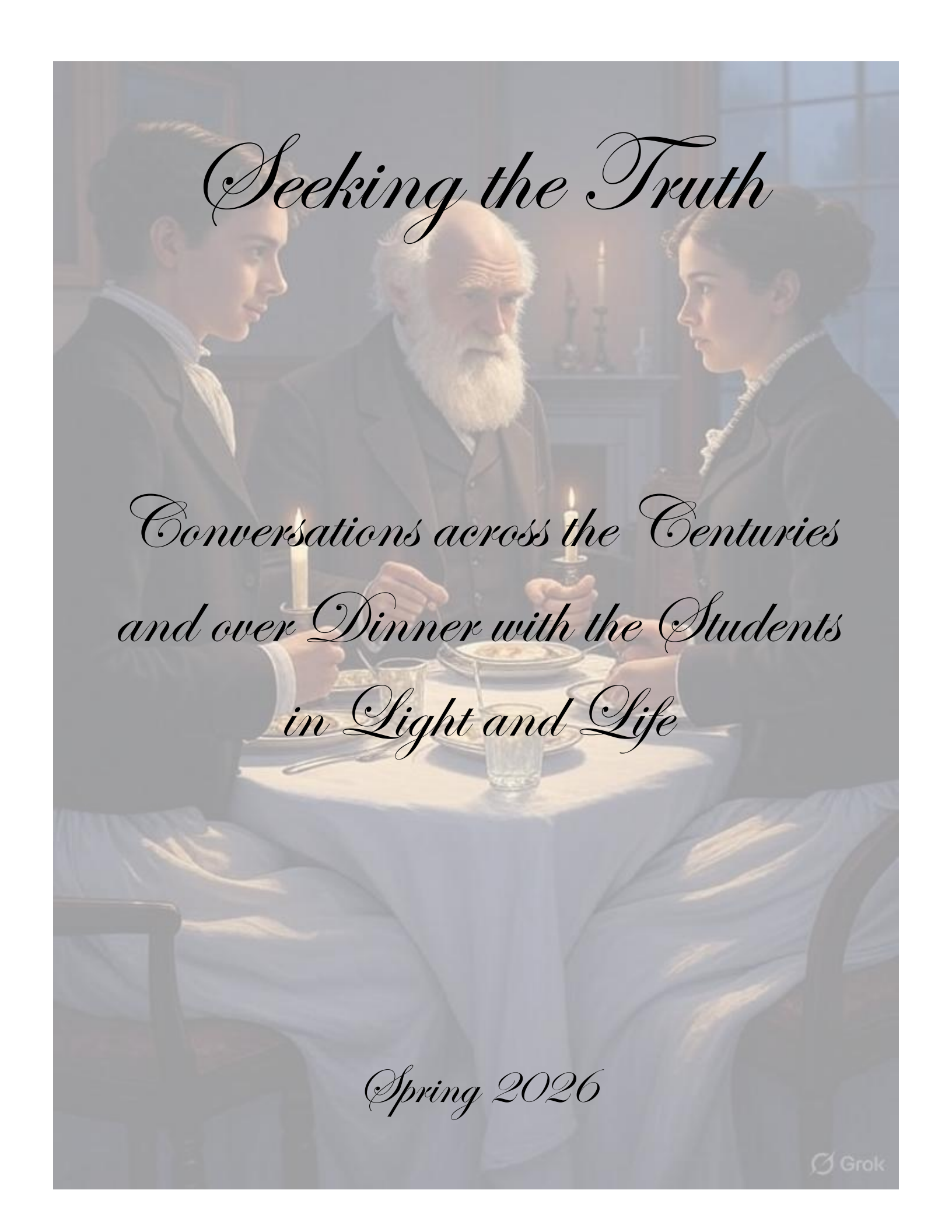




Seeking the Truth

*Conversations across the Centuries
and over Dinner with the Students
in Light and Life*

Spring 2026

Light and Vision: There is more than meets the Eye

Lecture 1: Light, the eye and the mind: Historical introduction to the elements of vision.

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Dinner conversation with Isaac Newton

Me: Sir Isaac, this previous lecture brought up the idea that light reveals truth but can also deceive us. Since you are someone who studies light, I have to ask a question I keep asking myself. Do you think seeing brings us closer to reality or does it give us an illusion?

Isaac Newton: Seeing does both. Light still obeys laws and with those laws we can learn real things about reality. The image is more of a mediation rather than the thing itself.

Me: That is interesting. If our sight and other senses is mediating our reality, what should we think about science, is it the actual truth or just more mediation?

Isaac Newton: Science is less of a final truth but more of a consistency. When we see a model giving us reliability, we can trust it not because it is the ultimate truth but because it works.

Me: But your writings make it seem like you do not seem satisfied with “what works.” You mentioned how light was tied to meaning. Do you think modern science has lost something by separating light from symbolism?

Isaac Newton: This could just be lost humility. Studying nature is a way of studying it’s creator. Light is physical but is also a metaphor for knowledge. To completely take away it’s meaning is to risk mistaking the mechanism for the source.

Me: So basically what your saying is that us understanding light is not when we can see more clearly but rather is when we think about how easily it can mislead us?

Isaac Newton: Exactly, studying light is about learning what is still in the dark.

Me:

Professor George Berkeley I have a question. In class, I learned that the image on our retina is upside down, and our brain must flip it. How much of what I'm seeing is real?

Berkeley:

That's a good question. You don't see the world directly. You see is what your mind decides the world is.

Me:

So when I think I'm seeing things like size or distance, I'm not actually seeing those things themselves?

Berkeley:

Not really, no. Your eyes take in light, but your mind interprets it using experience. A lot of that comes from touching things, moving through space, stuff like that. Vision has to be learned over time.

Me:

That explains why optical illusions still mess with us, even when we know they're fake.

Berkeley:

Knowing something intellectually doesn't always undo the habits of perception. The mind makes quick assumptions because it kind of must.

Me:

Like assuming light comes from above, or that things farther away are smaller.

Berkeley:

Those assumptions are helpful. Most of the time they give you a pretty accurate picture of the world. But when the context changes, they can also mislead you.

Me:

Like the moon illusion. The moon doesn't change size, but it really looks bigger near the horizon.

Berkeley:

Your mind is using its usual rules in a situation where they don't quite apply.

Me:

So perception isn't passive at all. It's more like the mind is constantly guessing what makes the most sense.

Berkeley:

That's a fair way to put it. Vision isn't a photograph taken by the eye. It's more like a conclusion the mind jumps to. And honestly, you shouldn't believe everything I say either.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 1 Dinner Conversation

Conversation with Ibn al-Haytham (Alhazen)

Ellie: Hello Mr. Alhazen. Thank you so much for meeting with me for dinner tonight! I'm taking a course called, "Light and Life: The Relationship between Light and Life in the Natural World and thought you were one of the most interesting people presented in today's lecture.

Alhazen: Of course, I'm really excited to answer any questions you may have about my experience and perspective on how we see.

Ellie: During the lecture, I was really drawn to your idea that vision is something we have when luminous objects or light reflected from nonluminous objects follow straight lines into the eyes as opposed to something our eyes send out. Can you tell me more about this idea?

Alhazen: Yes. I was sitting in my prison cell...after I failed to figure out how to stop the Nile from flooding using math... I was way too confident. Anyways, when I was sitting in the darkness, I realized that I was only able to see when light entered my cell, causing me to question Euclid's assumption that we could see because light emanated by the eye. This also made me wonder why would looking at the sun cause pain?

Ellie: That does make a lot of sense. I see where you're coming from with this idea. How else did you confirm this?

Alhazen: Well, after I was freed from prison, I continued making observations and performing experiments and then published a text on optics. In order to convey my idea, I used an analogy to suggest that the eye formed an image the same way that a camera obscura or pinhole camera formed an image.

Ellie: That's really interesting. So in a camera obscura, light from the outside scene enters through a tiny opening and forms an image inside the dark room. If an image can appear only when light comes in, it makes a strong case that vision works the same way. Our eyes aren't sending anything out, they're receiving light from luminous objects and reflected light from other objects, and that light travels in straight lines to create what we see.

Alhazen: Yes, exactly!

Ellie: Thank you so much for having dinner with me, I learned so much!

Alhazen: Of course!

Dinner with Sir Isaac Newton

The candles flicker between us. Newton sits upright, periwig slightly askew, a glass of claret untouched beside his plate.

Me: Sir Isaac, I have to confess something that puzzles me. The scientists of our era, my era, that is, some three centuries hence, tend to describe you as the man who "banished God from the clockwork heavens." But I've read your own words. In your Principia you wrote that this beautiful system of the sun and planets "could only proceed from the counsel and dominion of an intelligent and powerful being." So which is it? Did you exile God from physics, or invite Him in?

Newton: (setting down his fork with mild irritation) Banished Him? I spent more hours on theology than on natural philosophy, and considerably more on alchemy than either. The men of your age seem to have read my equations and burned the rest. Light, I wrote this plainly, is for the glory, truth, and knowledge wherewith great and good men illuminate others. I did not study light as a mechanic studies a pump. I studied it as one reads scripture, seeking the Author behind the text.

Me: But doesn't that create a problem? If God is the explanation, do we stop asking further questions? Isn't that where science goes dark?

Newton: (leaning forward, sharp-eyed) On the contrary. Does knowing a poem was authored by a genius prevent you from analyzing its meter? The laws I uncovered demand a lawgiver, they do not replace one. When I say the moon moves according to an inverse-square law, I am describing the grammar of creation. I am not explaining why there is a creation at all. The laws of nature explain everything except the source of events.

Me: That idea, that science has a ceiling it cannot penetrate, makes sense to me. But what I find striking about you is that you worked across faith, mathematics, alchemy, and optics without treating them as separate pursuits. Today we're trained to keep those disciplines apart. Do you think that has cost us something?

Newton: (a slight, cold smile) It has cost you Newton. (pause) I do not say that with vanity, or not entirely. I mean that the mind which cannot hold both the prism and the prayer, both geometry and mystery, is a mind half-furnished. Einstein understood this, I think, in his fashion. He believed that philosophical independence is what separates a mere artisan from a real seeker after truth. I would have liked that man, though I suspect we would have quarreled magnificently about the nature of light

Me: You both would have! He thought light comes in discrete packets, photons, and you believed it was a stream of particles. It turns out you were both right, and both wrong, depending on how you look at it.

Newton: (raising an eyebrow) Both right and wrong how?

Me: Light behaves as both a wave and a particle. Which one you see depends entirely on how you choose to look at it.

Newton: (a long pause, then quietly)... So the observer shapes the answer. Perhaps God does have a sense of humor after all. Pass the claret.

Lecture 1

Me: Your experiment freaked me out a little. Why would that guy say that the short line is long just because other people say so?

Asch: Because seeing is not just a visual act, it's a social one. Our eyes aren't the only things that give us a view of the world.

Me: But the task in your experiment was so obvious. I mean, it was literally line lengths.

Asch: That's exactly why it mattered. If people doubt their own eyes on something simple, imagine what happens when the issue becomes bigger

Me: So when most of the group gave the wrong answer, were people actually seeing the line differently?

Asch: Some can. Most others still saw correctly but chose silence or agreement to avoid standing out. Conformity doesn't always mean blindness, a lot of the time it comes from fear

Me: Fear of being wrong?

Asch: Fear of being alone. The cost of isolation can feel higher than the cost of being incorrect. It's the same reason in most big lectures no one raises their hand to answer questions.

Me: That hits different after the lecture on vision. It's like our eyes give us data, but society decides whether we trust it.

Asch: Exactly. Your senses give the evidence but your feelings decide what you do with it

Me: What shocked me most was that when even *one* other person told the truth the need to conform dropped

Asch: Yes. Independence is contagious. You don't need a bunch of people sometimes all it takes is the one other person

Me: So this isn't just about experiments. It's about real life, right?

Asch: This has always been true. Systems like education, science, and politics depend on people trusting their own experiences. When consensus is prioritized over truth, perception itself becomes distorted

Me: That makes the lecture's message about "trusting your own senses" feel a lot heavier.

Asch: It should. Seeing clearly is not enough. You must also be willing to say what you see.

Me: Thank you for your insight Dr!

Asch: Anytime.

Jenny Huang

PLSCI 1130: Light and Life

Lecture 1: Light, the Eye and the Mind: Historical Introduction to the Elements of Vision

Conversation with Karl Popper

Jenny: Good evening, Mr. Popper. It is so nice to meet you.

Karl: Yes, a lovely evening. It's a pleasure to meet you as well. Please – call me Karl.

Jenny: Okay, Karl. I recently came across your thoughts on intellectual excellence and criticism, and they really left an impression on me. Would you mind if I tickled your brain with a few questions?

Karl: I would be disappointed if you didn't.

Jenny: The more I sat with your words, the more I began to see them reflected in my own experience navigating early career spaces. The process claims to reward originality, but in practice it feels deeply conformist – hypocritical, even.

Karl: Institutions tend to praise originality because it sounds good, but they reward conformity because it feels safe.

Jenny: That's exactly how it feels. Everyone tells us to “stand out,” but the safest candidates are the ones who say the right things and follow the same paths. There's all this buzz around finance and corporate culture and I honestly know for a fact I am not deeply passionate about business.

Karl: Then you are already doing something most people avoid. You are questioning an assumption before committing your life to it. That hesitation is not weakness. Intellectual independence does not begin with confidence.

Jenny: But the way that the system is built forces me to continue my current path...or else, it almost feels like I am behind. If I were to change my major, for example, I would have wasted both my time and money...and I am only a sophomore. I feel conformity is so deeply rooted in our institutions it's impossible to break free – in my lifetime at least.

Karl: I understand why it feels that way, and you're right – systems are designed to reward predictability. But they don't have to dictate your thinking. Intellectual independence is about the choices you make in how you think and learn – in these environments that enforce conformity. The key is to find space to ask questions and to learn from mistakes.

Jenny: Wow...thank you, Karl. I will definitely hold onto that piece of advice.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Yooo René Descartes, what were you studying about vision and the eye?

René Descartes:

Mahidu let me tell you, I repeated Scheiner's experiment and studied how light forms images inside the eye using the laws of optics and refraction.

Me:

So you were looking at how light travels into the eye?

René Descartes:

Exactly! I used the Snel-Descartes Law of refraction to explain how light bends as it passes through different materials and reaches the retina.

Me:

Wait, isn't the image on the retina upside down?

René Descartes:

Yes, it is inverted if you didn't know. That led me to believe that vision involves more than just optics because the mind must interpret the image correctly.

Me:

So your brain flips the image around?

René Descartes:

In a sense, yes. The mind processes the information from the eyes and allows us to perceive the world correctly.

Me:

That's actually really interesting.

René Descartes:

It showed that understanding vision requires both physical science and the study of the mind itself and that was very big at the time.

Me:

So seeing is not just about the eyes working?

René Descartes:

You are splendid Mahidul! The eyes collect light, but the mind plays an essential role in interpreting what we experience.

Me:

Did this idea become important later in science?

René Descartes:

Absolutely. My work helped connect optics, perception, and philosophy, influencing later studies of psychology and neuroscience.

Me:

That's honestly really cool to think about.

René Descartes:

The relationship between the mind and the senses has made people curious for centuries!

Me:

Thanks for telling me all of this!

René Descartes:

No problem, Mahidul.

Lecture 1: Dinner Conversation with Plato

Light and Life | Vansh Kakra | vk365

Vansh: I've been reading excerpts of your dialogues through websites that make it easier to understand in plain English :), and what strikes me is that you never speak directly in them. You let other people argue, get confused, even contradict themselves. Why stay in the background like that?

Plato: Because the confusion is the point. In my work, especially in the dialogues with Socrates, I wanted readers to notice how easily confident people fall apart when asked simple questions. If I stepped in with answers, that moment would disappear.

Vansh: In the *Republic*, you talk about justice as something bigger than laws or outcomes. But from where I'm coming from - economics, incentives, markets - justice often just means "what works." Why isn't that enough for you?

Plato: Because "what works" depends on who benefits. Justice, as I saw it, was about order in the soul as much as order in the city. If people become clever at winning while slowly becoming worse humans, the system may function, but something essential is lost.

Vansh: That connects to your idea of philosopher-kings. I'll be honest, that part feels unrealistic today. Did you really believe knowledge could keep people from abusing power?

Plato: I believed knowledge could slow it down. I underestimated how strong ambition is. But I was reacting to leaders who ruled without reflection at all. My argument was less "philosophers are perfect" and more "unexamined power is dangerous."

Vansh: You also write a lot about illusion, especially in the cave. Do you think most people actually prefer illusion over truth?

Plato: Not exactly. I think people prefer comfort. Truth becomes frightening when it asks them to change their lives, not just their opinions.

Vansh: That's what worries me about going into finance. It's easy to get good at explaining outcomes after the fact and calling that wisdom.

Plato: Then your task is to keep asking whether success is shaping your values, or quietly removing them from your life.

Vansh: So the goal of your work wasn't to give answers, but to make people uneasy enough to think?

Plato: Yes. If someone leaves a conversation slightly unsettled but more honest with themselves, I've done my job.

Vansh: That's a strange definition of teaching.

Plato: Maybe. But it lasts longer than certainty.

Selina Ke
Dinner Conversation with Ibn al-Haytham (Alhazen)

Setting: Selina and Alhazen are having dinner in a dim room lighted by a candle on the table.

Selina: Even though the room is dim, we can still see clearly because of the candle, as light has to enter the eye for vision to happen. Sitting in the dark is what made you rethink how seeing actually works, right?

Alhazen: Yes. When I was imprisoned, I noticed that I could only see when light entered the room. That made me question the idea that vision comes from rays leaving the eye.

Selina: That has been supported by Extramission theories where Empedocles, Euclid and Ptolemy state that vision results from the emission of visual rays from the eye to the object being viewed.

Alhazen: True. But none of that mattered if the theory didn't match observation. If light came from the eye, we should be able to see in complete darkness. We clearly can't because vision occurs when light travels in straight lines from objects to the eye, either directly or by reflection.

Selina: Did you test this theory with some sort of experiment?

Alhazen: Yes, when I placed multiple lamps outside a dark room, each lamp formed its own image. Blocking one lamp only removed its image, which showed that light from each source travels independently in straight lines.

Selina: So, the eye doesn't take in the whole object, just light from each point on its surface?

Alhazen: Correct. The eye functions similar to a camera obscura, forming images point by point.

Selina: So only light traveling in straight lines from each point can form a clear image and scattered light would blur it.

Alhazen: Exactly. That is why a smaller opening improves sharpness, even though it reduces brightness, a tradeoff the eye constantly manages.

Selina: And would that also explain why when we look directly at strong light sources, like the sun, causes pain. If vision came from rays leaving the eye, the sun shouldn't harm us. Instead, it's the incoming light that overwhelms the eye.

Alhazen: Precisely. Light acts upon the eye, not the other way around which is why I advise you not to test the theory by staring into the candle!

Dinner Conversation with Alhazen

Me: You figured out light enters the eye rather than rays leaving it while sitting in a dark prison cell. Was it just the darkness that did it?

Alhazen: That was the first thing. I could only see when light came through a crack in the wall. If my eye were sending rays outward, darkness should not have mattered at all.

Me: And looking at the sun causing pain helped too?

Alhazen: Exactly. If the rays came from me, staring at the sun should not hurt. But it does. Something is clearly coming in, not going out. Euclid's premise was wrong even though his geometry was beautiful.

Me: What strikes me is you kept all the geometry. You just flipped the direction the light was traveling.

Alhazen: The mathematics did not need to change, only the premise underneath it. Straight lines, angles, image formation. All of it is still held. But reversing the direction required considerable work. You cannot simply flip the arrow and leave everything else untouched.

Me: The pinhole experiment is what made it click for me. Block one lamp, that image vanishes, the others stay.

Alhazen: Point to point, ray by ray. Each point on an object sends light in every direction. Only the rays entering at precisely the right angle form the image. The eye works exactly as the dark room does.

Me: Without Gerard of Cremona translating your Optics into Latin none of what came after happens.

Alhazen: Knowledge needs to travel, not just exist. Roger Bacon found it and recognized its worth. That chain of transmission mattered as much as the original work.

Me: Was Euclid just wrong, or was he reasoning well from a bad assumption?

Alhazen: He was reasoning carefully from a premise that happened to be false. The geometry itself was not wrong. Strip out the assumption that the eye is the source rather than the receiver, and what remains is still remarkable.

Thomas Young: The Wave, the Stinkpot, and a Tablet at Westminster

Me: Thomas! It's so good to see you! Thanks for making the trip!

Young: Maximo! A pleasure, truly. Is that roast duck I'm smelling?

Me: It is! Fresh out of the oven. Listen, Thomas, I've been reading about you for my class, and I have to tell you, you are the most improbable man in the whole lecture. A botanist, a physician, a translator of the Rosetta Stone, and somewhere in between all that, a part-time lecturer at the Royal Institution who overturned the theory of light. How did you end up doing physics at all?

Young: Ah, Maximo. You have noticed the thing my friends used to tease me about. I could not stay in one room for long. The eye drew me into anatomy, and anatomy drew me into optics, and optics drew me into Newton. And here is the piece I want you to understand. I read Newton directly. Not his disciples, not the commentaries, not the neat little summaries the professors were teaching. The man himself. And once you read Newton himself, you see that he had his doubts about the corpuscular theory, doubts his followers had sanded off.

Me: And that reading gave you the general law of interference. The idea that two waves of light, meeting, could amplify each other in some places and cancel each other in others. That is what explained diffraction. That is what explained the colors in thin films that Hooke had stared at and never cracked.

Young: It did. And the experiment was not complicated, Maximo. Two slits, a candle, a screen. A child could have run it. A child nearly did. The bands of light and dark were there on the wall, plain as a newspaper, and I went home and wrote it up and thought I had done a useful thing.

Me: But here is what I want to press you on, Thomas. For the useful thing, you were mauled. An anonymous reviewer, probably Lord Brougham, wrote that your wave theory was the unmanly and unfruitful pleasure of a boyish and prurient imagination. They called you Anti-Newtonian, which in your century was nearly the same thing as calling you a heretic. How did you absorb that?

Young: A fair blow, Maximo, and it landed hard. I will not pretend it did not. I was a young man with a reputation I had been building slowly, and Brougham, if it was Brougham, took a mallet to it in an afternoon. The worst of it was not the insult. The worst of it was that for years afterward, good men avoided my theory because no one wanted the Edinburgh Review pointed at him next. The review we later nicknamed the Stinkpot of Literature, and the name stuck, but at the time it was powerful enough to bury a man's idea for twenty years.

Me: And yet the idea came up again. Fresnel picked up the wave theory in France, and slowly the bands of light and dark won the argument. Eventually there was a tablet to you in Westminster Abbey calling you the man who first established the undulatory theory of light.

