to get very much snow,” said Thorin.

“That's because the AMOC keeps Europe warm,” said Bilbo. “London is at latitude 51.5074° N, 0.1278° W and Quebec is at 52.9399° N, 73.5491° W. Quebec is bitter cold and gets about 138 inches of snow.”

“Why is the AMOC unstable?” asked Thorin.

“It's due to melting polar ice that is changing the salinity in the ocean,” said Bilbo. “The polar ice is made of freshwater and the ocean is salty. The AMOC's action is dependent on salty water that sinks. Rachel Becker has a very clear explanation in her article. She says,

The AMOC is like a conveyer belt that brings warm water from the tropics to the the cooler reaches of the North Atlantic. There, the water loses its heat to the atmosphere. Because water gets denser as it gets colder, it sinks. This lower band of cool water circulates back to the tropics where it warms and repeats the process all over again. If you’ve ever watched soup boil up, spread, and then sink, it works kind of like that.

“And, the polar ice is melting because of greenhouse gases,” said Thorin.

“Yes,” said Bilbo. “There are six greenhouse gases. The two worst are carbon dioxide and nitrous oxide. I get 45% for percentage of the problem for each of them.”

“Do the other four greenhouse gases contribute 10% of the problem?” asked Thorin.
“Yes,” said Bilbo.

“We hear about carbon dioxide, but we really don't hear about nitrous oxide,” said Thorin.

“A writer named Elena Day posted an excellent piece about nitrous oxide on the Crozet Gazette Web site,” said Bilbo. “It's titled ‘What You Need to Know About Nitrous Oxide.’”

“Crozet Gazette?” asked Thorin.

“Crozet is in Albemarle County in the state of Virginia with a population of 5,565,” said Bilbo.

“Why don't we hear about nitrous oxide?” asked Thorin.

“It may be due to the use of synthetic fertilizer,” said Bilbo. “British chemist Humphry Davy made nitrous oxide at the Pneumatic Institution by heating ammonium nitrate crystals in 1799.”

“Ammonium nitrate?” asked Thorin.

“Ammonium nitrate is synthetic fertilizer,” said Bilbo. “According to the Cision PRWeb news distribution service, in 2016, the global ammonium nitrate production exceeded 58.6 million tons. The site lists the dominant players in the ammonium nitrate market.”

“So ammonium nitrate must be making nitrous oxide in hot weather,” said Thorin.

“I dowse a ‘Yes’,” said Bilbo. “About 20% of the nitrous oxide problem is due to harmful algae that has accelerated growth from nitrogen runoff from the synthetic fertilizer. Algae, also called cyanobacteria, is photosynthetic.”

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“Algae is a plant,” said Thorin. “And, plants give off oxygen that must combine with nitrogen to form nitrous oxide.”

“The algae problem is getting worse,” said Bilbo. “In 2015\(^1\) and 2016\(^2\), reporters Lydia Ramsey and Aneeta Bhole writing for *Business Insider* and *Daily Mail Australia*, explained the problem in articles that have startling pictures.”

“Now I understand why you said synthetic fertilizer needs to be banned,” said Thorin.

“We also need electric cars, or some other type of vehicle that is not dependend on oil,” said Bilbo. “We need something other than nuclear power.”

“Coal burning plants also harm the environment. They dump thousands of pounds of mercury into the air,” said Thorin.

“We also need compostable plastic that's made from plants,” said Bilbo.

“It sounds like we need solutions right away if the AMOC is unstable,” said Thorin.

“We need a critical path approach,” said Bilbo.

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Bilbo Baggins is talking to Thorin about alternatives for fertilizer, plastic, and transportation. On the topic of fertilizer, they are discussing agriculture and lawn care.

“When you mentioned banning synthetic fertilizer, who could actually ban a product?” asked Thorin.

“Products can be banned by the federal government, state, county, or even mayors,” said Bilbo.

“The EPA bans chemicals, but I don't think they can enforce,” said Thorin.

“Government leaders would need to decide if they need law enforcement,” said Bilbo.”