Young: There was. And I will tell you what Haldane said later, because he said it better than I could. A new idea passes through three stages. First it is worthless nonsense. Then it is interesting but perverse. Then it is true, and of course I always said so. I lived through the first two stages, Maximo. The third stage arrived after me, which is often how it works. A man does not get to watch his own vindication. He has to trust it will come, and do the work anyway.

Me: That's a generous way to hold it, Thomas. Would you care for some dessert?

Young: I'll pass, Maximo, the roast duck has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 1: Dinner Conversation with Alhazen

Me: Hi Mr Alhazen, thank you for meeting with me for dinner. I've been studying your work, and I was fascinated by how you challenged the idea that vision comes from rays leaving the eye.

Alhazen: I'm glad my work continues to spark curiosity. My own observations led me to believe that light must travel from the object to the eye, not the other way around.

Me: Right. I specifically enjoyed learning about your camera obscura experiment. Tell me more!

Alhazen: Ah, one of my favorite experiments. I made a small opening in the wall of a dark room and placed three lamps outside. On the opposite wall, three separate points of light appeared. When I covered one lamp, only its image vanished while the others remained unchanged.

Me: How did this lead you to rethink how images actually form in the eye?

Alhazen: I realized that vision is not the transfer of an object's entire surface all at once, but rather the result of light rays traveling in many directions from individual points on the object and entering the eye, where they form an image on the crystalline lens.

Me: Fascinating. But if light is being emitted in so many directions, how does a clear image ever form?

Alhazen: An excellent question. Although light rays travel outward from every point on an object, only those that strike the crystalline lens nearly perpendicular have enough strength to show up. In fact, the eye works much like a pinhole camera. Each point on the object sends a corresponding ray, creating a point by point image on the crystalline lens rather than a blurred mixture of light.

Me: Last question! You showed that light travels in straight lines, but this idea seems to break down when we study very small, microscopic objects. Does it bother you that scientific ideas can be challenged as new discoveries are made?

Alhazen: Not at all! That is the beauty of science. My work describes how light behaves in ordinary situations, but when light encounters extremely small objects, it begins to spread and interact in more complex ways. That I will leave to others! Knowledge advances by discovering where old explanations fail. My goal was never to prove anything, simply to refine understanding.

Me: Thank you for this conversation. This dinner truly helped me see in a new light!

The candles were already melting into dramatic little puddles by the time Plato arrived at dinner.

He didn't knock. He just appeared in my kitchen like he'd stepped out of a toga catalog and straight into suburban America.

"Is this the realm of Jared?" he asked, squinting at my refrigerator like it might reveal a higher truth.

"It's the kitchen," I said. "Same thing."

He stared at the microwave.

"This glowing box—does it contain the Form of Fire?"

"It contains leftover lasagna."

He nodded slowly. "Ah. So this... 'lasagna'... participates in the eternal Form of Dinner?"

"Only if I don't burn it."

We sat down at the table. I had tried to be classy and lit candles, but Plato kept leaning over them like he was inspecting an argument.

"So," I said, passing him a fork.

He held it delicately. "Is this weapon necessary for the consumption ritual?"

"It's a fork."

"A pronged instrument of nourishment. Fascinating."

He poked the lasagna cautiously.

"This appears imperfect," he announced.

"It's from Costco."

"Precisely."

Halfway through the meal, Plato leaned back dramatically.

"Tell me, Jared, what is justice?"

"Not stealing my garlic bread."

He paused.

“A compelling hypothesis.”

He took a piece anyway.

“Hey!”

“I am merely testing your commitment to justice.”

“That’s not how that works.”

“In the ideal republic,” he said calmly, chewing, “the philosopher would hold the garlic bread.”

“In this republic,” I said, grabbing it back, “the cook does.”

He considered this. “Perhaps democracy has some merits.”

Then he noticed my phone light up.

“What oracle is this?”

“It’s just a notification.”

He leaned in closer. “Does it whisper wisdom?”

“It’s DoorDash asking if I want dessert.”

He blinked. “You summon food from unseen realms?”

“Yeah.”

“And it arrives?”

“Usually.”

He stood up abruptly.

“Jared, this society has achieved what we philosophers only dreamed of.”

“Efficient snack delivery?”

“The abolition of walking!”

Later, over chocolate cake (which he insisted must be a shadow of a greater, perfect cake), he grew thoughtful.

“In my time,” he said, “we debated truth in the marketplace.”

“In my time, we argue in comment sections.”

He looked deeply troubled.

“Is there a Socrates there?”

“Not really.”

“Ah,” he sighed. “Then who asks the annoying questions?”

“Everyone.”

He paused.

“Barbaric.”

As the night wrapped up, Plato stood and adjusted his imaginary toga.

“Jared, tonight I have learned much.”

“Like what?”

“That lasagna is imperfect but comforting.”

“Fair.”

“That justice is fragile when garlic bread is involved.”

“Very.”

“And that perhaps the Form of Friendship is discovered not in the heavens... but at a dinner table.”

I stared at him.

“That was actually kind of beautiful.”

He smiled slightly.

“Of course it was. I invented the Academy.”

He walked toward the door, then stopped.

“One last question.”

“What?”

“Do you think there is a perfect version of me?”

I looked at him—sauce on his chin, holding Tupperware.

“If there is, he probably brought wine.”

Plato nodded thoughtfully.

“Then I, too, am but a shadow.”

And with that, he disappeared.

The microwave beeped.

The lasagna was still slightly cold in the middle.

Some truths, apparently, are eternal.

Ean Pope
Jan 21st, 2026

Me: Yo... you Isaac Newton for real?

Newton: I am.

Me: Crazy. I'm Ean , I play football here. But I'm in this Light & Life class and your name came up in the notes.

Newton: Light is an excellent subject.

Me: Facts. What got me was how the lecture said science is basically us using our senses to build a model of the world, and when enough people agree, it becomes a "law of nature."

Newton: Correct. A law describes nature. It does not create it.

Me: Exactly. And the notes said you didn't separate science from faith like people act now.

So here's my real question:

Me: How did you study light and physics so deeply without pushing God out the picture?

Newton: Because studying nature never removed God to me. It revealed Him. Light has order, reflection, refraction, principles. That intelligibility points to intelligence.

Me: That's tough. And you even wrote in *Principia* that the solar system couldn't just be random, it had to come from "the counsel and dominion of an intelligent and powerful being."

Newton: I did.

Me: But then the notes also hit us with a limitation. C.S. Lewis said laws explain everything except "the source of events."

Newton: Exactly. Laws explain patterns. Not the ultimate cause.

Me: So science can explain the motion of the ball... but not who threw it.

Newton: Well said.

Me: Appreciate you. That actually makes me see "light" different , not just photons, but truth too.

Newton: Then the lecture served its purpose.

ME:

Okay, first question for ya how does someone go from being a respected scientist to getting locked up?

ALHAZEN:

I told a ruler I could stop the Nile from flooding.

ME:

Bold move.

ALHAZEN:

Very bold. Also very wrong.

ME:

So... prison?

ALHAZEN:

Straight to prison.

ME:

Honestly, that's kind of impressive. Most people just say "my bad," and u managed to completely change science as we know it

ALHAZEN:

It helped that my prison cell was dark. Reallyyy dark

ME:

And that's when you started thinking about vision? I find that hard to believe

ALHAZEN:

Yes. People at the time believed eyes sent out rays to see things like eye lasers.

ME:

Which sounds cool, but also like a superhero problem. We talked about that in class. Our professor asked us what we believed. It honestly made me think for a second

ALHAZEN:

Exactly. But sitting in the dark made me realize something: I couldn't see *anything* unless light came into the room.

ME:

So your eyes weren't doing much on their own.

ALHAZEN:

Correct. And another thing if eyes really shot out light, looking at the sun wouldn't hurt. But it does. A lot.

ME:

Yeah, that checks out. The sun is undefeated.

ALHAZEN:

That's when I realized light must travel *into* the eye, not out of it.

ME:

Which feels obvious now, but apparently blew everyone's mind back then.

ALHAZEN:

Most breakthroughs sound obvious after the fact.

ME:

So you poke a hole in a wall, light goes through it, and boom camera obscura.

ALHAZEN:

Yes. An image appears, upside down, point by point.

ME:

And that's basically the first camera.

ALHAZEN:

Without the selfies.

ME:

Tragic. But here's what really messes with men you figured out that even if the image hits the eye correctly, the *brain* still has to figure it out.

ALHAZEN:

That part fascinated me the most. The eye collects light. The mind decides what you're seeing.

ME:

So when I see optical illusions and swear I'm right

ALHAZEN:

Your mind is guessing. Very confidently.

ME:

That explains a lot about group chats.

ALHAZEN:

And politics.

ME:

So basically, humans don't see reality directly we see our brain's best guess.

ALHAZEN:

Yes. Which is why questioning what you see and what you're told is important.

ME:

You figured that out in prison with a sunbeam.

ALHAZEN:

Not everyone needs a lab. Sometimes you just need time to think.

ME:

And maybe not promise to control rivers.

ALHAZEN:

Highly recommended.

ME:

Well, thanks for dinner. I really enjoyed your company. And for fixing vision as we know it

ALHAZEN:

You're welcome. Just remember, seeing isn't believing. Thinking is.

ME:

But can I really believe anything you say:)

Ariel Vilensky

Lecture 1. Light, the Eye and the Mind: Historical Introduction to the Elements of Vision

Me: Good evening, Dr. Asch - it's an honor to meet you. I have always wanted to speak to you because I am fascinated by the results of your research on visual discrimination. Could you talk to me about some of the interesting results you've obtained?

Solomon Asch: Of course. I think my most intriguing experiment on that topic would have to be my conformity study from the 1950s. The basic idea was to see if people would conform to a consensus opinion, even if that meant going against their own common sense and logic.

Me: What were the results of the experiment?

Solomon Asch: The result was that people would usually choose the incorrect answer that agreed with the consensus. However, if the consensus was broken by even one person, then the likelihood of people choosing the correct answer increased.

Me: What implication do you think this psychological phenomenon has on society?

Solomon Asch: As I've said in the past, life in society requires consensus, but this consensus is only productive when everybody contributes independently. When people influence each other, this process is polluted and people fall into conformity.

Me: Wow! This really reminds of the concept of the wisdom of the crowd – in general, the average of people's judgements tends to be correct, but social influence can cause the average to be inaccurate.

Solomon Asch: This is a great insight – these are highly related concepts. While wisdom of the crowd does often still have value, it is important to consider societal forces and see if they are warping the collective opinion.

Me: Do you think there is a way to influence these forces to reduce the pressure to conform?

Solomon Asch: The answer to that is unclear. However, if there is a way to do so, it would be easiest in the modern day given how easily information can spread and cultural moments can arise with the advent of social media.

Karen Zheng, kz374

Dinner Conversation with Karl Popper

Me: Hi Karl, I have been thinking about your idea that intellectual excellence depends on criticism and independence. But doesn't constant criticism sometimes make collaboration harder?

Karl: Yes, that's fair, but real collaboration actually depends on the freedom to question. That may feel cooperative, but it usually stops real progress.

Me: I get that, but in school or at work, I often feel frustrated or slow in group projects because there is so much pushback between teammates.

Karl: That frustration makes sense. Questioning ideas takes time, and it can feel slower than simply agreeing and moving forward. But speed and progress are not always the same thing. Sometimes what feels like "push back" is actually the group preventing bigger mistakes later.

Me: I guess that's true, but in the moment, it can feel like no one can agree on anything. It makes me wonder if there's a point where too much criticism stops being helpful.

Karl: That is an important balance. Criticism should be aimed at improving ideas, not defeating people. When criticism becomes too personal, it stops being useful.

Me: So it's not just about questioning others, it's also about being willing to have your own ideas questioned too.

Karl: Correct, intellectual independence is not stubbornness. It is the willingness to test your thinking and change it if the evidence or reasoning is stronger.

Me: I think part of my frustration is that I want things to be right the first time. It's hard to be comfortable with the messy part where no one is sure yet.

Karl: But that uncertain space is where learning happens. If everything feels certain immediately, it usually means no one has challenged the idea deeply enough.

Me: So maybe discomfort is part of thinking well.

Karl: Growth in understanding rarely feels comfortable at first. But if you learn to see discomfort as a sign that you are engaging deeply, it becomes less discouraging.

Me: Thanks, Karl, I will see criticism less as conflict and more as part of building something stronger.

Dinner Conversation with Bishop Berkeley

Me: Bishop Berkeley, I just want to tell you how much your ideas were coming to mind in one of my lectures today. The professor talked about how perception isn't just about geometry but also about how the mind works.

Berkeley: That's awesome to hear, I have always believed that what we think is reality is shaped by our brain's perception. We never see the world directly but through ideas that the mind thinks it is.

Me: That clicked for me when me mentioned the Pulfrich pendulum effect. With one eye having darker vision and the other doesn't, the eye that has the darker vision is slightly delayed. The brain combines these two images together and creates a false sense of depth.

Berkeley: This is a great example of how physical stimulus isn't the only thing that affects what we experience. Our minds interpret those signals and make it how it perceives it to be.

Me: It was interesting how this illusion isn't considered a flaw but is rather a way the brain reduces visual noise. This is very important, even though it can create false perceptions sometimes.

Berkeley: That's exactly right, it's more for usefulness rather than the actual perfect truth. The mind strays more for coherence rather than perfect accuracy.

Me: We also saw this in the waterfall illusion when we looked at constant motion then as that motion stopped, we saw movement in the opposite direction. It feels like the mind looks more at change rather than sameness.

Me:

Professor Spemann, I was surprised by how early the eye starts forming. I didn't realize so much of it happens in the first couple of months.

Spemann:

Most people don't. A lot of the basic structure of the eye is already taking shape before someone even knows they're pregnant.

Me:

What stuck with me was your idea that the optic cup acts as an "organizer of the lens." It sounds like the eye parts aren't just forming on their own.

Spemann:

Certain tissues send signals that tell nearby tissues what to become. The lens doesn't just automatically become a lens. It is guided to become one.

Me:

So without those signals, tissue could have turned into something like skin?

Spemann:

Yes. The surrounding environment matters a great deal in development.

Me:

I also thought it was interesting that the retina is basically part of the brain that we can see during an eye exam.

Spemann:

The retina comes from the same tissue as parts of the brain. It's not separate in the way people imagine.

Me:

That honestly made vision feel more serious than I thought. It's not just about eyes. It's about the brain, too.

Spemann:

Vision is a collaboration between the eye and the brain from the very beginning.

Me:

I guess that's why the professor said this is technical now, but it is easier once we see it in the lab.

Spemann:

Once you see the structures for yourself, the ideas stop feeling so abstract.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 2 Dinner Conversation

Conversation with Till Eulenspiegel

Ellie: Hello Mr. Eulenspiegel, thank you so much for sitting with me for dinner tonight. I heard a bit about you during today's lecture for my Light and Life class. I was wondering if you could first start off by talking a bit about yourself.

Till Eulenspiegel: Hi Ellie. Of course. I'm from Germany and I'm known by many to be a trickster. I was born around 1300 in Germany and I go around town to town holding my owl and my mirror, exposing injustice, lunacy, and hypocrisy.

Ellie: So, you're famous for messing with people?

Till Eulenspiegel: Haha yes I guess... My story was made into music by Richard Strauss called Till Eulenspiegel's Merry Pranks which basically tells a story of my trips to the countryside poking fun at and mocking the establishment. I promise I relate to your class somehow though.

Ellie: Yes, go on...

Till Eulenspiegel: I am an expert in the concept of how easily people trust what they think they see. Light makes the world visible, but it can also make the world deceptive, hence why I go around carrying my mirror when pulling pranks.

Ellie: True, I learned during the lecture that various mirrors tell us about ourselves and the world around us.

Till Eulenspiegel: Yes, yes, that's absolutely true. I believe that a mirror is like a test. People think it shows "the truth," but really it shows a version of the truth. That's why it's so useful in my pranks.

Ellie: So the mirror isn't lying, but people misunderstand what it's showing them?

Till Eulenspiegel: Exactly! People don't just see with their eyes, they see with their assumptions.

Ellie: That actually connects to what we've been learning... Light follows rules, but perception can be unreliable. I have a question for you. If you don't mind me asking, how did you die?

Till Eulenspiegel: Well, turns out they didn't appreciate my pranks so I was captured by the authorities and died through my death sentence. I just hope my message will live forever.

Dinner with Roger Bacon

A monastery refectory, candles guttering in the draft. Roger Bacon sits across from me in his Franciscan habit, a lens resting on the table beside his wine cup like a small transparent argument.

Me: Brother Roger, I've been thinking about something that strikes me as almost paradoxical in your work. You insisted that nothing should be accepted on authority alone, that experiment must confirm what reason proposes. And yet you pursued all of this in explicit service of the Church. Didn't those two commitments pull against each other?

Bacon: (breaking bread slowly) You assume a tension that I never felt. Tell me, when a physician refuses to guess at a diagnosis and instead examines the patient directly, does he dishonor medicine? I examined creation directly. That is not defiance of the Creator. It is the deepest form of reverence I know.

Me: But the Church didn't always see it that way. You were imprisoned for your ideas. Doesn't that suggest the institution felt threatened by the very method you were defending?

Bacon: (a dry smile) The institution is composed of men, and men suffer from all four of the obstacles I described: flawed authority, force of habit, popular prejudice, and above all, the cloaking of ignorance in a show of wisdom. The Church itself is not those men. Grosseteste taught me that light is the first principle of creation. If God made the world through light, should I not study it with every tool available to me? The stained glass in our cathedrals, do you think those colors arrived by prayer alone, without someone first understanding how light bends through glass?

Me: That's a beautiful defense. But I want to press you on something. You wrote that every investigation not directed toward salvation is "totally blind and leads finally to darkness." Isn't that its own form of the closed thinking you criticized? What about knowledge pursued simply because it is true?

Bacon: (pausing, setting down his cup) You quote me fairly. But consider what I meant. A man who masters optics in order to deceive – to forge documents, to build weapons for tyrants – has let his knowledge lead him into darkness. I did not say truth is dangerous. I said purposeless knowledge can be. Salvation, for me, was a wide word. It meant the full flourishing of the human being – body, mind, and soul. When I wrote that lenses might help old men read scripture, I was not merely being pious. I meant that extending the reach of the human eye extends the reach of the human mind, and therefore the human spirit. That is salvation in the broadest sense.

Me: So you would not be troubled by scientists today who study light with no religious motivation whatsoever, who simply want to understand how photons behave?

Bacon: (leaning forward) I would ask them one question only: do they follow the evidence wherever it leads, or do they stop when the evidence becomes inconvenient for their preferred conclusions? If they follow it honestly, if they have the courage to be in the minority of one when the evidence demands it, then they are doing exactly what I asked. The name they give to that courage is their own affair.

Me: (quietly) I think you would have been a difficult man to imprison for long.

Bacon: (standing to leave, picking up the lens) They kept me for fourteen years. But they could not imprison the light.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 2: Geometrical Optics and Image Formation

Daniel J. Simons

Jenny: Hello Dan! It's a pleasure to be here with you today.

Dan: Hi Jenny, likewise. Have you thought about what you would like to order?

Jenny: Ah yes! I studied the menu for a bit beforehand – I always get some sort of smoked salmon or egg benedict for brunch. You can never go wrong with these.

Dan: Oh really? I love to try new menu items whenever I visit new restaurants.

Jenny: I wish I was that brave, but my taste buds don't allow for it.

Dan: Actually, I'm a picky eater too. But there's something exciting about the uncertainty. When I do find something I like – which is rare, honestly – it feels like I've scored a goal.

Jenny: Do you never consider the tradeoff of taking that risk? I mean you spend money on dining out and, of course, sacrifice time and your tastebuds. Doesn't it feel wasteful?

Dan: I used to think that way too. But when you only focus on one face of a problem, you stop noticing everything else. Almost like how you didn't see the gorilla in the video in your light and life class the other day.

Jenny: Oh my god, how do you know about that?

Dan: That's besides the point. You were so focused on counting the passes that your visual system filtered out something unexpected, even though it was right in front of you.

Jenny: I think I do that with my major too. I'm studying business, and I've convinced myself it's the only feasible path. I don't love it but I don't hate it either because it feels safe and structured.

Dan: Have you tried looking into anything else at Cornell? They do say "any person, any study."

Jenny: Hmmm...yes actually. Not a major, but a minor. It's called Community Food Systems. The minor focuses on food security, food sovereignty, and food justice – how local food systems can be shaped to be more equitable and sustainable. It blends social science, environmental studies, and community work.

Dan: Maybe you can take some classes and see if you enjoy them and add the minor as a little bow on top of your business degree. Then, maybe you won't feel so tied down to being a finance bro.

Jenny: Where did you even learn to say “finance bro”?

Dan: I always keep up with the younger generation. Anyways...exploring and trying new things is the whole point of living and life. So maybe try something other than egg benedict next time.

Me:

Dude Vincent of Beauvais, why were mirrors such a big deal back then?

Vincent of Beauvais:

Mahidul let me tell you something, during my time people mostly used polished metal mirrors, but tin-coated glass mirrors produced much clearer reflections.

Me:

So glass mirrors worked better than metal ones?

Vincent of Beauvais:

Exactly! Glass mirrors could create flatter and more accurate reflections compared to polished metal surfaces.

Me:

When did people start making the really good mirrors?

Vincent of Beauvais:

By the 16th century, Venetian glassmakers became famous for producing high-quality mercury-coated plate glass mirrors.

Me:

Wait, Venice was known for mirrors?

Vincent of Beauvais:

Yes Mahidul how did you not know! Venetian craftsmen were skilled, and their mirror-making methods were considered secret and extremely valuable.

Me:

So how did the rest of Europe learn the secret?

Vincent of Beauvais:

The process eventually spread through Europe because of industrial espionage, where people secretly tried to learn and copy the techniques.

Me:

That honestly sounds like spy stuff.

Vincent of Beauvais:

In many ways, it was. Countries wanted the technology because fine mirrors were expensive and highly desired.

Me:

Was mercury dangerous to use?

Vincent of Beauvais:

Very dangerous. Mercury is toxic, so later manufacturers replaced it with safer materials such as silver, tin, and aluminum.

Me:

That's actually really interesting.

Vincent of Beauvais:

The history of mirrors shows how science and technology changed everyday life over time.

Me:

Thanks for telling me all of this!

Vincent of Beauvais:

No problem, Mahidul. Keep being curious about history and invention!

Benito Jaramillo
PLSCI 1130
January 26, 2026

Conversation with Augustin of Hippo

Benito: Saint Augustine, thank you for joining me for dinner. I hope you are hungry as we have a big meal ahead of us.

St. Augustine: Hello Benito, Thank you for inviting me into your beautiful home. Blessed be the lord that he has provided this food for us to enjoy tonight.

Benito: So Saint Augustine, I've been reading your book confessions and was wondering why you decided to write it in prayer and through scriptures instead of explaining it as pure theology?