“It might be a good idea to present alternatives before a ban,” said Thorin. “Farmers and lawn care people may panic if fertilizer is banned.”

“Considering how long synthetic fertilizer has been used, you're probably right,” said Bilbo. “Synthetic fertilizer grew out of munitions manufacturing after World War II.”

“So there aren't many people who remember alternatives,” said Thorin.
“Alternative farmers understand methods that don’t involve chemicals, but the number of alternative farmers is very small,” said Bilbo.

“What are the alternatives?” asked Thorin.

“I’ve made a list,” said Bilbo showing Thorin his notebook:

• Biochar as a source of nitrogen, phosphorus, potassium and calcium
• Composted paper as a source of nitrogen, vermiculture
• Chicken manure as a source of nitrogen
• Composted seaweed as a source of minerals, aerobic tumbling
• Composted seaweed as a source of minerals, vermiculture
• Greensand, from ancient sea beds, as a source of minerals
• Azomite, from ancient sea beds, as a source of minerals
• Sea salt, small amounts, source of 88 minerals
• Fish, fish oils, as a source of nitrogen and other minerals
• Calcium (transmuted into other minerals in Nature), ground eggshells
• Calcium/Magnesium (transmuted into other minerals in Nature), Dolomite
• Calcium, (transmuted into other minerals in Nature) water soluble, GSR Calcium
• Compost tea (made with black strap molasses) as a stimulant for beneficial soil bacteria

“ Aren't we talking about a major amount of education?” asked Thorin.

“Yes,” said Bilbo “We’re looking at changes that may be as large as the adoption of computer technology. We will need special interest groups or SIGs like they have in the technology business.”

“Manufacturers, retailers, colleges, high schools, churches and local government could help sponsor SIGs,” said Thorin.

“Yes,” said Bilbo. “SIGGRAPH, Special Interest Group on Computer GRAPHics and Interactive Techniques, is the largest SIG in
the country and thousands of people attend their annual meeting. The conferences have been held in cities across North America since 1974.”

“If the global ammonium nitrate production exceeds 58.6 million tons, there's a lot of work to do.”

“It needs to start immediately because synthetic fertilizer, also called NPK, only has 3 nutrients—nitrogen, phosphorus and potassium,” said Bilbo. “Plants given NPK fertilizer are propped up by the nitrogen. The plant is inherently weak and could flop over if the fertilizer is cut off.”

“If NPK farmers can get through the transition, then the plants will be stronger,” said Thorin.

“Animals and people will benefit because there will be more nutrition in plants,” said Bilbo.

“Where should they start?” asked Thorin.

“SIG meetings can be a source of information about equipment, source of supply and rates of application,” said Bilbo.

“Are pesticides made from oil?” asked Thorin.

“Most are derived from petroleum,” said Bilbo.

“Are there alternatives?” asked Thorin.

“Neem oil is made from the seeds of the Neem tree that is native to India and Pakistan,” said Bilbo. “It's safe for Earthworms, beetles and butterflies. W.R. Grace and the U.S. Department of Agriculture tried to patent Neem in 1995. India sued, the case lasted 10 years and India finally won. Home Depot sell a product that is 70% Neem oil in a pint bottle with a hose end nozzle.”


2 (Home Depot) Monterey 16 oz. Neem Oil, $23.99
“Anything else?” asked Thorin.

“There's sound energy,” said Bilbo.

“I remember we talked about a sonication device that killed nematodes in 12 minutes,” said Thorin.

“There's also a company in Quebec that is using sound energy to kill harmful algae,” said Bilbo.

“I remember we talked about a biochar trial,” said Thorin. “We've also talked about vermiculture a couple of times.”

“The vermiculture we talked about is small scale compared to what would be needed in agriculture,” said Bilbo.

“Is there an example of a large scale system?” asked Thorin.

“Rhonda Sherman, of NCSU’s Biological and Agriculture Engineering Department, is the author of The Worm Farmer’s Handbook: Mid- to Large-Scale Vermicomposting for Farms, Businesses, Municipalities, Schools, and Institutions,” said Bilbo.

“Is NCSU North Carolina State University?” asked Thorin.