St. Augustine: That is a great question Benito, I decided to write the book as a direct reflection of my life using prayer and the scripture as a lens to better understand myself. The scriptures teach us how to live and how to confront different situations that live and God presents us, but what about after we have lived? We need to look back at the scriptures in order to understand, analyze and illuminate every aspect of our lives so we can understand ourselves better.

Benito: I never looked at it that way, it makes a lot of sense for us to not only guide our lives based on the word of God but also judge our actions using the scriptures as a mirror into our lives. I also wanted to ask you about one of your famous quotes from the book Confessions Book X: "You called, you shouted, and you broke through my deafness; you flashed, you shone, and you dispelled my blindness." What did you mean by it?

St. Augustine: That quote reflects on how God is the light that shines and shows us who we truly are. Our lives are made to mirror that of Jesus and of God but without light how can we see that reflection? In order for us to see our souls we need a light, the same way we need the sun to see the wonders of our world.

Benito: This has been a very inspiring conversation, it has made me understand so much better the position from where you come from and your inspiration to write your book Confessions.

St. Augustine: Exactly, I did it as a way to guide the children of God into making self assessments and looking inwards to truly understand if they are living in the true ways of God. By the way, the food absolutely delicious.

Lecture 2: Dinner Conversation with George Berkeley

Light and Life | Vansh Kakra | vk365

Vansh: You really mean it when you say objects don't exist unless they're perceived?

George Berkeley: I do. What we directly know are our perceptions - colours, shapes, sounds. The idea of a solid object existing completely independent of any mind is something people accept without ever questioning.

Vansh: But that feels extreme. If I leave the room, the table doesn't just vanish.

Berkeley: My point wasn't that the table disappears into nothingness, but that its continued existence depends on being perceived. Not necessarily by you, but by a mind.

Vansh: And that's where God comes in.

Berkeley: Exactly. God perceives everything at all times, which explains why the world feels stable even when no human is around to see it.

Vansh: I get the logic, but it still feels like you're avoiding the simpler answer—that matter just exists on its own.

Berkeley: I was trying to point out that “matter” is an idea people use without realising they've never actually experienced it directly. They've only experienced sensations.

Vansh: From my side in data science, we treat the world as if it's solid and objective. Prices, assets, risks. Your view makes it feel like everything is... fragile.

Berkeley: Fragile, yes but also honest. Markets work because people agree on meanings such as value and ownership. Strip away minds entirely, and those concepts collapse faster than any physical object.

Vansh: So you'd say value isn't really in things, but in perception?

Berkeley: Precisely. A coin or paper money or even a signed NDA - none of it means anything without minds to care about it.

Vansh: That's unsettling, especially if you're planning a career built around “real” assets and asset-based securities in Private Credit that require valuations.

Berkeley: Then it's worth remembering how much of what you call real depends on belief, expectation, and shared understanding.

Vansh: That's a good way to put it.

Selina Ke
Dinner Conversation with Joe Novak

Selina: Professor Novak, something about concept maps has been bothering me in a good way. They don't move in straight lines.

Novak: Well, that's because knowledge doesn't.

Selina: When I build one, I notice how often I have to stop and rethink what I'm doing. The question I start with doesn't always hold. As the map grows, I realize I need a better question.

Novak: That's how understanding deepens. Learning isn't about filling in blanks, it's about reshaping how ideas fit together.

Selina: What stays with me is how the map asks me to choose what matters most. Not everything can sit at the same level. Some ideas support others, and some only make sense once the bigger picture is clear.

Novak: Meaning comes from those relationships. Without them, ideas stay isolated.

Selina: And that feels true beyond studying. As a Dyson major I often feel like there is only one linear path to follow, the path most people take, internships, networking, banking, step by step, like everything is already mapped out.

Novak: Straight lines are comforting, but they rarely show the full picture. Life, like knowledge, grows through connections, detours, and revisions.

Selina: But my own interests don't line up that way. I care about business, but I also care about social justice. When I think in terms of concept maps, I don't see a conflict. I see connections, like money shaping opportunities and systems shaping outcomes.

Novak: You're seeing how ideas connect, instead of forcing yourself to choose just one box.

Selina: Another thing I like is that one map is never enough. You can explain how light forms an image without talking about the eye, or talk about vision without talking about the mind.

Novak: One map doesn't show everything. Wisdom comes from linking them.

Selina: Maybe my life doesn't need one perfect plan. Maybe it's okay to build different maps as I grow and let them connect over time.

Novak: Learning is always unfinished. That's not a flaw, it's a feature!

Dinner Conversation with Benjamin Franklin

Me: So bifocals. The story I've heard is that you got tired of switching between two pairs of glasses at dinner, so you cut them in half and glued them together. Is that actually how it happened?

Franklin: More or less. I was in Paris and the French serve very long dinners. I could see my plate or I could see the person across from me, but not both, and switching glasses between every course made me look like a fool. So I had a man cut the lenses and set them in a single frame. The near pair below, the far pair above. After that I could eat and converse at the same time, which in France is the whole point of the evening.

Me: That's such a practical solution for something philosophers would have written ten books about.

Franklin: Philosophers were not the ones squinting at the soup. I have noticed that most useful inventions come from people who are mildly annoyed. Great suffering produces poetry. Mild annoyance produces tools. I have been mildly annoyed my entire life and it has served me well.

Me: You invented so many things though. The lightning rod, the stove, the glass armonica. Did you ever want credit for any of it? Patents, money, anything?

Franklin: No. I took the position early that if a thing was useful it should belong to everyone, and if it was not useful it was not worth fighting over. Other men disagreed and got rich. I do not begrudge them. But I slept better.

Me: I want to ask about the kite, because everyone learns that story in school and I've never been sure how much of it is true.

Franklin: Enough of it. I did fly a kite in a storm. I did draw a charge from it. I was more careful than the story suggests, because I had read about a Russian who tried something similar and was killed, and I had no interest in joining him. I stood under a shed, I kept the silk ribbon dry, and I touched the key with the back of my hand so that if anything went wrong my muscles would pull me away rather than clench me to it. The story makes me sound braver than I was. I was curious and I was cautious. Those two can coexist.

Me: That's the thing that strikes me about you. Everyone treats you like this folksy character with the kite and the almanac, but you were also doing serious science and serious politics at the same time.

Franklin: The folksy character was useful. In Paris especially. The French wanted a backwoods American philosopher in a fur cap and I gave them one. Meanwhile I was negotiating the treaty that ended your war. People underestimate a man who lets them. That is the oldest trick I know, and I recommend it.

Augustine of Hippo: Light, Truth, and the Eyes of the Mind

Me: Augustine! It's so good to see you!

Augustine: Maximo! Of course! Always happy to visit you! Is that carbonara I'm smelling?

Me: It is! Fresh off the stove. Listen, Augustine, I've been reading something interesting for my class. We've been studying the history of light and vision, and your name came up. A Franciscan monk from the 13th century wanted to reclaim scientific knowledge for the Christian faith, and the lecture says he was following your example. What was your thinking behind that?

Augustine: Well, Maximo, it's quite simple really. The Greeks and the Romans, they discovered wonderful things about nature. Mathematics, philosophy, the workings of the heavens. Now, some of my fellow Christians wanted to throw all of that away because it came from non-Christian sources. I thought that was foolish! I compared it to the Israelites leaving Egypt, they took the Egyptians' gold with them! Truth is truth, Maximo. It doesn't matter who finds it. If a pagan discovers something true about the world, that truth belongs to God.

Me: And it seems like your idea had legs. Roger Bacon used exactly that reasoning to justify studying the work of Islamic scholars like Alhazen, who completely changed how we understand vision. Without you setting the precedent, maybe Bacon never touches those texts.

Augustine: That is wonderful to hear. I always believed that studying the created world brings us closer to the Creator. If God made light, then studying light is devotion, not a threat. But tell me what did this Alhazen discover?

Me: So this is the interesting part. For centuries, the Greeks believed we see because rays shoot out from our eyes and touch the objects around us. Alhazen got thrown in prison by a Caliph, and sitting there in the dark, he realized he could only see when sunlight came into his cell. He concluded that light goes from objects into the eye not the other way around. He overturned a thousand years of accepted thinking.

Augustine: From a prison cell! That is remarkable. And you know, Maximo, this connects to something I thought about a great deal the relationship between our senses and our understanding. The eye receives light, yes, but it is the mind that truly sees. I wrote about this. The eye captures an image, but without what I call divine illumination the inner light of the mind we cannot grasp truth. A man can look at the world and see nothing. Another looks at the same world and perceives God's hand in it.

Me: That's a beautiful way to put it, Augustine. The eye captures, but the mind sees. I think that's something I'll carry with me for a long time. Thank you so much for this conversation and for the carbonara company!

Augustine: Thank you, Maximo! It was a wonderful evening. Take care of yourself, my friend!

Lecture 2: Dinner Conversation with Roger Bacon

Me: Hi Mr Bacon, thank you for meeting me for dinner today. In class, we learned that you believed mirrors could teach us not only about light, but also ourselves. Is that right?

Bacon: Absolutely. The idea of reflection helps us see both the world and ourselves more clearly.

Me: I've noticed that the Bible often uses mirrors and reflections as metaphors. Why did that stand out to you?

Bacon: Well, a mirror does not lie. Proverbs (27:19) states that just as water reflects the face, one's life reflects the heart. James (1:23-24) says someone who hears wisdom but doesn't act on it is like a person who looks in a mirror and immediately forgets what they saw. To me, learning only matters if it changes the way you go about your life!

Me: So I'm hearing that mirrors aren't just optical tools, but reminders?

Bacon: Exactly! In fact, there's a book called Speculum, which translates to mirror, written so that people could reflect on their actions. Pope Gregory also stated that the Bible itself is like a mirror for the mind.

Me: That makes sense. Following on from that, if mirrors help us reflect inward, what convinced you that experiments were necessary to understand the external world?

Bacon: Because words alone cannot reveal truth. Authority may guide us, but experience confirms understanding. I believed that reading or reasoning was never enough. You must test ideas with your own eyes. When studying light, I learned that observation and experiment reveal what books cannot. Without experience, knowledge remains abstract. With it, ideas become real.

Me: Now I'm curious. I just talked to Alhazen last week and would love to hear about your work.

Bacon: Ah! I spent much of my time building on the work of scholars like Alhazen. By experimenting with reflection and refraction, I learned how images form and how vision depends on light entering the eye. These observations taught me that nature follows patterns that can only be discovered through experimentation.

Me: Thank you for your time, Mr Bacon! Dinner with you definitely gave me something to reflect on.

Dinner with Carl Pulfrich was not what I expected.

First of all, he brought his own pendulum.

Not a gift. Not decorative. Just... a pendulum. Wrapped carefully in what looked like a vintage lens-cleaning cloth.

He set it down next to the salt shaker like this was a totally normal dinner move.

"I thought we might observe something delightful," he said in a very polite German accent.

"Cool," I said. "I made spaghetti."

He nodded gravely, as if I'd just presented a thesis.

We sat down, and he immediately began staring at my dining room light fixture.

"You have very stable oscillation conditions," he said.

"Thanks," I said. "It came with the apartment."

He squinted at me.

"Do you by chance have sunglasses?"

"Yeah?"

"Only one lens will do."

This should've been my first red flag.

So now it's 8:17 p.m. and I'm at my own dinner table wearing sunglasses with one lens popped out while Carl Pulfrich is gently swinging a spoon tied to a piece of string over my mashed potatoes.

"Observe carefully," he says.

"It's just swinging left and right."

"Ah," he says, smiling mysteriously, "but is it?"

He hands me the single dark lens.

"Place this over one eye."

“Which one?”

He pauses dramatically.

“Let destiny decide.”

I hold the lens over my right eye.

The spoon keeps swinging.

Except now it doesn't.

It's moving in a weird oval. Like it's coming toward me and backing away. Like it's doing a tiny spaghetti-themed rollercoaster.

“WHAT,” I say.

Pulfrich claps once. Not loud. Just a satisfied clap.

“You see depth.”

“It's literally just going side to side!”

“To both eyes equally, yes,” he says. “But when one eye is darker, it processes light slightly slower. A tiny delay.”

He leans forward.

“Your brain, in its arrogance, interprets this delay as depth.”

I stare at the spoon orbiting my mashed potatoes like it's training for the Olympics.

“So my brain is... faking 3D?”

“Precisely.”

He twirls some spaghetti calmly.

“This is known as the Pulfrich pendulum effect. A simple sideways motion becomes circular when one eye lags behind.”

I blink.

“So you’re telling me this spoon is not actually moving toward me?”

He nods.

“It is loyal to the left-right path. The illusion is yours.”

I look personally betrayed.

Ten minutes later, we are testing this on everything.

The ceiling fan? Looks like it’s spiraling into another dimension.

My cat walking across the room? Suddenly doing dramatic 3D runway modeling.

Pulfrich is delighted.

“This works best with predictable lateral motion!” he says, as my cat glares at us.

“Is this safe?” I ask.

“Safer than philosophy.”

Fair.

Mid-meal, I ask, “So how did you even figure this out?”

He shrugs casually.

“I worked with optics. I noticed that if one eye receives less light, the processing time changes. A few milliseconds.”

He holds up his fingers very close together.

“Just that.”

“And that tiny delay makes my brain think the spoon is moving in a circle?”

“Yes. The brain despises inconsistency. It would rather invent depth than admit confusion.”

I stare into the distance.

“Relatable.”

At some point, we forget about dinner entirely.

He's now swinging the pendulum faster.

"Speed increases the perceived depth!"

I nearly knock over my water.

"This is the most chaotic dinner I've ever had."

He beams.

"Physics should always be slightly chaotic."

Finally, dessert arrives. Chocolate cake.

He examines it carefully.

"With one eye darkened," he says, "even a flat image may appear sculpted."

I put the lens back over my eye.

The cake looks oddly dramatic. Like it's leaning toward me. Like it's whispering.

"I feel like the cake is judging me."

"It is not," he says gently. "Your neurons are."

As the night ends, he packs up his pendulum.

"One last question," he says.

"Yeah?"

"If your brain can so easily be convinced that side-to-side is forward-and-back... what else does it invent?"

I pause.

"That's not a chill thing to say before bedtime."

He smiles politely.

"Science rarely is."

He steps toward the door, stops, and adds:

“Remember—sometimes what appears circular is merely delayed.”

Then he leaves.

I sit alone at the table, holding a single sunglass lens over one eye, staring at a spoon.

It's just going left and right.

But honestly?

I don't fully trust it anymore.

Ean Pope

Jan 26, 2026

Dinner convo

Me: Yo... you Isaac Watts? Like the hymn guy?

Watts: *laughs* Yes, the same one. Though I also wrote about how people think and learn.

Me: That's actually why I wanted to talk to you. I'm in this Light and Life class and the notes mentioned how you said when you're trying to figure something important out, you should look at it from all sides and gather as much "light" as possible before deciding.

Watts: That is correct. Quick conclusions often lead to shallow understanding.

Me: That hit me because in the lecture we were talking about illusions and selective attention like how your mind can miss the gorilla in the video just because you're focused on counting passes.

It made me realize how easy it is to think you see everything when you really don't.

Watts: The mind often believes it has the full picture when it has only a piece.

Me: So here's my real question if we're just chilling at this party and I'm trying to live smarter: How do you actually slow yourself down enough to gather "all the light" instead of jumping to conclusions?

Watts: You train yourself to question first reactions. You look for other perspectives. You admit you may be missing something. Wisdom grows when patience replaces impulse.

Me: That makes sense. It's like in football if I only read one defender and don't see the whole field, I'm getting tackled.

Watts: A perfect example. Understanding requires seeing beyond the obvious.

Me: So basically, don't trust the first picture my mind paints?

Watts: Exactly. Let more light in before you decide what is true.

Me: I like that. Sounds simple, but it's hard.

Watts: The hardest lessons usually are.

Jasmine: Mr. Dawkins, isn't it crazy you figured out that natural selection really acts on genes, not entire organisms? And now we're seeing how science has progressed, and you are still here today to witness it all!

Dawkins: It is quite amusing to see how new scientists are growing on all these concepts us old people contributed decades ago. To be clear, though, Darwin showed that traits evolve. I simply asked what is actually being preserved through generations.

Jasmine: It is so insane to me that our bodies are made out of so many small compositions. We all live and die and our bodies come and go. However, genes persist. I thought about how it applies to eyes because that is what we are learning about. It is true that eyes do not appear fully formed.

Dawkins: Exactly. Genes accumulated small improvements. I will say I was blessed with good vision.

Jasmine: Lucky you... but that's the part that still confuses me. If the eye wasn't designed all at once, how does something so complex even start?

Dawkins: Very simply. Imagine a single light-sensitive cell, it can tell light from dark. If it sinks into a shallow pit, the organism can detect the direction of light. Just like what Randy was talking about in last class. So to add on what you have learnt, a narrower opening improves resolution, and eventually a transparent covering forms a crude lens. Each step is small, but each step helps.

Jasmine: Can I ask you something a bit more personal? Who inspires you?

Dawkins: Charles Darwin. Not only was he an absolutely bloody GENIUS of the idea of natural selection, but for the patience to follow evidence wherever it led. He was always curious, even if there is certainty in topics that apparently do not need disproving, and that is the most powerful inspiration of all.

Jasmine: Following evidence even when it changes what people believe... that must get controversial sometimes... right?

Dawkins: Frequently. Science does not exist to comfort us. It exists to describe reality as accurately as possible.

Jasmine: So when people ask if evolution removes purpose from life... what do you say?

Dawkins: It does not AT ALL personal meaning. The universe does not assign us a role. Just like how you can have the freedom to make your own identity.

Jasmine: I really like that. The English breakfast I made is ready— sorry for the wait!

Dawkins: This meal definitely has not evolved at all!

ME:

I have to admit something. When we watched the video in class, I was so locked in on counting the passes that I felt proud of myself. Then you asked about the gorilla and I honestly thought it was a joke.

DAN SIMONS:

That reaction is extremely common.

ME:

I actually laughed at first because I thought there was no way I could miss something that obvious. Then I replayed it and felt kind of stupid.

DAN SIMONS:

Most people do. But it is not stupidity. It is selective attention.

ME:

That made me think about how this happens to me all the time. Like when I am locked in on an assignment and someone says my name three times before I even realize they are talking to me.

DAN SIMONS:

That is the same process. Your brain is prioritizing one task and filtering out the rest.

ME:

So basically my brain is doing me a favor, even if it makes me look bad.

DAN SIMONS:

In a way, yes. If you tried to notice everything, you would not be able to focus on anything.

ME:

That actually made me think about sports too. When I am focused on one thing, like watching one player or one part of a play, I can totally miss something big happening somewhere else.

DAN SIMONS:

That is a great example. Attention always comes with a cost.

ME:

The part that really stuck with me is that even when you tell people about the gorilla ahead of time, some people still miss it.

DAN SIMONS:

Right. Knowing about the limitation does not always fix it.

ME:

That is kind of scary. It makes me wonder how many things I miss in real life and never even realize.

DAN SIMONS:

Probably more than you would expect.

ME:

The lecture also talked about how perception depends on how the brain combines information, like with depth and timing between the eyes. It made me realize how much of what I see is my brain's best guess.

DAN SIMONS:

That is exactly right. Perception is not a perfect recording. It is an interpretation.

ME:

So when two people remember the same situation differently, it might not even be about lying. Their brains could actually be filling in different stories.

DAN SIMONS:

Yes. Memory and perception are both shaped by attention and expectations.

ME:

That honestly explains so many arguments I have had where both people swear they are right.

DAN SIMONS:

That is one of the real-world takeaways of this research.

ME:

I guess the gorilla is funny, but the bigger point is kind of uncomfortable. We trust our eyes a lot, but they are not as reliable as we think.

DAN SIMONS:

That is the main lesson. Awareness feels complete, but it is actually very selective.

ME:

So next time I miss something obvious, I will try not to beat myself up too much.

DAN SIMONS:

That is fair. Just remember that attention is a limited resource.

ME:

Good to know. But if a gorilla walks through this party, I am definitely blaming you.

DAN SIMONS:

I will take responsibility for that one.

Ariel Vilensky

Lecture 2. Geometrical Optics and Image Formation

Me: Good evening, Dr. Novak. I've been learning about your concept maps, and I'm curious - what led you to create them in the first place?

Joseph Novak: It began with a problem in education. Students often memorize facts without truly understanding them. I wanted a way to make their thinking visible - to show how ideas connect, not just what they are.

Me: So concept maps are meant to represent relationships, not just information?

Novak: Exactly. Knowledge isn't a list; it's a structure. In a concept map, ideas are linked with meaningful connections, which helps students see how one concept builds on another.

Me: That seems especially useful in a topic like optics, where many ideas depend on each other.

Novak: It is. Concepts like light rays, lenses, and image formation are deeply interconnected. A concept map helps students organize those relationships, so they understand the system rather than isolated parts.

Me: Why is that better than just studying diagrams or equations?

Novak: Diagrams and equations are essential, but they don't always show how ideas fit together conceptually. A concept map forces you to ask: *How does this relate to what I already know?* That's where real understanding begins.

Me: So the goal is deeper learning, not just recall?

Novak: Precisely. When students build their own maps, they actively construct knowledge. That process makes the ideas more meaningful and easier to apply.

Me: Thank you, Dr. Novak. That gives me a new way to approach complex topics.

Novak: You're welcome. Remember - understanding grows from connections.

Karen Zheng, kz374

Dinner Conversation with Plato

Me: Hi Plato, I've been thinking about your Allegory of the Cave.

Plato: Yes, what would you like to know?

Me: Honestly, I don't know if people are just trapped or if sometimes we choose easier versions of reality.

Plato: Yes you bring up a good point. The cave is not only about being trapped by others. Sometimes people stay because the familiar feels safe.

Me: Yeah, for me taking a risk and leaving can sound exhausting. Like, imagine realizing everything you trusted might only be part of the story. I think I would rather stay comfortable in some situations as well.

Plato: Comfort is powerful. But comfort can also keep people from seeing more clearly because the cave is built from fear and convenience.

Me: Do you think that some people aren't choosing to see shadows? Sometimes that's just all they've ever been shown.

Plato: Yes, and that is exactly why we should be careful when we judge others. Most people don't choose their starting point. They inherit beliefs, perspectives, and limits from the world they grow up in. The cave is not a punishment, but simply a place where most people begin.

Me: That makes it feel less like people are ignorant and more like they just haven't had the chance to see something different yet.

Plato: Understanding grows through experience, exposure, and questioning. Without those, even the most capable mind can mistake shadows for truth.

Me: But what if the person who leaves the cave isn't automatically right either? What if they just found a different version of shadows?

Plato: Leaving the cave is not the end of learning. It is only the beginning. The search for truth requires constant questioning, even of what you think you have discovered.

Me: That is comforting. It makes the cave feel less like a trap and more like a starting point. Thank you for your perspective.

Dinner conversation with Hans Spemann

Me: Spemann, I've been thinking about your idea that the optic cup is like the organizer of the lens. I find it interesting how you showed that one piece of tissue can tell another what it should become. It feels like this idea is almost philosophical, have you thought about how radical that idea is?

Spemann: I knew how controversial it was at the time since almost everyone believed brain development was predetermined. This essentially means that cells have like a blueprint they follow. But, when I put tissue in and saw a new structure come in, it made me realize that context matters.

Me: That's what I find interesting. In class we talked about how the optic vessel basically causes the lens placode to form. The lens becomes a lens rather than skin because of it. This does make me think about how much of what we become is because of who we're next to.

Spemann: This curiosity is bringing biology into human life.

Me: I know but I can't help it. I can't stop thinking about what level of biology like the optic cup organizing the lens mirrors our life and how environments organize people.

Spemann: That is essentially the implication. Development is relational, there is not structure that forms in isolation. Even the retina forms through layered signaling.

Me: That sticks out to me too, the idea that the retina is really just brain tissue that has moved outward. It's kind of like the brain and vision isn't passive but rather structured.

Spemann: Correct, the eye isn't just sight but is also guided by instruction

Me: Ok I want to ask you this, if organizers are localized inducing molecules, how do they determine the organizer? What actually organizes the organizer?

Spemann: That is the question. There is really no single organizer, development comes through many cascades of influence.

Me: So there really isn't a single command center?

Spemann: No, just networks of interaction

Me:

Mr. Newton, I kept thinking about the prism experiment from the lecture. It's kind of crazy that white light already contains all the colors.

Newton:

Most people back then thought colors came from the objects themselves. The prism showed that the light already carried them.

Me:

So a rainbow isn't something new being created. It's just the light getting split up.

Newton:

The prism doesn't add color. It just separates what's already there.

Me:

That made me look at sunsets differently. When the sky turns orange or red, it doesn't just look cool; it's light bending and scattering in the air.

Newton:

Yes, the atmosphere changes how the rays travel, and different colors bend differently.

Me:

What surprised me more was learning that even if the light has all these colors, we only see them because of three types of cones in our eyes.

Newton:

The eye plays a large role. Light exists, but perception finishes the job.

Me:

So color isn't only outside of us. Part of it is happening in our brains, too.

Newton:

That's a reasonable way to think about it.

Me:

I like that idea. It makes color feel less like paint on the world and more like something our brain is helping create. Two people can look at the same thing and still see it differently, but we usually agree enough to call the sky blue.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 3 Dinner Conversation

Conversation with Hermann Snellen

Ellie: Hi Mr. Snellen, thanks for meeting with me for dinner! I'm currently taking a course called "Light and Life" and your name was mentioned in today's lecture. I was really curious about what you've accomplished but first can you tell me a little bit about yourself?

Hermann Snellen: Of course! I'm an eye doctor and I've always wondered how we can measure how well a person can see. So, I went ahead and developed the Snellen eye chart in 1862 which helps measure visual acuity.

Ellie: Wow, that's amazing. I've always used it when I go get my eyes checked at the doctors. Can you tell me more about how the eye chart works?

Hermann Snellen: Yes, so basically the person has to stand 20 feet away from the chart, cover one eye and read the letters starting at the top until they get to the line where they can no longer make out the letters. The last line that they can clearly read, gives their visual acuity.

Ellie: Ohh, yes I remember having to read the chart. What would you say is the standard person's eyesight?

Hermann Snellen: Well, a "standard" person has a visual acuity of 20/20. Others have better or worse vision. If someone was to have a visual acuity of 20/200, it would mean that they can see as clearly at 20 feet as a "standard" person can see at 200 feet so it would mean that their vision is legally blind.

Ellie: I've learned in lecture that there's also an angular term to visual acuity as well. Can you elaborate more on that?

Hermann Snellen: Yes, yes. In angular terms, "normal" 20/20 vision is tied to being able to distinguish small details separated by about one minute of arc.

Ellie: One minute of arc... that's like an extremely tiny angle, right?

Hermann Snellen: Very tiny. Your eye is essentially acting like an optical instrument that must separate two close points of light. If the image on the retina is too blurry or if the retina or brain can't resolve the detail those points blur together and you can't reliably identify the letters.

Ellie: Wow! Thank you so much, I was able to learn so much about the eye and people's vision.

Hermann Snellen: Yes, of course. Glad I could help!

Dinner with Hans Spemann

Me: Professor Spemann, your Nobel Prize recognized something that now seems almost philosophically strange: the idea that one tissue can instruct another to become something entirely different from what it would have become on its own. The optic cup reaches out and tells the overlying ectoderm to become a lens instead of skin. What struck you most about that when you first established it?

Spemann: (thoughtfully) What struck me first was the specificity. I had transplanted the optic cup to different positions on the embryo and found that wherever it made contact with the ectoderm, a lens formed. But it was not simply that any signal produced any result. The optic cup produced a lens, not a tooth or a kidney. The information carried in the induction was precise, directional, purposeful – if I may use that word without implying intention. The ectoderm cells did not decide to become a lens. They were told, by something in the contact with the optic cup, what they were to become. And they obeyed.

Me: The word organizer is interesting, and it implies something that imposes order on what would otherwise be undifferentiated. But we now know the relationship is reciprocal. The lens placode, once induced, sends signals back to the optic cup. The retina and the cornea join in. It is less like a commander issuing orders and more like a conversation.

Spemann: (nodding with visible pleasure) That is precisely the right image, and it is one I came to appreciate more fully as the work progressed. I originally thought of the organizer as a dominant element, the optic cup acting upon passive ectoderm. But the ectoderm is not passive. It responds, and in responding it changes the optic cup, which changes further still. The eye is not constructed by a single directing agent but emerges from a series of reciprocal inductions, each tissue informing the next. I find that more interesting than the simpler picture. It suggests that development is a dialogue, one in which every participant both speaks and listens.

Me: That is a striking contrast to how we usually think about building things. An architect draws a plan and workers execute it. But the embryo has no plan that exists prior to its execution, the plan and the execution are the same process.

Spemann: (leaning forward) This was what troubled the vitalists and the mechanists equally. The mechanist wanted to reduce development to chemistry – molecules binding, cells dividing, nothing more. The vitalist wanted to invoke a non-material organizing force. I tried to occupy a middle ground: the organization is real, it is physically mediated, it is chemical in its mechanism – but the result is a structured whole that cannot be predicted simply from knowing the properties of the parts. The optic cup is ectoderm. The lens is ectoderm. They are made of the same material. And yet when they are placed in contact at precisely the right moment, one becomes a light-focusing lens of extraordinary optical quality and the other becomes a light-sensitive retina capable of capturing images. The same material, organized differently by

what it encounters, becomes something entirely new. That seems to me one of the most remarkable facts in all of biology.

Me: And if the induction fails, if the optic cup never reaches the surface ectoderm, the child is born without eyes. The eye is not preformed in any single tissue. It exists only in the conversation between them.

Spemann: (quietly) Yes. The eye is a relationship before it is an organ. Remove either partner from the dialogue at the critical moment, and neither becomes what it was meant to be. I think there is something in that worth sitting with for a long time, well beyond its implications for embryology.

Me: You mean as a metaphor?

Spemann: (with a slight smile) I mean as a fact that invites reflection. I am a scientist, not a poet. But some facts have a weight to them that exceeds their technical content. That an eye requires a conversation to come into being seems to me such a fact.

Lecture 3 Dinner Party Conversation

Tyler: I thought eyes just worked automatically and that was basically it. I did not expect there to be so much physics involved.

Hermann Snellen: Vision can be measured quite precisely.

Tyler: The 20/20 thing surprised me because I always thought it meant perfect vision.

Hermann Snellen: It simply means standard vision.

Tyler: So someone with 20/200 is legally blind, and somebody with 20/10 actually sees better than average.

James Clerk Maxwell: Mathematics often reveals hidden relationships.

Tyler: Honestly the physics part kind of hurt my brain though. The cornea and lens are basically working together like camera equipment.

Harold Ridley: The eye relies on multiple refracting elements to focus light correctly.

Tyler: The cornea doing most of the focusing was not what I expected.

Harold Ridley: The cornea bends light strongly because of the difference between air and the tissue of the eye.

Tyler: And then the lens just fine-tunes everything.

James Clerk Maxwell: Optics often depends on small adjustments.

Tyler: The blind spot part was weird too because I had never really thought about how everyone literally has a missing piece of vision.

Hermann Snellen: The optic nerve leaves the retina through a region without photoreceptors.

Tyler: And somehow our brains are just like "don't worry, I'll fill that in."

James Clerk Maxwell: The brain interprets reality rather than merely recording it.

Tyler: That sentence is honestly kind of creepy.

Tyler: The rods and cones thing was cool too though.

Harold Ridley: Rods specialize in dim-light vision while cones specialize in color and detail.

Tyler: Which explains why things look weird at night.

James Clerk Maxwell: In low light your visual system relies more heavily on rods.

Tyler: So at night I can tell something is moving in the corner of my eye, but I cannot actually tell what it is.

Hermann Snellen: Peripheral vision is better at sensing movement than detail.

Tyler: And then the pupil thing got kind of funny because apparently your eyes are exposing your emotions all the time.

Harold Ridley: Pupil size changes in response to light and other stimuli.

Tyler: Basically my eyes are out here revealing information I did not approve.

James Clerk Maxwell: The body often communicates things without permission.

Tyler: That feels unfair honestly.

Tyler: So today I learned that eyes are part biology, part physics, and part my brain making stuff up.

Hermann Snellen: Vision is more complicated than simply seeing.

Tyler: To eyes then, because I definitely trusted mine more before this lecture.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 3: Development, Anatomy, and Physiology of the Eye

Hans Spemann

Jenny: Dr. Spemann, it's wonderful to speak with you. How are you doing today?

Dr. Spemann: It's lovely to meet you. I am doing fantastic. How about you?

Jenny: I'm feeling a little sick...which is why my eyes are a little red. I hope you don't mind.

Dr. Spemann: Not at all. It's quite fitting, actually. Red eyes are a good reminder of how delicate and complex the eye really is. It's something I've spent much of my life studying.

Jenny: I actually really wanted to ask you about your work on embryonic development. What first made you want to study how embryos develop?

Dr. Spemann: That's a classic question. I've always been fascinated by how life unfolds from such a tiny, simple beginning. I wanted to understand how a cluster of cells could organize itself into something as complex as an eye or any other organ.

Jenny: That's amazing. So it was curiosity that drove you at first?

Dr. Spemann: Of course not! I knew from day one that I'd win a Nobel Prize. Haha...Well, actually, no. I didn't set out to win a Nobel. I just wanted to watch something so small grow into something so important in human life – and, of course, figure out the rules along the way.

Jenny: You're very funny, Dr. Spemann.

Hans: No please, call me Hans. Like the evil man from Frozen...

Jenny: Woah... how do you even know what Frozen is?!

Hans: Well, as a ghost, my favorite pastime is to binge watch TV shows and my favorite Disney movies.

Jenny: Is that why you wear glasses now?

Hans: I never really wore them when I was alive, but ever since humans invented the screen... Well, it's easy to see why people need them nowadays. Eyes deteriorate over time, and all the screens we stare at only make it worse.

Jenny: Tell me about it. I feel like my phone and laptop are conspiring against me.

Hans: Exactly! The eyes weren't built to focus on bright pixels for hours. Strain, dryness, even redness like yours today – it all adds up.

Mahidul Islam Dinner Conversation

PLBio 1130 2/17/26

Me:

Fam Hans Spemann, what did you find about eye development?

Hans Spemann:

Well Mahidul, I studied how different tissues develop in embryos, like during the formation of the eye.

Me:

So what was the optic cup supposed to do?

Hans Spemann:

I hypothesized that the optic cup acts as an organizer of the lens that means that it helps guide nearby tissues to develop into the lens of the eye.

Me:

Wait, so one tissue can tell another tissue what to become?

Hans Spemann:

Exactly Mahidul you starting to think like me! Certain tissues in developing embryos can influence how surrounding cells grow and specialize.

Me:

How did you prove that idea?

Hans Spemann:

I performed tissue transplant experiments where I moved tissues from one embryo to another and saw how they affected development.

Me:

And the tissues actually changed what other tissues became?

Hans Spemann:

Yes, Mahidul. The transplanted tissues could induce nearby cells to develop into completely different structures.

Me:

That's honestly really crazy to think about.

Hans Spemann:

It was an crazy discovery because it showed that embryonic development is controlled by signals between tissues.

Me:

Is that why people called them organizers?

Hans Spemann:

Exactly. Organizers help direct and organize the development of other tissues in the embryo.

Me:

Did you win any awards for this research?

Hans Spemann:

Yes, I won the Nobel Prize in 1935 for my work!

Me:

That's actually really impressive. I am proud of you!

Hans Spemann:

Understanding development helped scientists learn how complex organisms form from simple cells.

Me:

Thanks for telling me all of this!

Hans Spemann:

No problem, Mahidul. Keep learning about Biology!

Benito Jaramillo
PLSCI 1130
February 03, 2026

Conversation with John Muir

Benito: John Muir it is great to see you again, thank you for joining me for dinner. I hope you are hungry as we have a big meal ahead of us.

John Muir: Hello Benito, Thank you for inviting me into your beautiful home. I just came from hiking for days in the Adernodachs.

Benito: So John, I've been reading about your different adventures and was wondering how you view light in relation to the world? What drives you to continue exploring and admiring nature in such a way?

John Muir: That is a great question Benito, I've dedicated my life to nature and the biggest teaching that i've had is that nature doesn't just reflect light, it teaches us how to see it and appreciate it. We have lost connection with nature and with real light, so I view it crucial to maintain a relationship with all that surrounds us that completes the life cycle.

Benito: I never looked at it that way, it makes a lot of sense seeing that today most of the light that we interact with is artificial same with the colors that we see. I also wanted to ask you about the time that you lost sight for a couple of days if you don't mind. How did it change your perception of the world? Did it change how you appreciate nature?

John Muir: That experience changed my entire life, losing sight in both eyes for a while made me realize that nothing in this world is a given and that perception is everything. We might be seeing the most beautiful waterfall when someone next to us cannot see it or comprehend it. It made me realize that the ability to see is a gift and that we should cherish it in the best way that we can.

Benito: This has been a very inspiring conversation, it has made me understand so much better the way in which you live your life and your philosophy. It has opened my eyes in a way and has taught me to appreciate nature and our world more. Hope you enjoyed the food.

John Muir: Thank you for the compliment, it is a pleasure always to talk to people that are keen and open to better understand the world. The food was absolutely delicious and much needed, you should join me on a hike someday. Thank you!!

Lecture 3: Dinner Conversation with Professor Spemann

Light and Life | Vansh Kakra | vk365

Vansh: I have to start with this. You tied a baby hair around an embryo and somehow changed how an animal developed. That's either brilliant or slightly unhinged :)

Hans Spemann: I've heard both descriptions. In my defense, microscopes were limited and curiosity was abundant. You use what you have, isn't it?

Vansh: Fair enough. But when you discovered what later became known as the organizer, did you immediately realize how big that was? Or did it feel like just another strange result?

Spemann: At first, it felt like confusion. One small piece of tissue, moved to another place, suddenly telling the rest of the embryo what to become. I remember thinking, "Why is this tiny thing giving orders?"

Vansh: That's what gets me. You showed that development isn't just cells doing their own thing. It's more like someone quietly coordinating the whole operation.

Spemann: Quietly is the right word. The organizer doesn't shout, it just nudges and gives signals while the rest of the cells respond as if they were waiting for instructions.

Vansh: Did that change how you thought about life?

Spemann: Very much so. I stopped thinking of organisms as machines and more as a division of power dynamics. Each part listening, responding, adjusting in kind of a unique way.

Vansh: I like that. But let me challenge you a bit. Isn't it unsettling that so much depends on such a small signal? One mistake and everything goes wrong.

Spemann: It is unsettling, but life is not built with backup plans everywhere.

Vansh: That's oddly comforting and terrifying at the same time.

Spemann: Science often is. We uncover beauty, and then we realize how fragile it is.

Vansh: Were you ever disappointed that your work raised more questions than answers?

Spemann: Often but if an experiment closes the book, it usually wasn't a very good one.

Vansh: So you're saying confusion is part of progress.

Spemann: Not just part of it. It's the sign you're doing something right.

Vansh: I didn't expect a developmental biologist to make me feel better about not fully understanding things.

Spemann: Then dinner has been productive!

Selina Ke

Dinner Conversation with George Adams

Selina: You work with instruments all day. Lenses, glass, tools like that. Do you ever stop thinking about how things work?

Adams: Not really. I enjoy it. The way parts come together, that's where meaning hides.

Selina: I was thinking about the eye earlier. It's strange how we depend on it for almost everything, but barely notice it unless there's a problem.

Adams: That's usually a sign of good design. When something works well, it stays out of the way.

Selina: But eyes aren't always reliable. Some people can't see well at all. If one of your instruments worked only sometimes, you'd probably call it flawed.

Adams: True. But the eye isn't just a tool we hold in our hands. Even my instruments are more than objects. They shape what we're able to know.

Selina: So seeing isn't only about avoiding danger or finding things.

Adams: No. It's also about noticing color, faces, distance, beauty. It helps us feel oriented in the world.

Selina: Still, I wonder if we really see as much as we think. We look at things all day, but we don't always pay attention.

Adams: That's an important difference. The eye gathers information, but attention gives it meaning. An instrument matters because of how it's used.

Selina: Then maybe the bigger issue isn't whether the eye is perfectly made, but what we do with what it shows us. We see beauty, but also suffering and inequality.

Adams: And once we see those things, we can't pretend we didn't. Sight brings responsibility.

Selina: So would you say that being able to see the world clearly also asks something from us, to respond, not just observe?

Adams: I would. A gift like vision isn't meant to be passive!

Dinner Conversation with Harold Ridley

Me: So you were a wartime eye surgeon, and you treated this fighter pilot who had Perspex from his shattered canopy embedded in his eye, and that's where the idea for plastic lens implants came from. Is that actually how it clicked?

Ridley: It clicked slowly. I treated Cleaver in 1940 and I did not put in the first implant until 1949. What struck me at the time was simply that the eye was not fighting back. Pieces of aircraft canopy had been sitting in his eye for months and the tissue around them was calm. No infection, no inflammation, no rejection. That was unusual enough to remember.

Me: And then nine years later you just decided to try it.

Ridley: Not just decided. I had been thinking about cataracts for years. After surgery the patient was essentially blind in that eye without thick spectacles that distorted everything. It seemed obvious that if you removed a lens you should replace it. The obvious part was easy. Finding a material the body would tolerate was the problem, and Cleaver had answered that question without meaning to.

Me: I read that you did the first surgery in secret. That part seems wild to me.

Ridley: It was necessary. If I had announced what I intended to do, the medical establishment would have stopped me. So I did it quietly with a patient who consented and a colleague who kept his mouth shut. The lens went in. The eye accepted it. The patient could see. And then I had to wait to find out whether anything would go wrong, because nothing like this had been done before.

Me: How long did you wait?

Ridley: Years. And when I finally published, the reaction was worse than I expected. Surgeons accused me of recklessness. Some refused to speak to me. There were complications in the early cases, which I admitted, and which my critics used to argue the whole idea was mad. It took thirty years for the field to come around. By the time they did, I was old enough that the recognition felt like it belonged to someone else.

Me: Did the original patient ever know what she'd been part of?

Ridley: She was a nurse, which helped. She understood what she was agreeing to better than most patients would have. I saw her again years later and she still had the lens, still working. I have thought about that often. One woman in 1949 said yes to something no one had ever tried, and millions of people now see because of it. The history books tend to leave her out, but she was the one who took the actual risk. I only did the operation.

Maximo Mander

Harold Ridley: From Warfare to Healing

Me: Harold! It's so good to see you! Thanks for making the trip!

Ridley: Maximo! A pleasure, truly. Is that lasagna I'm smelling?

Me: It is! Fresh out of the oven. Listen, Harold, I've been reading about you for my class, and there's something I can't stop thinking about. Your whole breakthrough came out of the war. A fighter pilot gets shot down in combat, and somehow that ends up being the thing that lets millions of people see again. How do you sit with that?

Ridley: Ah, Maximo. You've put your finger on something I thought about for years. It was 1940, and they brought in Lt. Gordon Cleaver, Mouse, everyone called him. His canopy had shattered in combat and his eyes were full of Perspex. A terrible thing. And yet, as I examined him over the following months, I noticed something extraordinary, his body was not rejecting the plastic. No inflammation, no infection. The shards simply sat there, tolerated.

Me: And that observation changed everything.

Ridley: It did. But you're right to feel the weight of it. So much of modern medicine carries the fingerprints of violence. I don't pretend that makes the violence worthwhile. But I owed it to Mouse, and to the others, to make something useful of what I saw in their eyes.

Me: That's a fair way to hold it, Harold. Here is what I really wanted to ask you. In 1949, when you performed the first lens transplant, you did it in secret. The establishment said the operation was too risky. You went ahead anyway. How did you justify that?

Ridley: I won't pretend it was simple. My patient had lost her natural lens to cataract surgery. She consented, fully. And I had spent years, Maximo, years, satisfying myself that Perspex was safe inside the human eye.

Me: But what gives one surgeon the right to overrule the consensus of his field?

Ridley: A fair question. The establishment's caution wasn't based on evidence that the lens would fail. It was based on the fact that no one had done it before. That is not science. That is timidity wearing the robes of science. Had I waited for permission, my patient would have lived out her life in a blur.

Me: And yet you were mocked for decades after. If you were right, why did it take so long?

Ridley: Because the truth is often unwelcome when it arrives early. Medicine has its orthodoxies like any other field, and a man who goes around them pays a price, even when he is right. Perhaps especially when he is right. Today, cataract surgery is the most common operation in the world. Millions of people see because of what I did in secret that afternoon in 1949. I take some comfort in that.

Me: Well, Harold, I think you've earned your comfort. Would you care for some dessert?

Ridley: I think I'll pass, Maximo, the lasagna has done me in. Thank you for having me, my friend. Take care of yourself.

Maximo Mander

Lecture 3: Dinner Conversation with Hans Spemann

Me: Good evening Dr. Spemann, thank you for meeting me! In class, we learned about your work on eye development, and I was most fascinated by your idea that the optic cup acts as an organizer of the lens. Can you tell me more about that?

Spemann: Of course! During early development, the optic cup comes into contact with the surface ectoderm. This contact sends signals that cause the ectoderm to become the crystalline lens instead of skin. Without this interaction, the lens would never form.

Me: I always thought that the eye just formed automatically. There really is a scientific explanation for everything.

Spemann: Development is far from random. Cells must communicate with one another! Through my transplant experiments, I showed that when organizer tissue is moved, it can cause entirely new structures to form. This helps explain that growth depends on instruction, not just genetics.

Me: That is incredible. I want to know, what discovery was most surprising to you?

Spemann: Honestly, how cooperative life is. Cells are constantly responding to signals from their neighbors. A small group of cells can influence the fate of many others. It showed me that development is truly a carefully coordinated process, much like teamwork. Every part has a role and without signalling, structures like the retina or lens would never appear.