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“Yes,” said Bilbo. “They have an annual vermiculture conference that was covered by *Biocycle* magazine in 2010.”


“Yes,” said Bilbo. “They also eat sawdust. Their waste, called castings is very high in nitrogen.”

“What type of paper?” asked Thorin.

“Shredded cardboard, shredded paper towels that have dried, used coffee filter paper—with the grounds as well as used tea bags,” said Bilbo. “Chemical-free if possible.”

“Unbleached?” asked Thorin.

“Yes,” said Bilbo. “And paper towels that contain environmentally soap.”

“What about paper plates and cups?” asked Thorin.

“Hefty and Chinet plates are compostable,” said Bilbo. “Consumer reports tested them to see if they disappeared.”

“Did they?” asked Thorin.

“Hefty disappeared in three weeks and Chinet plates disappeared in five weeks,” said Bilbo.

“Do you think worms would eat shredded paper plates?” asked Thorin.

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“I would need to ask vermiculture specialists,” said Bilbo. “I would also like to ask them whether a shredded paper container coated with PLA plastic is suitable for worms.”

“Do you think paper would break down in your aerobic tumbler?” asked Thorin.

“My tumbler is a small 35 gallon drum. Paper towels disappear, but they are a source of carbon which is only 20 percent of a batch,” said Bilbo. “Composting needed for agriculture would require commercial size tumblers. Texas-based BW Organics makes seven different “in-vessel” composter tumbler models and five are commercial scale.”

“You used compost starter in your tumbler batch. Would the large scale tumblers need starter?” asked Thorin.

“I used 9 cups of starter. I dowsed that the large commercial tumblers would need 4 gallons,” said Bilbo.

“If a paper container coated with PLA plastic is not suitable for worms, do you think it would disappear in aerobic composting tumblers?” asked Thorin.

“It would need to be tested,” said Bilbo.

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2 BW Organics, commercial tumblers, http://tmaorganics.com
Bilbo Baggins is talking to Thorin about a critical path approach to organizing solutions to prevent a possible collapse of the AMOC. Thorin has never heard of the critical path method.

“What is the critical path method?” asked Thorin.

“It's a project management technique that was invented in the 1950s,” said Bilbo. “It is the longest sequence of tasks in a project plan that must be completed on time in order for the project to meet its deadline.”

“What is the longest sequence of tasks in the projects we've been talking about?” asked Thorin.

“None of the projects can exceed two years and nine months,” said Bilbo.

“That's not a lot of time,” said Thorin.

“Some projects for Earth's Reboot can be implemented right away,” said Bilbo.

“Can you give some examples?” asked Thorin.

“I've made a list of project names and estimated time for completion,” said Bilbo showing Thorin his list:
Less Than 6 Months
• Synthetic Fertilizer Ban
• Lift Restrictions on Sale of Iodine Crystal
• One-Time Driver's Test and License Requirement (One Dowsed Fee)
• Scan Earth for Dolomite Deposits
• Dowse new prices and fees (revert 60 years)
• Currency tied to gold standard
• Sponsoring organizations for Special Interest Groups (SIGs)
• Bakeries to learn/sell sourdough rye, bagels and brioche
• Coffee shops learn/sell quiche
• Housing Co-Ops Formed
• Begin development of new vehicles
• Begin development of radioseptic devices
• Begin development of naturally filtered lakes for potable water (to accompany phase out of chlorine)
• Begin development of documentaries and news interviews for public education
• Utilities revert to public ownership
• New phones (texting ok, smart phones not approved)
• If available, apply for OMRI Processing Containers and Packaging Materials (PC) Listing for PLA and PLA plastic coated paper containers
• Test decomposition of PLA plastic coated paper in aerobic composter (commercial scale tumbler)

6 Months to One Year
• Plan/Organize Large Scale Conferences
• Small business startups created, Batavia, NY Incubator and Conover, NC Manufacturers Solution Center sponsorship
• Biochar Earth's citrus and other locations (wood produces nutrient-dense biochar)

One to Three Years
• Leaders, Abraham traditions, fix Bible
• Distilled liquor companies to remove phytates