Me: Absolutely. Now, what made you realize experimentation was the key to understanding this phenomenon?

Spemann: Observation alone could not answer all my questions. By transplanting parts of the optic cup and placing them in new locations, I could see how the nearby tissues responded. These experiments then gave me the ability to trace cause and effect directly.

Me: Alright last question. If you could leave me with one takeaway, perhaps beyond biology, what would it be?

Spemann: That's a hard one. Hmm, I would say all complex systems depend on communication. The eye forms because cells exchange information and cooperate. No structure develops in isolation. Whether in embryos or in life, growth comes from interactions. I hope that is insightful to you.

Me: Our whole conversation was absolutely insightful! Thank you for sharing your thoughts.

Dinner with Bernard Nathanson was... intense.

Not awkward. Not boring.

Just intense in the way that only a former obstetrician-gynecologist, co-founder of an abortion rights organization, later anti-abortion activist, documentary narrator, and Cornell University alum can be.

And there I was.

An undergraduate freshman.

With a meal plan.

He arrived precisely on time.

"I understand you attend Cornell," he said, shaking my hand firmly.

"Yeah. Freshman."

He raised an eyebrow. "Ah. Still optimistic."

"That obvious?"

"You haven't mentioned prelims yet."

Fair.

We sit down.

He looks around my dorm dining hall like he's conducting a medical evaluation.

"This is where intellectual formation occurs?"

"And chicken nuggets," I say.

He nods solemnly. "A crucible."

For context: Bernard Nathanson was a physician who helped found the National Association for the Repeal of Abortion Laws in the late 1960s (which later became NARAL). Then—plot twist of the century—he publicly reversed his position years later and became a leading anti-abortion advocate.

That's not exactly light dinner conversation.

But he jumps right in.

“When I was at Cornell,” he says, “I studied medicine with great seriousness.”

“I just figured out how to do my own laundry,” I reply.

He studies me like I’m a fascinating case file.

“Growth is nonlinear.”

“I failed my first chem quiz.”

“So did many physicians,” he says calmly. “Though perhaps not proudly.”

Mid-bite of pasta, he leans forward.

“You are studying what?”

“I’m undeclared.”

He nods slowly.

“Ah. The purest form of academic honesty.”

He then proceeds to talk about his medical training, how ultrasound technology changed the way physicians—and the public—perceived fetal development, and how that influenced his shift in beliefs.

He describes narrating the documentary *The Silent Scream*.

I sip my soda nervously.

“This is the most serious dinner I’ve ever had.”

“History is serious,” he says. “But humans are not.”

He gestures to my tray.

“You have eaten pizza three times this week.”

“Twice.”

He says nothing.

The silence is devastating.

At one point, he asks, “Why did you choose Cornell?”

“Good program. Pretty campus. Ivy League bragging rights.”

He smiles faintly.

“When I was there, we argued fiercely about ethics, medicine, and society. The university should disturb you.”

“It definitely disturbed my bank account.”

He almost laughs.

Almost.

Then he suddenly points to my phone.

“Your generation debates moral philosophy there?”

“Mostly memes.”

He nods thoughtfully.

“Every era has its pamphlets.”

We circle back to his life’s work.

He talks about statistics, medical practices, how he later claimed earlier advocacy groups used inflated numbers to shape public opinion. He speaks about regret, public transformation, and how controversial shifts follow you forever.

“You cannot reinvent yourself quietly,” he says.

“Yeah,” I say. “I changed my major on Instagram and people acted like I’d joined a cult.”

He pauses.

“You will find that conviction—real conviction—costs something.”

I poke my mashed potatoes.

"I'm just trying to survive freshman year."

He leans back.

"That is your revolution."

Halfway through dessert, he asks:

"What do you believe?"

That is NOT a casual dining hall question.

"I believe... I need sleep."

He considers this.

"Exhaustion shapes belief more than ideology."

"Is that a medical diagnosis?"

"It is a freshman diagnosis."

As dinner winds down, he stands.

"Cornell will challenge you," he says. "Do not merely collect credits. Wrestle with ideas."

"I'm wrestling with calculus."

"Begin there."

He adjusts his coat.

"You are young. You will encounter arguments that disturb you. That is education."

I nod.

"Also, maybe get more vegetables," he adds, glancing at my tray.

Even in hypothetical dinner form, the Cornell alumni judgment is undefeated.

Before leaving, he says:

"You are a freshman. That means you are allowed to be wrong."

“That’s... comforting?”

“But do not remain careless.”

He pauses.

“And perhaps choose a major before Thanksgiving.”

No promises.

He walks away through the dining hall crowd, leaving behind half a cup of coffee and a strangely motivational sense of responsibility.

I look down at my meal plan receipt.

Undergraduate freshman.

Cornell.

And apparently, dinner guests with full philosophical plot arcs.

Next time, I’m inviting someone less historically complicated.

Maybe a physics guy with a pendulum.

Ean Pope

Lecture 3

Me: Cicero, right? The Roman philosopher?

Cicero: You seem curious.

Me: Yeah. I'm Ean. I'm in this Light and Life class and today we were talking about the eye, how it develops, how it connects to the brain, and how it's basically part of the brain itself.

Cicero: Fascinating. Even in my time, we knew the eyes held great meaning.

Me: That's what stood out to me. In the lecture notes it quoted you saying, "If the face is the image of the mind, the eyes are its interpreters."

Cicero: A person's eyes often reveal what words try to hide.

Me: That hits, especially after learning how the retina is literally connected to the brain. It's like when we look at something, it's not just seeing, it's our mind involved too.

Cicero: Exactly. Vision is never only physical. It is always shaped by thought and emotion.

Me: So here's my real question if we're just talking at this party:

Do you think people actually see the world as it is, or more like how their mind wants it to be?

Cicero: Most people see through the lens of their beliefs, fears, and desires. The eyes bring in light, but the mind decides what it means.

Me: That makes sense. Kinda like how the class showed us illusions and blind spots. Your eyes miss things even when they're right there.

Cicero: And that is why wisdom requires reflection, not just observation.

Me: So seeing isn't enough. You gotta think about what you're seeing.

Cicero: Precisely.

Me: Appreciate that. Makes me realize light gives us information, but understanding comes from the mind.

Cicero: Well said, my friend.

Jasmine: Professor Spemann, welcome! I wasn't sure what German embryologists eat, so I made boiled eggs where you add a bunch of toppings: kimchi, smoked salmon, avocado, everything-bagel seasoning, chili crisp... it felt thematically appropriate. Hahahaha!

Spemann: Development is much like your eggs you made. The base may look the same at first, but small additions at the given moments can change what it becomes. I studied embryos at the stage when they still look deceptively simple, quite literally just layers of tissue—

Jasmine: Sorry! Not to cut you off but I am fascinated by your work so I already know the basics front and back. So, like you said, when people assumed each part was already destined to become a specific organ, you suspected something else: that certain tissues instruct other tissues!

Spemann: Exactly! In one of my most famous experiments, I took a tinyyyy piece of tissue from an early embryo, specifically a region that would help form the nervous and back system. Then, I transplanted it onto another embryo. The ground breaking discovery was born that day: the surrounding cells began reorganizing themselves.

Jasmine: So like if a second plan had been given to the embryo's cell, right!

Spemann: Precisely!

Jasmine: So does that mean your research, especially after being recognized as a Nobel Prize winner, also helped explain birth defects???

Spemann: From Randy, I am sure you have learnt that comprehension in biology does not come from force, but from patience. We do not command nature. And, in my opinion, as Einstein best puts it, “the most incomprehensible thing about the world is that it is comprehensible.”

Jasmine: You would not think something as small as a cell placement location would alter what the embryo ends up becoming... A tiny move, at the right moment, can shape an entire future. Even for the human body, which seem so mighty and strong, could be made weak with some slight genetic delineation.

I heard this question being asked on a podcast the other day and wanted to ask you, what is the kindest thing someone has done for you?

Spemann: There were years when my results seemed small, even trivial. My teachers and true colleague friends gave me the time to explore and even be uncertain. Yet, they trusted that observations that were careful and not rushed towards a conclusion that is deemed “acceptable” was the best objective to have. That trust is a rare gift in science because so many people want to see quick results and answers.

So take time for yourself and do not speed up your growth and learning, even when others might move ahead. Go at your own pace and stay consistent and true to yourself!

Jasmine: Thank you for that advice. You are so kind! Cheers to a great year ahead!

Nomar: I have to admit something while we are sitting here. Before this lecture I honestly thought eye color was just brown or blue, like flipping a coin. Then I saw all the diagrams and realized it is way more complicated than that.

Mendel: Many people believe traits are simple until they examine them carefully.

Nomar: What surprised me most is learning that two blue-eyed parents can *sometimes* have a brown-eyed child. I always thought that was impossible and just something people said as a joke.

Mendel: It is rare, but not impossible. That happens because more than one gene can influence eye color, even if one version is more common.

Nomar: That actually made me think about my roommates whoa re at this table right now. 2 of my friends have lighter eyes but one of my has very dark brown eyes, and we joked that he must be adopted because His parents dont have the same eye color. Turns out genetics just has more layers than we think.

Mendel: Genetics follows patterns, but nature often combines several patterns at once.

Nomar: The light scattering part also blew my mind. I never realized blue eyes are not really blue pigment. It is more like the way light bounces around inside the eye, kind of like the sky looking blue.

Mendel: Yes. Structure and physics work together with inheritance. What you see is not always caused by a simple color substance.

Nomar: That also made me rethink how people talk about eye color and personality. Some people still act like eye color says something deep about you, which feels pretty ridiculous after learning all this.

Mendel: Physical appearance should lead to curiosity and understanding, not judgment.

Nomar: Honestly, I am never going to look at eye color the same way again. It went from being a random fact to something that mixes biology, math, and even physics all at once.

Mendel: The closer you observe nature, the more connections you discover.

Nomar: Next time someone says eye color is simple, I am just going to smile, finish my dinner, and think about Punnett squares and light scattering instead of arguing.

Mendel: That would be a very informed smile.

Ariel Vilensky

Lecture 3. Development, Anatomy, and Physiology of the Eye

Me: Good evening, Dr. Bernard Nathanson. Thank you for joining me. I wanted to ask about your film *The Silent Scream* and your reflections on it later in life.

Bernard Nathanson: Good evening. The film was intended to show the reality of abortion as I saw it then, but in hindsight, I realize some aspects were overstated.

Me: You've said that at the time, you interpreted fetal movements as intentional reactions. Looking back, how do you view that interpretation?

Bernard Nathanson: I see now that those movements were likely reflexive, not purposeful. I let my own moral perspective influence how I presented the imagery.

Me: That's a striking admission. Do you think public responses to the film were shaped more by the emotional impact than the scientific accuracy?

Bernard Nathanson: Absolutely. Ultrasound is powerful, but people often project intentions onto what they see. Emotion can overshadow nuance in complex scientific matters.

Me: Given that, how should science be used in debates like this?

Bernard Nathanson: Science can clarify facts, but it cannot settle ethical questions alone. Ethical reasoning, law, and personal values all play essential roles.

Me: That perspective is very helpful. Thank you for your time, Dr. Nathanson.

Bernard Nathanson: You're welcome. I hope people can learn to interpret science carefully, without letting personal agendas cloud judgment.

Karen Zheng, kz374

Dinner Conversation with Bernard Nathanson

Me: Hi Bernard, what made you change from an abortion rights advocate to an anti-abortion activist?

Bernard: It wasn't a single moment, but rather it was gradual. Early in my career, I was deeply involved in advocating for abortion rights. At the time, I believed it was about public health and women's autonomy. But over time, I started to question the work I was doing and the assumptions I was making.

Me: During your tenure as director of what was then the largest abortion clinic in the Western world, you oversaw about 60,000 abortions and performed more than 1,500 yourself. Was there something specific that changed how you saw it?

Bernard: I stopped performing abortions in the late 1970s. I narrated "The Silent Scream," a 28-minute film depicting the abortion of a 12-week old fetus. Seeing the child's mouth open in a silent scream and the ultrasound image showing the child attempting to move away from the surgical tools forced me to rethink my choices.

Me: You were also one of the founders of NARAL and director of New York's Center for Reproductive and Sexual Health. How did you process the emotional side of that shift? Did you feel guilt?

Bernard: I felt a lot of conflict. When you spend years believing you're helping people, and then you begin to question that belief, it's deeply unsettling.

Me: Was it difficult to speak out publicly after being so closely tied to the abortion rights movement?

Bernard: It was very difficult. I lost professional relationships and friendships. Many people thought I had betrayed them. Others assumed I had political motives.

Me: Do you regret it?

Bernard: For me, it was more personal. I felt I had an obligation to share why my thinking changed, even if people disagreed. But real understanding usually comes from being willing to listen, even when it's uncomfortable.

Dinner conversation with Helene Boas

Me: Dr, Boas, I have been thinking about how geneticists narrowed down eye color to one single gene, brown dominant, blue recessive. I thought it was so clean and easy.

Boas: Definitely clean, but maybe too clean.

Me: Exactly what I know you argue. When blue eyed parents had brown eyed children, they were considered errors. But you found that among two blue eyed parents, 12 percent of the children had brown eyes.

Boas: Science must account for what exists rather than what is convenient. Substituting hypotheticals to preserve a model weakens that model.

Me: The issue then wasn't Mendel's Law of Segregation itself but rather assuming eye color was narrowed down to a single gene.

Boas: Exactly. The peas has constant differentiating characters while human eyes aren't that simple.

Me: The slides we looked at show that eye color is polygenetic, there are interactions between OCA2 and HERC2. These interactions break that simple dominant-recessive theory.

Boas: Melanin production also involves multiple enzymes which are each encoded by genes. Each layer of the iris contributes differently, reality has depth.

Me: Even blue eyes aren't blue pigment. Rayleigh scattering causes the result. The blue light is scattered more than the red.

Boas: So what seems simple is actually layered.

Me: This is the question I really wanted to ask, why do you think people were so reliant on the one-gene theory?

Boas: I believe that it is because simplicity is powerful. A simple gene gives predictability and certainty.

Me: The slides show how Mendelian ideas were tied to eugenic policies, science shaped social decisions.

Me:

Mr. Leopold, the part in the lecture about the green fire in the wolf's eyes really stayed with me. I kept thinking about how one moment of eye contact could change someone's whole perspective on nature.

Leopold:

That moment changed how I understood animals. Before that, I saw them as part of the landscape. Afterward, I realized they have their own place and value, separate from what humans want from them.

Me:

I also liked how the lecture showed that eyes aren't just about forming perfect pictures like cameras. Even simple organisms can sense light without having full eyes like ours. It made me realize that seeing exists on a whole spectrum.

Leopold:

Some creatures only detect brightness or movement, but even that small amount of information can guide their survival.

Me:

It made me think about how every animal basically experiences a different version of the world. Owls are built for night vision, fish are built for underwater vision, and insects can even see ultraviolet light that we can't. Humans are in the middle we see well enough, but we're limited.

Leopold:

Each eye reflects the life it lives. There is no perfect eye, only one that fits its environment and needs.

Me:

That idea stuck with me because it makes vision feel less universal and more personal. Two creatures can be standing in the same place but experiencing different realities just because of how their eyes work. It's almost like we all live in different worlds, even when we're side by side.

Leopold:

And recognizing that difference can create respect. When you understand that other beings experience the world differently, it becomes harder to treat them as unimportant.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 4 Dinner Conversation

Conversation with Gregor Mendel

Ellie: Hi Mr. Mendel, thank you so much for meeting with me today for dinner. I wanted to get a chance to meet you after hearing about your work in today's lecture. I've heard of your work with the pea plants and was fascinated by the idea of inheritance. Could you please start off with a quick introduction on yourself?

Gregor Mendel: Nice to meet you, Ellie. Yes of course! I was born in the Czech Republic and later joined the Augustinian monastery in Brunn. Although I lived my life as a monk, I was really passionate about science. Thankfully, the monastery let me study nature eventually causing me to build interest and conduct experiments on pea plants.

Ellie: Wow, that sounds amazing! What else inspired you to conduct experiments on pea plants?

Gregor Mendel: Well, I read a book by Carl von Gärtner entitled, *Versuche und Beobachtungen über die Bastarderzeugung im Pflanzenreiche*. The book documented the results of thousands of hybridization or artificial fertilization experiments that he performed on useful and ornamental plants.

Ellie: That doesn't sound quite like the experiment you conducted...

Gregor Mendel: You're absolutely right. I was interested in something else. I was interested in using artificial fertilization to find a law of nature that explained inheritance.

Ellie: Ah, yes. Please explain more about your experiment!

Gregor Mendel: I chose pea plants because they were practical and consistent. They have clear traits like purple versus white flowers, or round versus wrinkled seeds and I could control their reproduction. I started with true-breeding plants, meaning they reliably produced the same trait generation after generation. Then I cross-pollinated plants with different traits and carefully counted what appeared in the offspring.

Ellie: Wow. Even listening to you talk about your experiment sounds so complicated and confusing. Didn't you have to work with a lot of numbers?

Gregor Mendel: Haha yes yes but I've always had a thing with numbers that I really liked so that wasn't a big issue. Also, the patterns were very similar to the patterns of Pascal's triangle. Anyways, my work wasn't taken seriously until 1900, however, but I'd like to think I made a big impact on the idea of inheritance!

Dinner with Gregor Mendel

A modest dining room in Brunn. Mendel sits across from me.

Me: Father Gregor, your work lay unread for thirty-five years after you presented it. Three botanists had to independently rediscover it in 1900 before anyone paid attention. Does that not strike you as one of the great injustices in the history of science?

Mendel: (spooning his soup thoughtfully) Injustice is a strong word. The world was not ready. Gärtner performed thousands of hybridization experiments before me and could not find a generalizable law because he was not asking the right question. He wanted to document. I wanted to deduce. That is a different enterprise entirely, and it requires a different kind of patience, not the patience of waiting to be recognized, but the patience of counting thirty thousand pea plants until the numbers tell you something true.

Me: But surely it must have stung. You presented your findings to the Brunn Natural History Society in 1865. Darwin was alive. He was corresponding with botanists across Europe. The two of you were working on problems that fit together like two halves of the same argument, heredity and natural selection, and yet you never connected.

Mendel: (a flicker of something, not quite regret) I read Darwin. I made annotations in the margins of his work. Whether he read mine (a pause)... that I cannot say with certainty. But consider this: even if Darwin had read my paper, would he have known what to do with it? The world in 1865 thought in continuous gradients, in blending and flowing. My factors were discrete, particulate, either present or absent. That way of thinking, atoms of heredity, was not yet in fashion. It took Max Planck's quantum of energy in 1900 to make the world comfortable with the idea that continuity can be built from discrete parts.

Me: So your work failed not because it was wrong, but because it was conceptually ahead of its time?

Mendel: It required a certain kind of mind to read it correctly. My teacher was Christian Doppler, a man who built mathematical models of physical phenomena before anyone could confirm them experimentally. He taught me that mathematics is not decoration placed on top of observations. It is the skeleton that holds them together. When I saw a 3:1 ratio appear reliably across thousands of plants, I asked what underlying mechanism would necessarily produce it. That question, what hidden structure gives rise to this visible pattern, is the right question in any science.

Me: And yet R. A. Fisher later accused your data of being too clean. He suggested someone may have adjusted the numbers to match your expectations.

Mendel: (sets down his spoon firmly) Fisher was a statistician of great skill and limited imagination. He could not conceive that a careful experimenter, who simultaneously refined his

theory and his protocol across eight years, might arrive at results that were genuinely close to expectation – because he himself had designed the experiment well enough to eliminate the noise. He looked at my garden through the window of his own assumptions. I would ask him: have you ever grown thirty thousand pea plants? Have you learned, season by season, which variables to control and which to discard? Numbers do not lie, but they do require someone who understands how they were obtained.

Me: Fair enough. One last question, your laws describe dominant and recessive traits with elegant simplicity. But we now know that eye color, for instance, is controlled by multiple genes interacting in complex ways. Does the complexity that came after you undermine the laws you found?

Mendell: (smiling for the first time) Does the discovery that white light is composed of many colors undermine the law of refraction? No. It extends it. My laws describe the behavior of single factors with clean dominance. Nature has many such factors, and also many that interact, modify, and surprise. I found the grammar. Others are still writing the sentences. That seems to me not an injustice, but a rather fine result for a monk with a garden.

Lecture 4 Dinner Party Conversation: Tyler: I thought eye color genetics was supposed to be one of the easiest things in biology.

Gregor Mendel: Many people thought simple inheritance patterns could explain a lot.

Tyler: Yeah because everyone always hears brown eyes dominate blue eyes and that's basically where the explanation stops.

Charles Davenport: Early researchers believed eye color followed a straightforward Mendelian pattern.

Tyler: But then the lecture starts throwing in all these exceptions and suddenly everything gets messy.

Charles Darwin: Nature often resists simple categories.

Tyler: That was actually my favorite part though. Scientists kept finding people who did not fit the expected pattern.

Helene Boas: Data should not be ignored simply because it disagrees with a theory.

Tyler: People were acting like if two blue-eyed parents had a brown-eyed kid then something had to be wrong with the data.

Helene Boas: Sometimes the outliers are the interesting part.

Gregor Mendel: My work explained inheritance patterns, but not every trait behaves in exactly the same way.

Tyler: Which makes sense because eye color is not literally one switch that says blue or brown.

Charles Darwin: Complex traits often involve multiple factors.

Tyler: The craziest thing to me was learning blue eyes are not actually blue pigment.

Gregor Mendel: Appearances can be misleading.

Tyler: That completely broke my brain for a second.

Tyler: It's light scattering and melanin levels and different layers of the eye.

Charles Davenport: Early researchers reduced a complicated trait into a simpler model.

Helene Boas: Simplifying something can help understanding, but oversimplifying creates problems.

Tyler: I think that was basically the lesson. Simple and simplistic are not the same thing.

Charles Darwin: Science usually starts with simple explanations and then becomes more refined.

Tyler: So eye color went from "brown beats blue" to "actually this is way more complicated than we thought."

Gregor Mendel: Science continues growing long after the first discoveries.

Tyler: To genetics, where every answer somehow creates five more questions.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 4: Eye Color and its Inheritance

Gregor Mendel

Jenny: Hi Gregor! It's so nice to finally meet the guy behind the pea experiment.

Gregor: Ah yes, the peas. They follow me everywhere.

Jenny: I'm actually really into plants and gardening too. It's just where I live, New York City, there's not much space for these types of activities.

Gregor: That's unfortunate. Is there anything that you can grow?

Jenny: Yes, yes. I have a lot of different succulent plants and I have a snake plant as well. But one of the oldest ones died when I left for college.

Gregor: Oh that is so sad...I get emotionally attached to my plants as well even though I grew thousands of them.

Jenny: Yes, I was devastated when my sister sent me a picture of the wilted succulent. It was my oldest and biggest one – it was almost 6 years old! But sadly it didn't make it into 2026. I got it during the pandemic, which is also when I developed an interest in some light gardening. I would talk to my plants – and believe it or not I think it really helped them grow. Perhaps it was because I left for college and couldn't show them the same love anymore.

Gregor: That makes a great deal of sense, actually. Plants respond to consistency – light, water, attention. When you care for them regularly, you create the right conditions for growth. When that care changes, they feel it in their own way.

Jenny: I feel so guilty for leaving the plant for dead ...even though it was totally my sister's fault for not taking care of them properly. But anyways, one of my younger succulent plants just bloomed and the pollen is falling everywhere on the windowsill.

Gregor: Ah, pollen everywhere – that's a very good sign. It means the plant is healthy and ready to pass something of itself on.

Jenny: So the mess is actually a success?

Gregor: Yes! That bloom tells me your care is working even if you are only going back home every month or so.

Jenny: That's comforting to know.

Me:

YOO MENDEL you're the pea guy, right? What made you stare at them for eight years straight?

Mendel (laughing):

Yeah, when you put it like that, it sounds kinda strange hahaha. But honestly I wasn't obsessed with peas. I was obsessed with patterns. Peas just happened to behave nicely.

Me:

Nicely how?

Mendel:

Ok, here is the thing they were predictable. Their traits stay consistent, they mostly fertilize themselves, and you can tell who the parents are super easily.

Me:

I know that lots of people were crossing plants before you. What made your work different?

Mendel:

Most people just looked and described what they saw. I counted. Like... a lot, and a lot, like I was actually counting for days on days. Thousands of seeds. I realized the same thing kept happening. Yellow peas kept showing up about three times as often as green ones.

Me:

That's where the whole 3 to 1 thing comes from?

Mendel:

Yes, Mahidul! When I was that it felt crazy. That's when I found out inheritance wasn't some blurry mixing of traits. Something was being passed down in pieces over the generations.

Me:

Is that why you came up with dominant and recessive?

Mendel:

Yep, buddy boy. One trait shows up right away, the other kind of hides. The trait is still there. The hidden trait comes back later.

Me:

Thanks for telling me all of this

Mendel:

No worries, dude. Go play Roblox now.

Benito Jaramillo
PLSCI 1130
February 07, 2026

Conversation with Richard Dawkins

Benito: Richard Dawkins it is great to have you in my house for dinner, I have heard a lot about you and your studies and if you don't mind today I would like to talk to you about the theory of the eye as a flawed design. We will also be having lasagna so I hope you enjoy it!

Richard Dawkins: Hello Benito, Thank you for inviting me into your beautiful home. I would be more than happy to have this conversation with you.

Benito: So Richard, I've been reading about how you say that one of the main reasons why you doubt that there is a God or an intelligent creator is because the human eye is a flawed design, what do you mean by that?

Richard Dawkins: Yes of course, so first of all I wanted to be clear that what I mean is not that the eye doesn't work, I mean that the only logical explanation to it is evolution. This is because evolution works with what it has it doesn't design. We have a blind spot in our eye and this is because our photoreceptors are in the back of the eye. No engineer or superior intelligence would create an eye like that, it is years and years of evolution that can make something like that.

Benito: I think that you make a good point there, but what the scriptures say is that God made us to his image, and so it would be understandable that he would have made us with flaws.

Richard Dawkins: That is a good argument but you also need to consider that what we see is imperfect. It is not the full truth in a similar way as looking at an image through a mirror. There are different mirrors that distort the images, our eyes compared to other species' eyes are similar.

Benito: This has been a very interesting conversation, I feel that it is always good to have conversations and discussions with people that don't necessarily share your views on the world. It helps the world be a better place when people can get along without the need of sharing the same views.

Richard Dawkins: Thank you for the food. It was amazing. It is always a pleasure to talk to people that are keen and open to other ideas than their own.

Lecture 4: Dinner Conversation with Gregor Mendel

Light and Life | Vansh Kakra | vk365

Vansh: I have to say, you might be the most patient person I've read about. You spent years crossing pea plants while the rest of the world basically ignored you.

Gregor Mendel: Ignored is a polite word for it. At the monastery, people mostly just thought I liked gardening a little too much.

Vansh: Did that ever bother you? Doing all that careful work and having no one really care?

Mendel: I won't pretend it didn't sting. But there was something calming about the routine. Plant, wait, observe, count. Pea plants never argued with my results.

Vansh: Your big idea that traits follow patterns instead of blending feels obvious now. But back then, it went against what people believed. Were you confident you were right?

Mendel: I was curious and stubborn. The numbers kept repeating themselves, and at some point I trusted them more than popular opinion.

Vansh: Still, it's funny. You discovered rules that explain heredity, and it all came from peas.

Mendel: I often wondered if people would have listened sooner if I had worked with something more impressive. Roses, perhaps. Peas lack drama!

Vansh: I kind of like that. Big ideas coming from very unglamorous places.

Mendel: Nature is like that. It hides its rules in plain sight and waits to see who is bored enough to notice.

Vansh: Did you ever feel frustrated that your work didn't matter while you were alive?

Mendel: Sometimes. But I was a monk before I was a scientist. I was used to quiet work without applause.

Vansh: That's hard to imagine now. Everything feels rushed now.

Mendel: People confuse speed with importance to be honest. My plants took their time. I learned to do the same, which is to give it time.

Vansh: One last thing. If you were watching people today argue about nature versus nurture, what would you think?

Mendel: I would smile quietly and say it's never been one or the other. And then I would probably go back to my garden.

Vansh: You really would.

Mendel: Of course. The peas are still waiting.

Selina Ke
Dinner Conversation with Martin Luther King Jr. (MLK)

Selina: I keep thinking about how quickly we describe people by what we can see. Skin, hair, and eyes. Color feels like the most obvious way to tell people apart.

MLK: What is obvious to the eye often feels reliable. But reliability is not the same as understanding.

Selina: That's what unsettles me. Color does distinguish. It's visible, immediate, and hard to deny. Yet the more weight we give it, the more it seems to shrink people into categories.

MLK: Color is a trait not a truth. It can describe but it cannot define.

Selina: Still people treat it as if it does. As if appearance alone carries character intention or worth. It feels efficient but also shallow.

MLK: Efficiency often replaces care. Judging by color requires little effort. Judging by character requires time and patience.

Selina: When you spoke about wanting your children to be judged by their character rather than skin color, I hear a challenge to how we decide who someone is.

MLK: The danger is not in noticing color. The danger is in letting it end our thinking instead of beginning it.

Selina: But color shapes how the world responds to someone before they ever speak. Can character truly rise above that?

MLK: It cannot stand apart completely. But it must stand above. Color tells us how the world treats a person. Character tells us how that person moves through the world.

Selina: That difference feels important to me. I have felt defined before I have been understood. And I notice how easy it is to do the same to others.

MLK: Certainty is comfortable. Understanding is demanding.

Selina: If color is visible and meaningful but also limited how do we teach ourselves not to stop at seeing but to move toward understanding.

MLK: By remembering that what we see is never the whole story. The moment we believe we already know someone we have chosen not to learn!

Dinner Conversation with Gregor Mendel

Me: I have to ask the obvious thing first. You did all this work, published it, presented it, and then nothing happened for thirty-five years. Did you know what you had?

Mendel: I think I did. Whether anyone else would was another matter. I stood up and told that society the question was as important as anything in the study of living things. But I was a monk in Brunn counting peas, not a professor in Vienna. The work was good. The room was not ready for it. And there is a difference between being wrong and being early.

Me: The thing that gets me is how you chose peas. It's almost the way a mathematician would pick them. You wanted traits that were cleanly one thing or the other. But most of life isn't like that.

Mendel: No, it is not, and that was the trick and the weakness both. I needed characters that stayed constant and were easy to tell apart. Yellow seed or green seed. Tall plant or short. If I had picked something that blended, I would have seen a smear of in-betweens and no rule at all. I got a clean law because I only looked where clean laws live.

Me: And that's the exact thing people used against it later. That you'd described a neat special case and skipped how inheritance actually works.

Mendel: It is. And I understand why, even though I think they missed something. The blending they believed in looked real because they watched the whole creature at once. I watched one factor at a time. And when you follow a single factor, it does not blend. It gets passed on whole or not at all. The smooth appearance comes from many small things added together. The chemists already knew this. They built everything from atoms. The biologists were just not ready to hear that life came in pieces.

Me: And it took until 1900 for that to land. By then you were already gone.

Mendel: I was. But look at what else happened that year. Planck found that even energy comes in discrete amounts. All at once the same idea was turning up in physics and biology together. My work was not rediscovered because three botanists were clever. It was rediscovered because the world had finally become the kind of place where my answer fit.

Me: That's kind of an unsettling thought though. The truth didn't change. Only whether anyone could see it.

Mendel: That is the part I would sit with. I did careful experiments and honest arithmetic, and the work still needed the right moment before anyone could understand it. Which makes you wonder what is in front of us now that we cannot see, not for lack of evidence but for lack of readiness. So do the careful work anyway. The moment comes when it comes. What matters is that something true is waiting when it does.

Maximo Mander

Gregor Mendel: Peas, Patterns, and the Weight of a Legacy

Me: Gregor! It's so good to see you! Thanks for coming all this way!

Mendel: Maximo! A pleasure, truly. Is that goulash I'm smelling?

Me: It is! Fresh off the stove. Listen, Gregor, I've been studying your work for my class, and there's something heavy I want to ask you about. Your work got picked up decades after you died and used to justify things I don't think you could have imagined. The Nazi Primer literally taught your laws to the Hitler Youth. How do you sit with that?

Mendel: Ah, Maximo. You've asked me the question I have carried for a long time. Let me be honest with you. I spent eight years in that garden. Eight years counting seeds, pale yellow and green, writing down ratios. I was a monk, Maximo. I was looking for a law of nature, something that pointed to the order God had placed in creation. I never imagined my work would be read in a prison cell by a man planning a thousand-year Reich.

Me: But once the work is out in the world, Gregor, you don't get to control what people do with it. Do you bear any responsibility for that?

Mendel: A fair question, and one I have asked myself. I will tell you what I think. The truth I found about peas was a true thing. Yellow is dominant over green. That does not become false because evil men later tried to extend it to human worth. But I should have been clearer, perhaps, that my laws described seeds, not souls. The geneticists who came after me, they wanted eye color to be one simple thing, brown or blue, and nothing in between. And then the eugenicists wanted whole peoples to be sorted the same way, the good ones and the bad ones, clean and simple. That is not science, Maximo. That is prejudice dressed up in a lab coat.

Me: And yet the Nazis quoted Mendel's laws in their schoolbooks. Your name, a monk's name, on the page next to their race theory.

Mendel: It grieves me more than I can say. You know, I gave a sermon once about a gardener planting seedlings. The soil must be right, the sun must shine, the rain must fall. Growth is not forced. It is received. What the Nazis did was not gardening. It was butchery with my vocabulary. I cannot undo that. But I can tell you what I meant, and what I still mean. The laws of inheritance describe how a trait passes from parent to offspring. They say nothing about which lives are worth living. Nothing.

Me: Thank you, Gregor. That means a great deal. Would you care for some dessert?

Mendel: I'll pass, Maximo, the goulash has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 4: Dinner Conversation with Mendel

Me: Good evening Mr Mendel, thank you for joining me for dinner. I had a really interesting time learning about genetics today and found out you are known as the father of genetics!

Mendel: Thank you for your kind words. I was simply curious about the natural world around me. So I wanted to use the law of nature to explain inheritance.

Me: What inspired you to use pea plants in particular for your experiments? They seem so ordinary.

Mendel: Yes, but they were perfect for my experiments. Peas have clear differentiating characters like seed color and shape. Most importantly, they self-pollinate. These traits allowed me to control breeding and observe inheritance patterns over many generations.

Me: So you were looking for patterns. What did you find?

Mendel: Exactly. I noticed that in hybrids, one trait usually appeared while the other seemed to disappear. That led me to describe these traits as dominant and recessive, helping explain why certain characteristics show up more often than others.

Me: Fascinating. And I heard you're good with numbers too. How did that come to play?

Mendel: After counting thousands of plants, I noticed consistent ratios that came up. An average of three dominant traits to one recessive. Numbers really helped me see patterns that were not obvious at first glance.

Me: So inheritance is far from random then?

Mendel: Absolutely. Traits are passed on as discrete units, each 'parent' contributing one factor, which explains why certain characteristics reappear across generations. I guess today you call these factors genes! But back in my day, I simply showed that they follow logical, mathematical rules.

Me: That is amazing! Did people immediately see how important your work was?

Mendel: My research was actually ignored for a long time. I'm glad it was rediscovered nevertheless. I did not know about genes or DNA, but I simply wanted to understand life more deeply.

Me: I'm glad you earned your title as the father of genetics. You truly laid the foundation for future discoveries. Thank you for this conversation!

Dinner with Gregor Mendel started quietly.

Which makes sense.

The man spent years cross-pollinating peas in a monastery garden and nobody noticed until decades later. He's not exactly kicking the door down yelling, "LET'S TALK GENETICS."

He just kind of appears in my kitchen holding a small pouch.

"Good evening," he says gently.

"Is that... seeds?"

He nods.

"I never travel without peas."

We sit down. I made salad.

He looks deeply emotional.

"Legumes," he whispers.

"They're from Walmart."

"All peas are noble," he says.

Five minutes in, he's already sorting the peas on my plate by color.

"Green. Yellow. Green. Green. Yellow."

"Uh. You okay?"

He smiles politely.

"I am always okay when ratios behave."

I should have known.

He explains that back in the 1850s, while living as an Augustinian monk in Brno, he started experimenting with pea plants. Tall vs. short. Green vs. yellow. Smooth vs. wrinkled.

"I counted everything," he says.

"How many?"

"Thousands."

I almost drop my fork.

"Thousands?"

He nods calmly.

"Over many years."

"Sir, I get tired after organizing my sock drawer."

"Science," he says softly, "requires patience."

He grabs two dinner rolls.

"Observe," he says.

He names one Dominant. The other Recessive.

"Dominant," he declares, stacking one on top, "tends to show itself."

"Recessive," he says, placing the other underneath, "waits quietly."

"So like the kid in class who never talks but aces the exam?"

He beams.

"Precisely."

Then he starts explaining how when he crossed pure tall plants with pure short plants, the first generation was all tall.

"All tall?" I ask.

"Yes. The short trait vanished."

"Rude."

"But in the next generation," he continues, eyes lighting up, "the short plants reappeared."

I gasp dramatically.

“They came back?”

“Approximately three to one.”

He says it like it’s poetry.

“Three tall. One short.”

He taps the table.

“Predictable. Reproducible. Beautiful.”

At this point he’s drawn a Punnett square on a napkin.

I didn’t even give him a pen.

It just happened.

“So you basically discovered the rules of inheritance,” I say.

“I described patterns,” he corrects gently. “The rules were always there.”

He takes a sip of water like he just invented statistics casually over soup.

“Did everyone freak out when you published this?” I ask.

He pauses.

“No.”

“Like... no?”

“No one paid attention.”

I blink.

“You discovered the foundation of genetics and people just... ignored it?”

“For about thirty years,” he says pleasantly.

I stare at him in disbelief.

“If that were me, I’d be tweeting every hour.”

He tilts his head.

“What is tweeting?”

“Never mind. It wouldn’t have helped in the 1800s.”

He looks at my houseplant in the corner.

“It appears slightly unhealthy.”

“Don’t judge me.”

“I do not judge,” he says calmly. “I predict.”

That’s somehow worse.

Midway through dessert, I ask, “So what would you think of modern genetics? DNA? Gene editing?”

He smiles softly.

“I worked with peas and probability. You now see the molecules themselves.”

He gestures thoughtfully.

“From garden beds to genomes.”

“Yeah, we kind of escalated.”

He nods approvingly.

“Good.”

As dinner wraps up, he carefully places a single pea on the table.

“Remember,” he says, “great discoveries may appear small.”

I look at the pea.

“That’s inspirational, but also that’s literally a vegetable.”

He smiles.

"Both can be true."

He stands to leave.

"One last question," he says.

"Yeah?"

"If traits pass from generation to generation... what will yours be?"

I freeze.

"Uh... chronic procrastination?"

He laughs quietly. It's surprisingly warm.

"Then perhaps select carefully."

He exits as calmly as he arrived, leaving behind a napkin covered in ratios and one perfectly round pea.

I stare at it.

Three parts dinner.

One part destiny.

Honestly?

The man made vegetables dramatic.

Respect.

Ean Pope

Lec 4

ME: Hello, are you Gregor Mendel? The monk who figured out inheritance with pea plants?

Mendel: That's me.

Me: I'm Ean. I'm in this Light and Life class and today we talked about eye color and how people first thought it was just brown versus blue because of your laws.

Mendel: Yes, many scientists tried to apply my simple ratios directly to humans.

Me: What stood out to me was how perfect your pea plant data looked , the whole dominant and recessive thing, but then when people studied real human eyes, it turned out way more complicated.

Mendel: Nature often begins with simple patterns and ends in complexity.

Me: Facts. They found out eye color actually comes from multiple genes interacting, plus things like development and even perception.

Mendel: Which shows that models help us understand reality, but they are not reality itself.

Me: So here's my real question, since we're just talking.

Did you ever think your laws explained everything about inheritance?

Mendel: No. I believed they revealed a basic principle , that traits are passed in discrete units. But I always knew the full picture would be richer and more complex.

Me: That makes sense. It's like learning the alphabet before you can write a whole book.

Mendel: A very good comparison.

Me: I guess the big takeaway from the lecture is that science has to simplify things to learn , but not oversimplify them.

Mendel: Exactly. There is a difference between simple and simplistic.

Me: I like that. Makes me realize knowledge is always evolving.

Mendel: And it always should.

Jasmine: Nice to meet you, Mr. Mendel. I could not find anything on Wikipedia about your favourite foods, so I made peas five ways in honour of your work: pea soup, mashed peas, roasted peas, buttered garden peas and a pea risotto.

Mendel: How thoughtful! And thank you for not mistaking me for someone else... like you did with von Baer and Leopold.

Jasmine: Yeah, that was embarrassing. Randy called me out for that one hahahaha! He is awesome. You should meet him too. Anyways, I find your life so interesting, not just for your findings, but also for how one decision could alter your whole life. There was a point where you almost became a farmer, right?

Mendel: Indeed. that was the expectation growing up. My family had little money. I was also their only son, meaning I should have continued our farm. For me, curiosity is a stubborn trait. As a boy, I noticed that plants resembled their parents but not fully. Farmers accept this as fortune or misfortune. I had this desire to figure out if the relationship was as simple as that. So once I got a garden in the monastery, I chose pea plants because their traits were clear and distinct, and I could control their reproduction well.

Jasmine: How many did you plant at the same time? Like 100?

Mendel: You wish. Only large numbers reveal patterns. I would count them by the THOUSANDS. An example of my experiments would be that in the first generation, one trait always appeared like yellow seeds. When those plants reproduced, the green seeds returned in about one out of four. THE TRAITS HAD NOT VANISHED... THEY WERE HIDDEN! *knocks over wine*

Jasmine: I'll clean it up. No worries!

Mendel: Grapes making this wine also behave the same as the peas. All these crops, and vineyards, are basically just a giant genetics experiment.

Jasmine: When you were doing these experiments, did you realize how important your work would become?

Mendel: Not at all. I hoped it might clarify a question that had troubled scientists for generations, but I did not imagine it would travel far beyond our pretty small community in Brunn. When I presented my results, the audience was... largely unconvinced. Many preferred explanations that sounded simpler, even if they explained less. I feel like a lot of scientists that you have also invited for dinner felt the same. In truth, discovery often lives in doubt at first. Now reading about me, it just sounds like I discovered something... and that was that.

Jasmine: You are amazing! Thank you for giving me confidence in trusting my own work process and be okay with floating around doubt while still being aware of the feedback given.

Mendel: No problem! Also, the peas were delicious! Green peas are still my favourite!

Nomar: I have to be honest while we are eating this. Before this lecture I thought blue eyes literally meant there was blue pigment in the eye, like paint. I never questioned it. Then I learned it is mostly light scattering and now I feel like my whole life was a lie.

Lord Rayleigh: That reaction is quite reasonable. Many people assume color must come from pigment alone.

Nomar: The part that stuck with me was the collagen fibers scattering blue light more than red. It reminded me of why the sky looks blue. I never connected those two things before.

Lord Rayleigh: The same principle applies. Shorter wavelengths scatter more strongly than longer wavelengths.

Nomar: It actually made me think about my own eyes and my friends' eyes. Growing up people always said "you got your eye color from your parents" like it was a simple yes or no. But now I realize it is genes, structure, and even physics working together.

Lord Rayleigh: Nature rarely follows only one rule hahaha, it can never be that easy.

Nomar: I also liked the part about perception. Our lecture showed how the same gray iris can look blue or different depending on the surrounding colors. That honestly reminded me of when I try on different shirts and suddenly my eyes "look different" in photos. For example the clothes someone might be wearing or the weather all have consequences

Lord Rayleigh: Context changes what the observer perceives, even when the object itself does not change.

Nomar: So when someone says "your eyes look really blue today," it might just be lighting and contrast, not my biology changing overnight.

Lord Rayleigh: Precisely. The physical structure remains, but the light and surroundings alter the appearance.

Nomar: What I like about this is that it makes eye color feel less like a label and more like a mix of science and environment. It is not just brown versus blue. It is layers, genes, light, and even the angle someone is standing at.

Lord Rayleigh: A very accurate summary.

Nomar: Honestly, next time someone compliments my eyes I am going to think about wavelengths and collagen instead of just saying thanks.

Lord Rayleigh: That would be an unusually scientific dinner response.

Ariel Vilensky

Lecture 4: Eye Color and its Inheritance

Me: Good evening, Mr. Wilde. In *The Decay of Lying*, you say nature keeps repeating effects like sunsets until we grow weary of them. I must disagree. No two sunsets are ever the same.

Oscar Wilde: My dear friend, they look suspiciously similar—orange, pink, a touch of purple. Nature is fond of recycling.

Me: But the clouds shift, the season changes, the air alters the light. You can view a sunset from your porch, from a beach, or on top of a mountain, and each landscape gives the sunset its own unique beauty. The combinations are endless. Repetition doesn't mean sameness; it can mean variation on a theme.

Wilde: Art varies deliberately. Nature does so accidentally.

Me: I'm not so sure. The physics of light scattering, the tilt of the Earth, the atmosphere's chemistry, and many more factors produce endlessly distinct results. If Turner taught us to notice sunsets, perhaps he was revealing a richness that was already there.

Wilde: So you believe repetition does not exhaust wonder?

Me: Exactly. The fact that sunsets "go on" doesn't make them old-fashioned - it makes them endlessly renewing. Your favorite food can be just as delicious in your adulthood as it was in your childhood.

Wilde: You defend nature admirably. I remain loyal to art. However, I shall grant that the sky has more imagination than I allowed.

Me: That's all I hoped to prove.

Karen Zheng, kz374

Dinner Conversation with Martin Luther King Jr.

Me: Since we last spoke, I've enrolled in a class called EDUC 2610: Intergroup Dialogue, and something I keep coming back to is how quickly we rely on visible things, especially the color of someone's skin, to understand people. It feels automatic, like we notice it before we even realize we're doing it. The class is really focused on recognizing and limiting our biases and assumptions that come from looking at someone's appearance.

MLK: That awareness is an important first step. Bias often works quietly and slips into our thinking through habit and history. But once you begin to notice it, you gain the power to question it.

Me: How do we learn to look beyond what's visible and truly understand one another when that is the most convenient thing?

MLK: Noticing differences is just part of being human. When you walk into a room, and you register what you can see: skin color, age, the way someone carries themselves. The real issue is what we do next because too often, people let that first glance become a conclusion.

Me: I feel like even when I'm trying to be aware, those initial judgments still show up. How do I make sure I am pausing and truly reflecting?

MLK: Those initial judgments are part of our human wiring, shaped by years of societal influence and lived experiences. Real connection is an intentional act that comes from curiosity: asking questions, listening to someone's story, and letting that reshape and refine your first impression.

Me: I am afraid of asking questions sometimes because I fear I don't know enough or I'll say something offensive.

MLK: True understanding begins in humility, and admitting what you don't know is the first step towards reform. Questions are how we get to know a person better and move past initial visual judgments.

Me: So it's okay if my question isn't perfect?

MLK: Imperfect questions are a signal of someone truly listening. If you thought you knew everything, then you probably made up your mind before the conversation even started, and left no room for their story. That's the very danger of judging by color I warned about in my "I Have a Dream" speech.

Me: Sir Isaac Newton, we talked the other day in class about your prism experiment where you passed sunlight through a small hole and used a glass prism to split it into colors. What shocked me was when you said that light already has all the colors but it was previously thought that the prism created the colors.

Newton: Yes that's true, many did already believe that the glass made the colors. My experiment showed that white light isn't just white but a mixture. When the light is put through a prism, each color bends a different amount. The red rays refracted least while the violet rays the most.

Me: That has really stuck with me because it changes the way I see a lot of things. Even while looking at the background of my documents I type in I just think if I look close enough it is a mixture of colors. This means that color is something that is hidden in light itself. The prism only separates what is already in the light.

Newton: The spectrum of light is actually continuous, there are infinite gradation of colors. I do, however, choose to look at seven principal colors including orange, red, blue, green, yellow, indigo, and violet.

Me: So there really aren't any boundaries between colors but rather we make categories to differentiate them? This makes me think of how scientists said we only need three primary colors. You discovered the light side of color.

Newton: Correct, my concern was the actual behavior of light. Others looked more into vision and together, the perspectives explain why humans experience such a wide variety of colors and mixtures of light.

Me: Something else I found interesting is how your work is how your work changed everything from photography to computer screens.

Newton: Science often begins with simple curiosity. A beam of light through a small hole can reveal principles that can change everyone's perspectives.

Me:

Mr. Pasteur, one thing that stuck with me was the quote about “chance favoring the prepared mind.” I never thought of discovery like that before.

Pasteur:

Many people think discoveries happen by luck, but luck usually rewards those who are paying attention. Preparation allows you to recognize something unusual instead of ignoring it.

Me:

That makes sense. I realized that two people can look at the same thing and only one might notice what matters. It’s not just about eyesight, it’s about awareness.

Pasteur:

Observation is a skill. The more you train yourself to question what you see, the more likely you are to find the truth.

Me:

I liked how the lecture showed that science isn’t always clean or immediate. Sometimes people resist new ideas even when there’s strong evidence. It reminded me that learning isn’t just about facts, it’s also about being patient.

Pasteur:

New ideas often challenge comfort. People do not easily let go of what they already believe.

Me:

It also made me think about everyday life. We look at things all the time, but we don’t always notice them. The lecture kind of made me slow down and actually pay attention instead of just assuming I understand something.

Pasteur:

Curiosity begins when you stop assuming and start asking questions.

Me:

I guess that’s what I’m taking away from this lecture seeing is more than using your eyes. It’s using your mind too. The world doesn’t really change, but how we look at it can.

Pasteur:

And when your perspective changes, discovery becomes possible.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 5 Dinner Conversation

Conversation with Isaac Newton

Ellie: Hi Mr. Newton, thanks for taking the time to have dinner with me. I have been really looking forward to this. In class today we talked about your discoveries about light and color. What made you want to study light in the first place?

Isaac Newton: I was curious about what light actually is. At the time, many people thought white light was pure and simple, but I doubted that. So I tried an experiment where I let sunlight come through a small hole in my window and passed it through a glass prism. The light spread out into a band of colors like red, orange, yellow, green, blue, indigo, and violet. That showed me that white light is made of many colors.

Ellie: That is so interesting. But why did you decide on seven colors?

Isaac Newton: Well, the colors blend smoothly, and you could divide them in many ways. I chose seven partly because I believed nature has patterns and harmony, and seven was often treated as a complete number. It felt like a fitting way to describe the full range.

Ellie: Wow that makes a lot of sense! Something else we talked about in class is that color is not only about light itself. It also depends on how our eyes and brains interpret it. Did you ever think about that side of it?

Isaac Newton: My main focus was physics, how light bends, refracts, and separates. But I did argue that objects look colored because they reflect certain parts of the spectrum and absorb others.

Me: I see. Later scientists built on your work. Your work explained what light contains, and other's work explained how we detect it. And even now, people do not all experience color the same way. Some people have four types of cones and can see differences most of us cannot. Others are colorblind and experience the spectrum differently. Do you think two people ever see the exact same colors?

Isaac Newton: Yes, a lot of people usually build off one experiment and further expands it to discover more things! And yes, that is a fascinating question, Ellie. If perception depends on the body, then it is likely each person experiences color a little differently, even when the light is the same.

Me: Thank you, Mr. Newton. This made me think about color as both physics and perception, not just something we casually see every day.

Dinner with George Washington

Me: General Washington – or Mr. President, I suppose – I was struck by something you wrote in 1790 to the Hebrew Congregation in Newport. You wished that "the father of all mercies scatter light and not darkness in our paths." It's a beautiful phrase. Did you mean it literally, metaphorically, or both? Because light as a physical phenomenon and light as moral good seem deeply connected in how you wrote about the world. Was that a conscious connection for you?

Washington: (*considering slowly*) I was not a natural philosopher in the manner of Mr. Franklin or Mr. Jefferson. I did not spend my evenings with prisms. But I was a farmer and a soldier, and both occupations teach you a great deal about light. You plant by the angle of the sun. You fight by it or against it. You learn quickly that light reveals what darkness conceals, and that a man who fears examination tends to prefer the latter. So yes, when I wrote to that congregation, I meant both things at once. A people who have been persecuted understand, better than most, that darkness is not merely an absence of candles.

Me: Jefferson wrote that "light and liberty go together." Do you share that view, that there is something fundamentally linked between the physical diffusion of light and the diffusion of political freedom?

Washington: (*nodding*) Jefferson was more eloquent on the subject than I, and I would not quarrel with him on it. Consider what light does: it makes objects visible at equal angles to everyone standing in the same place. It does not prefer one observer over another. A tyrant works in shadow – he controls what is seen and what is hidden. A republic requires that its citizens see clearly. That is why I was so insistent on a free press, even when it tormented me personally. The press, like light, is indiscriminate. It illuminates what powerful men would prefer to keep dark. That is its value and, I confess, occasionally its inconvenience.

Me: You chose the metaphor of scattered light specifically – not a single beam or torch held by one man, but scattered light reaching everyone. It turns out that is physically precise. It is the scattering of sunlight by gas molecules in the atmosphere that gives us the blue sky and makes the whole world visible – not a single directed beam, but light diffused in every direction at once.

Washington: (*with genuine interest*) I confess I did not know the mechanism, only the effect. But it seems to me that is rather the point of a republic as well. You do not want a single torch held by a single man and pointed where he chooses. You want the light scattered – distributed among many citizens, many institutions, many voices – so that no part of the landscape remains permanently in shadow. The danger in every age is the man who wishes to gather the light back into one beam and aim it himself.

Me: And yet you held more power than almost any man in American history, and chose to give it back. Twice. Do you think that act, refusing to become what the light was meant to prevent, was its own kind of moral statement?

Washington: (*quietly, after a pause*) Any man who holds power long enough begins to confuse his own shadow with the truth. I was not immune to that danger. I simply believed, and it required some effort to keep believing it, that the republic was worth more than my comfort within it. The father of all mercies does not scatter light so that one man may stand at the center of it. He scatters it so that everyone may find their way.

Me: (*after a moment*) I think that may be the finest thing anyone has said to me.

Washington: (*standing, lifting his glass*) Then the Madeira has done its work. To scattered light.

Lecture 5

Me: Sir Isaac before dessert comes out, I want to ask, were you uncovering something about the external world, or something about human perception with the prism experiment?

Newton: I was uncovering a property of light itself. White light contains all colors, and the prism simply separates what is already present.

Me: But the lecture showed that people do not all see color the same way. John Dalton confused pink and blue. Does that not complicate the idea that color is objective?

Newton: It complicates perception not reality. The rays do not change because an observer identifies them wrong.

Me: But, color reaches the brain as electrical signals from cones, not as wavelengths. The brain constructs color from those signals.

Newton: It constructs nothing without a cause. Different rays excite the cones differently, and that difference matters.

Me: Yet the spectrum itself is continuous. The lecture even asked whether seven colors truly exist or whether that number reflects human tradition more than nature.

Newton: The divisions are ours, but the differences are real. Continuity does not eliminate structure.

Me: What about color mixing? Red and green light create yellow, even though no yellow wavelength is present. The brain experiences the same yellow either way.

Newton: The experience may be the same, but the physics is not. One comes from a single wavelength, the other from a combination.

Me: But if the mind cannot tell them apart, does that distinction still matter?

Newton: It matters if you wish to understand nature rather than merely sense it.

Me: The lecture also mentioned tetrachromats, people who might see colors the rest of us cannot. Does that mean reality looks different to them?

Newton: Reality is constant. Their instruments are more refined.

Me: So color is not fully in the object, and not fully in the mind either.

Newton: Correct. Color emerges where light meets perception.

Me: Then seeing color is not passive. It is something we help create.

Newton: Yes. The light provides the order, but the eye completes the act of seeing.

William Morris

Jenny: Hello, it is so nice to meet you. I was walking in and admiring all the wallpaper in here...it's so capturing.

Morris: Ah yes, I really wanted to have dinner at this particular restaurant for that very reason. Guess who the designer behind the prints are.

Jenny: Haha, you're funny, Mr. Morris. Your designs are everywhere – flowers, vines, repeating patterns. They feel alive, almost like they're growing along the walls.

Morris: That was always the intention. Nature should not be shut out of the home. Beauty belongs to everyday life, not just galleries and palaces.

Jenny: I agree. Though after reading *The Yellow Wallpaper*, it made me think differently about walls and patterns.

Morris: Ah, literature over dinner. I like that already. What troubled you about it?

Jenny: The way the wallpaper seemed to close in on her. The pattern repeats endlessly, and the more she stares at it, the more trapped she feels – until she can't tell where her mind ends and the wall begins.

Morris: She was already unwell, no? The wallpaper merely reflected her condition.

Jenny: That's what everyone in the story believes. Her husband certainly does. But I couldn't help wondering: what if the room played a larger role than anyone wanted to admit?

Morris: Decoration shapes mood, yes. That is precisely why it matters.

Jenny: Exactly. The room was meant to be comforting. Instead, it became oppressive. The color – oh the fading, psych ward color – oh and the pattern – there was nowhere for her eyes to rest.

Morris: Still, it was only wallpaper.

Jenny: Only wallpaper can do quite a lot. It's interesting that the story uses yellow. Sickly, decaying. But in real Victorian homes, green carried its own dangers.

Morris: You're referring to the rumors.

Jenny: Arsenic green wasn't a rumor. In damp rooms, fungi released trimethylarsine gas. People grew ill and even died.

Morris: The damp was to blame, not the design.

Jenny: That's what doctors said about the woman in *The Yellow Wallpaper*, too. They blamed her nerves. Her imagination. Never the room.

Morris: You draw a harsh comparison.

Jenny: I don't mean it harshly. I just find it fascinating how invisible harm works.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Yooo man John Muir, why did you write so much about nature and Yosemite?

John Muir:

Dude Mahidul, I believed nature was one of the most beautiful and inspiring things a person could experience in their life .

Me:

So Yosemite really impressed you that much?

John Muir:

Absolutely! In The Treasures of Yosemite, I talked about seeing the great central plain of California as one of the most amazing landscapes I had ever witnessed.

Me:

What made it look so special?

John Muir:

The land stretched out for hundreds of miles and looked almost level like a giant lake. It was covered with golden flowers that made the entire thing shine beautifully in the sunlight.

Me:

That honestly sounds amazing.

John Muir:

It was amazing, Mahidul. Moments like that made me feel connected to nature and the beauty of the Earth that I hadn't noticed before.

Me:

Is that why you became famous for protecting nature?

John Muir:

Yes. I wanted people to appreciate wilderness and understand why the places in nature should be preserved for future generations and be left how we found them.

Me:

So your writing was meant to inspire people too?

John Muir:

Exactly! I hoped really good descriptions of nature would encourage people to value and protect the environment.

Me:

That's actually really cool.

John Muir:

Nature has a way of inspiring wonder in me and other people and reminding people how extraordinary the world can be.

Me:

Thanks for telling me all of this!

John Muir:

No problem, Mahidul. Keep exploring and appreciating the beauty of nature!

Benito Jaramillo
PLSCI 1130
February 24, 2026

Conversation with Nelson Mandela

Benito: Nelson Mandela I can't express how honored and grateful I am to have you in my house for dinner. I admire your life and how you stood up with peace and not with violence. We will also be having roasted chicken so I hope you enjoy it!

Nelson Mandela: Hello Benito, Thank you for inviting me into your beautiful home. I am happy to hear you say that, I am willing to answer any questions that you have. I hear you are taking a light and life course this semester.

Benito: Yes Dr. Mandela, in fact I am. I wanted to ask you about how your time in prison changed your view on both light and life?

Nelson Mandela: Yes of course, so I made a decision to make my 27 years in prison into an experience of inner thought and reflection. I spent my time learning and meditating about myself and how life functions. I found out that light comes from within, we are responsible for illuminating our own path the same way a full moon guides us through the night.

Benito: That is really deep and admirable, I agree with your idea that we are the ones who have to shine a light to our future, we need to work with what life has given us and make the best that we can. I also wanted to ask you about your views on the paths of life as a whole?

Nelson Mandela: That is a good question, life to me is a mirror of our society. But as mirrors we can show completely different things given the same image just depending on the angle of refraction. What I mean by that is that we cannot choose the life that we get or the situations that happen around us, but we can choose how we react to them. We can always choose our reaction so that is where we should be careful as to where we shine the light that life has given us.

Benito: This has been a very inspiring conversation. My views on the world have been changed for good. I now have a better understanding of what we are here for and that I have the responsibility to do good in this world. Thank you Mandela, you have been an inspiration.

Nelson Mandela: Thank you for the food. It was amazing. It is always a pleasure to talk to people that are keen to understand the deeper meaning of life.

Lecture 5: Dinner Conversation with Isaac Newton

Light and Life | Vansh Kakra | vk365

Vansh: I have to admit, when I first learned that white light is actually made of all colors, my reaction was mostly, “How did no one notice this earlier?”

Newton: Oh, people noticed colors. They just blamed the glass. Prisms had a terrible reputation back then. Everyone thought they were distorting light instead of revealing anything, which is why I kept repeating it. Different prisms, different angles, different rooms. The colours always showed up in the same order, like they were lining up on purpose.

Vansh: And that’s when you realized white light wasn’t pure.

Newton: Yes. It was crowded. White light looked simple only because our eyes are lazy.

Vansh: You argued with people who said the prism created the colors. Is that true?

Newton: That argument exhausted me. I had to pass the spectrum through a second prism just to prove I wasn’t hallucinating. Scientists can be very stubborn when their favourite ideas are threatened.

Vansh: Sounds familiar. Today, people argue online with graphs instead of prisms.

Newton: Ah, yes, the modern prism.

Vansh: If you were around now, with LEDs, screens and filters—would the discovery still matter?

Newton: More than ever. People think what they see on a screen is reality. They forget it’s been adjusted and enhanced. My prism was honest. It didn’t beautify the light. It exposed it and showed its purest form. White looked simple. It wasn’t. Nature enjoys hiding complexity inside neat packages.

Vansh: That explains a lot about people, too.

Newton: I would agree, but I avoided people whenever possible.

Vansh: One last thing. Why seven colors? Why not six? Or ten?

Newton: I’ll confess something quietly - nature didn’t insist on seven. I did. Seven felt orderly.

Vansh: So even you edited reality a little.

Newton: Of course. Discovery is never pure. It always passes through a human mind first.

Vansh: That might be the most modern thing you've said all night.

Newton: Then I should probably stop before I ruin my reputation.

Selina Ke
Dinner Conversation with John Dalton

Selina: Can I ask you something simple? Do you think everyone actually sees the same colors?

Dalton: No. We just assume they do because we use the same words.

Selina: That's what bothers me. If I say something is purple, I never stop to wonder whether it looks the same to you.

Dalton: Most people don't. But the eye isn't a single, uniform thing. It reacts to light in parts. If one part responds differently, or not at all, then some colors blend together.

Selina: So two people could look at the same flower and honestly disagree about its color.

Dalton: Exactly. One might clearly see a difference between red and pink. Another might see them as almost the same. Neither is lying. Their eyes are simply working with different information.

Selina: That makes color feel less objective than we treat it. We talk about it like it's a fact, not an experience.

Dalton: Color is a relationship. It depends on the light, the object, and the person looking. Change any one of those, and the color changes too.

Selina: That explains why colors look different at night than during the day.

Dalton: Yes. Some eyes notice that shift much more strongly than others. What looks nearly unchanged to one person can look dramatically different to someone else.

Selina: I keep thinking about how easily we dismiss differences like that. If most people see something one way, we assume that's the correct way.

Dalton: Science warns us against that instinct. If an observation doesn't fit, you don't throw it away but you ask what's missing. Sometimes what's missing is a whole range of perception.

Selina: So disagreements can actually be evidence.

Dalton: Often it is. Especially when it's consistent. If the same people keep seeing the world differently in the same ways, that tells you something real is going on. The real question, then, is whether we treat difference as a problem to erase or a clue to what we've yet to understand.

Dinner conversation with John Muir

Me: I feel like people always talk about you as this big nature figure, but what really stuck out to me was that you went blind for a while and that must've been terrifying.

Muir: It was. I didn't know if it would last a week or the rest of my life. And honestly, the hardest part was thinking I might never see the outdoors again.

Me: Yeah... I think that's what gets me. Like losing something you didn't realize you depended on that much.

Muir: Exactly. When I couldn't see, everything slowed down. I had no choice but to sit with my thoughts. And when my sight finally came back, I felt like I'd been given a second chance.

Me: Did it change how you thought about what you wanted to do with your life?

Muir: Completely. Before that, I was on a more practical path. Afterward, it just didn't make sense anymore. I didn't want a life that kept me indoors all the time.

Me: I relate to that. I'm still figuring things out, and sometimes it feels like there's pressure to pick something "safe" instead of something that actually feels right.

Muir: There's always pressure. But the safe path isn't always the one that lets you breathe. I just started walking and paid attention to what made me feel awake.

Me: and what makes you feel awake?

Muir: Feeling awake is when your mind is focused on one thing and only one thing at once. The moment you step on the land and all you could think about is the color, the terrain, and the texture of mother earth. That was when I knew I was awake, nothing else was competing for my attention.

Me p: That sounds really rare now. Even when I'm doing something I enjoy, my brain is still jumping around. So it wasn't about having everything figured out- it was more about noticing when things felt right?

Muir: Exactly, I never had a grand plan. I kept choosing what made me feel more alive than the day before.

Maximo Mander

Isaac Newton: Prisms, Sevens, and the Color of Heat

Me: Isaac! It's so good to see you! Thanks for making the trip!

Newton: Maximo! A pleasure, truly. Is that roast beef I'm smelling?

Me: It is! Fresh out of the oven. Listen, Isaac, I've been reading about your work with the prism for my class, and I have to ask you about it. In 1675 you stood before the Royal Society and showed that sunlight split into seven colors. Red, orange, yellow, green, blue, indigo, violet. Why seven?

Newton: Ah, Maximo. You have gone right to the heart of it. The spectrum itself, you understand, is continuous. One color melts into the next. There is no line in nature that says here ends blue and here begins indigo. I drew those lines myself.

Me: So why seven, then? Why not five, or ten?

Newton: I will tell you honestly. Seven is a number that carries weight. Seven days of creation. Seven notes in the musical octave, which I thought a beautiful parallel, since I believed the colors and the tones must share some hidden harmony. Seven felt complete. Seven felt right. I was a man of my time, Maximo, and my time saw the hand of God in numbers.

Me: But here is what troubles me, Isaac. If the spectrum is truly continuous, and you imposed seven on it because seven felt holy, doesn't that mean your science was shaped by something other than science?

Newton: A fair charge, and one I will not dodge. You are right that the number is a human choice. But the observation beneath it was not. Red light is bent least by the prism, violet is bent most, and once a color is separated it cannot be broken down further. That is the part nature told me. The number seven, that part I brought with me into the room. A good scientist should know the difference between what he discovers and what he decides.

Me: That's an honest answer, Isaac. Can I ask you about something else? In your book Opticks, you wrote about black bodies absorbing heat more than other colors. How did you arrive at that?

Newton: Simple reasoning, really. A black body reflects almost nothing. So the light that enters it must go somewhere. I imagined the light bouncing around inside, refracting and reflecting, until it had nowhere left to go and became heat. White bodies throw the light back. Black bodies keep it. Anyone who has worn a dark coat on a summer day knows the truth of it, even if they cannot explain it.

Me: Well, Isaac, I think that clears it. Would you care for some dessert?

Newton: I'll pass, Maximo, the roast beef has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 5: Dinner Conversation with John Muir

Me: Hi Mr. Muir, thank you for meeting with me for dinner! I was fascinated by the depth of detail you went into describing the Sierra.

Muir: Ah yes, one of my favorite landscapes. Light was never just something I observed. Rather, it was something I felt. If you look closely enough, the colors, light, and reflections come together to tell a story.

Me: You suggested renaming the Sierra the 'Range of Light'. Why?

Muir: It was the harmony of everything coming together: snow, forests, valleys, and sky. The light moved across them so elegantly. This made me truly recognize the scenery as a living system, one that encompasses a range of light.

Me: I hope you don't mind me asking, but I learned that you temporarily lost your vision. I'm sorry you had to experience that. Did it change the way you saw the world afterwards?

Muir: Very much so. Losing my sight, even briefly, taught me not to take vision for granted. Our ability to see is truly a gift. In the same way, we must protect the natural beauty around us that gives us so much to see.

Me: You're absolutely right. A lot of times, people focus on how light enters the eye and enables us to see, but you focus on how it makes us feel. Do you think both perspectives matter?

Muir: Of course. Science gives us the foundation for how light works, but our emotional connection to it shows why it matters. When people truly connect with what they see, they become more willing to care about the facts.

Me: I completely agree. I also know you dedicated your life to preserving America's wilderness. What is something you would like me, and others in my generation, to take away?

Muir: Go outside. Take in the world around you. Pause. Look up, down, and side to side. Ask yourself how seeing this makes you feel. The more closely you look, the more you'll realize the serendipity of nature. Let your experience teach you. Once you truly embrace this, you'll want to protect it just as I did.

Me: Very well said, Mr. Muir, and wonderful advice. Thank you for sharing your thoughts. I can't wait to share them with my friends.

Dinner with John Muir did not happen indoors.

That was my first mistake.

I had set the table. Candles. Plates. Napkins folded in a way that suggested I tried.

He walked in, took one look at the ceiling, and said, “Why are we contained?”

“Contained?”

“Yes,” he said, gently pushing open a window. “The mountains are not contained.”

“We are in a suburban neighborhood.”

“All the more reason to leave it.”

Ten minutes later, we are sitting in my backyard on overturned lawn chairs. He has repositioned us so we are facing the one tree that looks even slightly dramatic.

He closes his eyes.

“Listen.”

“I hear traffic.”

“Beneath that.”

“I hear my neighbor’s dog.”

He nods approvingly. “A wild voice.”

“It’s a golden retriever named Kevin.”

“All creatures are wilderness,” he says solemnly.

Kevin barks again. Muir looks thrilled.

For context, John Muir basically fell in love with mountains and then made it everyone else’s problem—in the best way. He advocated for protecting natural landscapes and helped inspire the creation of national parks like Yosemite National Park and Sequoia National Park.

He once walked a thousand miles just because he felt like it.

I get winded walking to my mailbox.

Dinner is sandwiches because he refused anything “overly engineered.”

“Bread is honest,” he says.

“It’s from a plastic bag.”

“All bread contains the memory of grain.”

He says this while staring meaningfully into the distance.

I stare at my turkey sandwich like it’s about to reveal a spiritual lesson.

Halfway through the meal, he stands abruptly.

“We must walk.”

“We are actively eating.”

“The earth does not pause for digestion.”

I reluctantly follow him as he circles my yard barefoot.

“You know,” he says, looking at the sky, “when I first saw Yosemite Valley, I felt as though the Creator had carved poetry into granite.”

I glance at my lawn gnome.

“Best I can offer is concrete.”

He studies it.

“Even this,” he says, “was shaped from earth.”

I squint at the gnome.

“You’re really committed to this perspective thing, huh?”

He smiles. “The world is larger than your walls.”

We sit back down.

I ask, “So did people think you were dramatic back then?”

He laughs.

“Constantly.”

“Good. Because you just referred to my shrub as ‘a humble cathedral.’”

“It aspires,” he replies calmly.

I ask him what made him fight so hard to preserve wilderness.

He leans forward, suddenly serious.

“When you stand among ancient trees, you realize they do not need us. But we need them.”

That one lands.

Even Kevin the retriever goes quiet.

Then Muir ruins the mood by gasping at a moth near the porch light.

“Look at that perfect creature!”

“It’s trying to kamikaze into the bulb.”

“It is following light,” he says reverently.

“It’s following bad decisions.”

“Many beings do,” he replies.

Touché.

At some point he lies flat on the grass, hands behind his head.

“You must lie on the earth more often.”

“There are ants.”

“They are part of the experience.”

“That’s not comforting.”

He looks at the stars like they personally invited him.

"In the wild, you find yourself."

"I found a rock in my back."

He beams.

"The earth greets you."

Before he leaves, he stands by the lone tree in my yard and places his hand on its trunk.

"Care for it," he says gently.

"I water it."

"Listen to it."

"...It doesn't talk."

He smiles knowingly.

"Everything speaks."

Kevin barks again from next door.

Muir nods with deep respect.

"Yes. Like that."

As he heads toward the gate, he turns back one last time.

"Go to the mountains," he says.

"The closest I've been is a hiking trail with a snack bar."

He looks slightly pained.

"Go farther."

"I get bad reception."

"Good," he says.

And then he's gone.

I stand in my backyard holding a half-eaten sandwich, staring at a tree I've ignored for years.

It does look... taller somehow.

Kevin barks again.

The moth keeps chasing the porch light.

The night feels bigger.

And for the first time ever, I consider touching grass unironically.

Ean Pope

Dinner Convo

Me: you John Muir, right?

Muir: I am. And judging by your tone, you weren't expecting me here.

Me: Not at all. I'm Ean. I'm in this Light and Life class, and today's lecture on color honestly made me slow down more than I expected.

Muir: Color has that effect when you let it.

Me: Yeah. We talked about how color isn't really "in" things, it's light reflecting, refracting, and then getting interpreted by our eyes and brain. But when I read your writing about Yosemite, it felt like you weren't breaking color down... you were experiencing it.

Muir: I never believed nature needed to be reduced in order to be understood.

Me: That stood out to me, especially knowing you were temporarily blinded at one point. After learning how vision works, cones, light, perception, it made your writing hit harder.

Muir: Losing sight, even briefly, teaches you how precious light truly is.

Me: So here's my question, just us talking at this party:
Do you think understanding the science of color makes nature less beautiful?

Muir: Not at all. Knowing *how* light paints the world only deepens the wonder. The danger is not knowledge, but forgetting to look.

Me: That makes sense. Sometimes it feels like people explain things so much they forget to feel them.

Muir: Exactly. Mountains are not just wavelengths and reflections. They are experiences of light that shape the soul.

Me: I like that. Makes me realize color isn't just information, it's connection.

Muir: And light is the language it uses.

Jasmine: Professor Wald, it is so nice to meet you! The dress shirt, tie and jeans combo never gets old! Anyways, in honor of this conversation, I made the theme for today's dinner Vitamin A rich: roasted sweet potatoes, grilled salmon marinated in teriyaki sauce paired with kale salad, and a mango cake for dessert. I hope you enjoy :)

Wald: How wonderful! And yes, to my choice of clothing, I keep it simple, similar to the way I cherish life... "to know reality is to accept it, and eventually to love it."

Jasmine: I love that— please, try some of the salmon. Consider it a small tribute to vitamin A and all the molecules you've made famous. But I've got to ask: once you understood vision down to the chemistry, did the world start to feel more mechanical to you, or even more miraculous? I just feel like, sometimes, the fantastical part of life is not understanding some concepts fully.

Wald: Understanding never drained the color from the world. Every sunset, walk with my dog Freddie, swim in the lake became even more beautiful. When you realize that something as fragile as a molecule of vitamin A can begin the whole cascade that lets you see this table, these porcelain plates, even this DELICIOUS salmon on our plates, it's hard not to feel a kind of awe... that somehow this Earth was capable of raising us. I feel improbably lucky.

Also, you are the second person I am telling this to, but I am actually starting to think about a new paper on why human color vision is so uneven. Specifically, why we're remarkably sensitive to some colors, yet surprisingly poor at perceiving others, especially in low light and darkness. My colleague theorizes that color vision might have even evolved for beauty, accuracy or something else entirely.

Jasmine: Firstly, thank you for trusting me with this information. You are always bouncing from one thing to the next. Could I throw in a side tangent of if color is the first thing our eyes abandon in the dark, do you think that's part of why nighttime feels less busy and more introspective? I personally do all my journal entries and administrative tasks at night. I feel so much more at peace with myself at night than in the bustling cities in the morning times.

Wald: That is very interesting! I will note that question down.

Jasmine: You speak about wonder so calmly, while I feel like knowing the unknown is daunting. Was that something science gave you over time?

Wald: As a child, I was annoyingly curious. I was fascinated by how everything worked. Thinking about this whole discovery of vision and Vitamin A together, I felt like I was standing closer to wonder than dismantling it. The more precisely I understood how retinal changes shape electrical signals, the more obvious it became how much vision depends on fragile coincidences. We are so delicate, so fragile, so special. Like I say to all my students, science reminds me that every explanation opens into a larger unknown.

Jasmine: You are so inspiring. Thank you for taking the time to chat with me today. Could I pack you up the leftovers since I know you have a long night ahead at the lab?

Nomar: I have to be honest while we are eating this. Before this lecture I thought white light was just... white. I never really questioned it. Then I saw the prism experiment and realized white light secretly has every color inside it. That actually blew my mind a little.

Newton: Many people assume white light is simple, but it is a mixture of many wavelengths. The prism merely separates what is already there.

Nomar: The rainbow example helped me a lot. I always liked rainbows growing up, but I never thought about the science. Now when I see one, I am going to think about refraction instead of just saying "that looks cool."

Newton: Curiosity often begins with beauty. The scientific explanation does not remove the wonder.

Nomar: Another thing that stuck with me was learning that there are not really "seven official colors." I always memorized ROYGBIV like it was law. Finding out that the spectrum is actually continuous made me realize I kind of accepted it without thinking.

Newton: The division into seven was more symbolic than scientific. Nature itself is continuous.

Nomar: That actually made me think about how we label things in general. In class we kept trying to decide if a color was blue or green, and half the room disagreed. It reminded me of arguments with friends over what color a shoe or shirt is.

Newton: Perception varies from person to person because each observer interprets the incoming light differently.

Nomar: The cone receptors part also hit me. Knowing we only have three types of cones but can still see millions of colors is wild. It made me realize my brain is doing way more work than I give it credit for.

Newton: Indeed. The mind reconstructs color from signals rather than directly seeing wavelengths.

Nomar: Honestly, I am never going to look at sunlight the same way again. Something as basic as daylight now feels layered. It is physics, biology, and perception all at once.

Newton: That realization is the beginning of scientific understanding.

Nomar: Next time I see light through a window or a rainbow after rain, I am probably going to think about prisms instead of just walking past it.

Newton: Then the experiment has succeeded beyond the laboratory.

Ariel Vilensky

Lecture 5. Color and Color Vision

Me: Good evening, Dr. Wald. You gave a most intriguing speech upon receiving your Nobel Prize. Would you mind if I ask a few questions about it?

George Wald: Of course not, ask away.

Me: At the beginning of your speech you said that “A scientist lives with all reality. There is nothing better. To know reality is to accept it, and eventually to love it.” I’m wondering what you mean by “accepting reality,” especially since it seems like a scientist’s main job is to question reality.

George Wald: That’s a great question! By “accepting” reality I mean to learn to accept the results you see and not try to force any preconceived ideas onto your data.

Me: How interesting! You additionally mentioned that scientists never truly achieve their goal, and that there’s “always the further horizon.” Do you think that this applies to other fields, like ambitious entrepreneurs?

George Wald: Yes, of course it does. It is the attitude of always having a next goal to reach that I value.

Me: That makes sense. Lastly, you said in your speech that you have spent your life living among molecules, and that you tell your students to try to “feel” like a molecule. What do you mean by these statements?

George Wald: I was expecting you to ask about that. For the first part of that, I mean that I have immersed myself in molecules in my research throughout my life, and that my work has given me great pleasure. For the part I recommend my students, I mean that they should try to immerse themselves in what they enjoy to study, and try to gain an instinctive understanding of it as much as possible.

Me: Thank you so much for your time, Dr. Wald.

Karen Zheng, kz374

Dinner Conversation with William Morris

Me: Hi William, what inspired you to start the Arts and Crafts movement?

William: I was tired of seeing the machine-made products. I needed a new and refreshing approach to design and manufacture when industrial mass-production was at its peak.

Me: What is the Arts and Crafts movement in your own words?

William: For me, it's championing hand craftsmanship during a time of mass production in British history.

Me: Certainly, I was looking at your wallpapers today in class, and they're truly amazing. But I can't help asking, weren't you afraid and aware of all the talk about the illness associated with the arsenic green?

William: I am not scared of it because I don't believe it is factual. The doctors were being bitten by witch fever.

Me: Still, the fear seemed widespread. Even if the science was uncertain, didn't it concern you that people believed your work could be harmful?

William: I decline to comment further. My father's Devon Great Consols mine was the world's greatest arsenic producer, and those shares funded Morris, Marshall, Faulkner & Co from the start.

Me: Then, what are some ideas that you want people to take away outside of art?

William: I want people to see my vision about social reform, conservation, and what it means to live a fulfilling life. For me, art, politics, and literature were all linked to my struggle against the industrial age.

Me: Seems a little hypocritical coming from you...

William: While I may have been problematic, there are values that can still be applied to the world today.

Me: That I can agree with. Even today, we see the same issues of waste and overproduction, such as through low-quality items, fast fashion, and general overconsumption.

Dinner Conversation with Charles Darwin

Me: Darwin, it struck me when I read your words about the eye seeming absurd in the highest possible degree to have formed by natural selection.

Darwin: Yes this struck me as well, if so many possibilities from a simple to complex eye is possible, then the difficulty fades.

Me: That was the part that stood out to me. You argued that imagination struggles but evidence is more important. In our lecture we saw some examples of this like in the Articulata, with the optic nerve coated with pigment then going through numerous gradations.

Darwin: Exactly my point. To see what gradations are possible we have to look to the collateral descendants.

Me: Something else that fascinated me was when we talked about the crustaceans. Some have superposition compound eyes where light follows the law of reflection rather than refraction.

Darwin: What about the spiders?

Me: The jumping spiders like *Portia fimbriata* and the ogre-faced spider *Dinopis srbrufa* have the high resolution eyes. Nocturnal spiders have large eyes to help them hunt at dusk.

Darwin: A great example of more utility in different cases

Me: That's why I believe your argument is powerful. You never claimed the eye appeared fully formed but rather that each stage was important.

Darwin: Exactly, even if we can't trace fossil intermediates in Vertebrata, traditions are also in living forms

Me: Here is a question I really want to ask you, when people look at something complex and assume design, how do we respond?

Darwin: By looking carefully, comparing structures across groups and recognizing sensitive nerves are more responsive to light.

Me: So complexity doesn't need a leap but rather requires accumulation

Darwin: It is more of a gradual modification.

Me:

Mr. Hubble, the part of the lecture about galaxies moving away from us really surprised me. I always thought the universe was just there. I never pictured it expanding.

Hubble:

Many people assumed the universe was static for a long time. The farther away a galaxy is, the faster it appears to move away from us.

Me:

That idea messed with my head a little. It's strange to think that space itself is stretching, not just objects flying through it. It makes the universe feel more alive somehow.

Hubble:

It is not movement in the ordinary sense. It is the fabric of space expanding, which carries galaxies along with it.

Me:

I also liked how the lecture connected this to light. The redshift idea made it clearer to me how light waves stretch and shift toward red as things move farther away.

Hubble:

Light carries a lot of information. By analyzing it carefully, we can learn about distance, speed, and even composition without ever traveling there.

Me:

What surprised me most was that all of this started with just looking through a telescope and noticing patterns. It makes science feel less like magic and more like patience and attention.

Hubble:

Discovery often begins with observation. Technology helps, but curiosity is what drives it forward.

Me:

I think that's what I'm taking away from this lecture. The universe feels huge and overwhelming, but humans also figured out these massive ideas just by studying light and asking questions. It makes the night sky feel different now, not just stars, but clues about time and motion.

Hubble:

When you look carefully, even distant points of light can tell a story.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 6 Dinner Conversation

Conversation with Jerome Wolken

Ellie: Hello Mr. Wolken, thank you for meeting me for dinner. I have been really looking forward to talking with you. In class today, we learned about how organisms like *Euglena* react to light. I was especially drawn to your description of *Euglena* as a “photo neurosensory cell.” What led you to study how such a simple organism senses light?

Jerome Wolken: I have always been fascinated by the connection between light and life. It amazed me that even a single celled organism could detect light and respond in a purposeful way. When I watched *Euglena* swim toward light, which we call phototaxis, it made me realize that these tiny cells function almost like living light detectors.

Ellie: That is so cool. It also makes me think about how vision might have evolved. Do you think studying organisms like *Euglena* helps explain how vision became more advanced?

Jerome Wolken: Definitely. Vision did not appear all at once. Evolution likely began with simple light sensitive systems, like what we see in *Euglena*. Over time, those systems became more specialized, leading to things like pinhole type eyes, then camera style eyes, and eventually the complex visual systems we see in humans and other animals. Studying simple organisms helps us understand the early steps in that process.

Ellie: That makes a lot of sense. I also read that your research went beyond *Euglena*. You studied bioluminescence and even worked on ways to help restore sight. Can you tell me more about that?

Jerome Wolken: Yes. One of the things I cared about most was applying what we learn from nature to help people. I studied how light interacts with biological tissue and how technology might be used to support or restore vision for those with visual impairments. My work on bioluminescent organisms also helped inspire better imaging methods, which let scientists observe living systems in new ways.

Ellie: That is really inspiring. You connected biology, physics, and medicine in a way that actually impacts people’s lives. It makes me see how basic research can lead to real innovation.

Jerome Wolken: Haha yes. Each discovery builds on earlier work, and future researchers will take what we learn and push it further to make new discoveries.

Ellie: That is exactly what I find exciting about science. Thank you for sharing all of this with me, Mr. Wolken.

Jerome Wolken: It was my pleasure, Ellie.

Dinner with William Paley

Me: Reverend Paley, your argument is elegant: if you found a watch on a heath, you would immediately infer a watchmaker – and if the eye is more intricate than any watch, surely it implies a designer of still greater intelligence. But I want to press on the analogy itself. A watch is designed to do one thing. The eye, as we now understand it, comes in dozens of radically different forms across the animal kingdom: compound eyes in insects, mirror eyes in scallops, pinhole eyes in nautiluses, the camera-style eye of the vertebrate. Do all of these point to the same watchmaker, or does the diversity complicate your argument?

Paley: (untroubled) It strengthens it considerably. You describe to me a craftsman who has solved the problem of vision not once but a dozen times, using different materials and different principles – pinholes, lenses, mirrors – each solution suited precisely to the creature's way of life. The web-spinning spider, who waits for food to come to him, has eyes of modest resolving power. The hawk, who must spot a mouse from two hundred feet, has eyes of extraordinary acuity. Is that the work of blind chance, grinding away for eons? Or does it not rather suggest a mind that understood the problem deeply enough to devise multiple solutions?

Me: That is a fair point about diversity of design. But Richard Dawkins would say, and has said, that what looks like design is the product of natural selection acting over vast stretches of time without any foresight or purpose. A true watchmaker has foresight. Natural selection, he argues, has none. It has no mind's eye. It simply selects what works today, with no plan for tomorrow.

Paley: (leaning forward with interest rather than irritation) I have read Hume's objections in a similar spirit, and I will grant you this: the argument is not a proof in the mathematical sense. I never claimed it was. What I claimed is that design is the most reasonable inference from the evidence before us. Mr. Dawkins says natural selection explains the apparently purposeful form of living things. Very well, but what explains the laws that make natural selection possible? What explains the laws of optics that both the eye and the telescope obey? I speak not of the origin of those laws themselves, as I wrote plainly in *Natural Theology*. The laws being fixed, the eye is adapted to them with astonishing precision. But the existence of those laws, that is a question natural selection cannot touch.

Me: That is interesting, you are not arguing against evolution directly, but pushing the question back to a level beneath it.

Paley: Precisely. Consider the fish. The eye of a fish requires a more convex crystalline lens than the eye of a terrestrial animal, because light passing from water into the eye requires stronger refraction than light passing from air. And the fish eye is, in fact, more spherical. What plainer testimony of design could there be? The laws of refraction are the same for the optician and for the Creator. The difference is that the optician works with his hands, while the Creator works with those very laws themselves.

Me: And what do you make of the parts of nature that do not look like beneficent design? De Candolle described nature as all the plants of a country at war with one another. Hume's Philo described every living creature surrounded by enemies seeking its destruction. Does that not complicate the picture of a good designer?

Paley: (soberly) It is the hardest question, and I do not pretend to dissolve it. I argued that in a vast plurality of instances, contrivance is beneficial. I also argued that the Deity has superadded pleasure to animal sensation beyond what was strictly necessary. That a creature can see a sunset, that it can feel the warmth of the sun, these are not required by mere survival. They suggest a goodness that goes beyond the mechanical. The war in nature is real, but so is the pleasure. I ask only that you weigh both.

Me: (after a pause) You know, Dawkins called your argument gloriously and utterly wrong. But he also called it made with passionate sincerity, informed by the best scholarship of your day. I think that is a more honest epitaph than most scientists receive.

Paley: (smiling, raising his glass) I will accept gloriously wrong over boringly right any evening. More wine?

Lecture 6 Dinner Party Conversation:

Tyler: I did not realize there were basically different levels of eyes across evolution.

Charles Darwin: Small changes over long periods can produce remarkable complexity.

Tyler: Like we started with organisms that could barely sense light and somehow ended up with giant squid eyes.

Aldo Leopold: Vision changes how organisms understand the world around them.

Tyler: Even Euglena was kind of crazy because it does not even have eyes and it still moves toward light.

Charles Darwin: Life can respond to environmental information without forming images.

Tyler: Then we got to pinhole eyes and camera eyes and suddenly it felt like evolution was building upgrades.

Aldo Leopold: Nature often modifies what already exists.

Tyler: The squid part was honestly wild.

Charles Darwin: What interested you?

Tyler: Squid eyes are weirdly similar to human eyes but they evolved separately.

Charles Darwin: Similar environmental challenges can produce similar solutions.

Tyler: And somehow squid do not even have a blind spot which feels unfair.

Aldo Leopold: Humans like to assume evolution moves toward perfection.

Tyler: But evolution is more like good enough to survive.

Charles Darwin: Exactly.

Tyler: Then the archerfish showed up and made me feel dumb.

Charles Darwin: Why?

Tyler: Because this fish can shoot insects above water and somehow compensate for light bending better than I can.

Aldo Leopold: Adaptation can create abilities that seem extraordinary.

Tyler: The giant squid eye was insane too. Soccer ball-sized eyes sound fake.

Charles Darwin: Large eyes provide greater light gathering ability in deep water.

Tyler: So basically every animal eye is designed around what that animal needs.

Aldo Leopold: The world looks different depending on who is seeing it.

Tyler: I think that was the coolest part of the lecture honestly. Every creature is basically living in its own version of reality.

Charles Darwin: Different eyes reveal different worlds.

Tyler: To animal eyes then, because apparently fish, squid, and birds have been showing off this whole time.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 6

Ernst Haeckel

Jenny: Hi Ernst! It's nice to meet you.

Haeckel: Lovely to meet you too! I already ordered for us: smoked salmon for you and trout for me.

Jenny: You know, that actually feels very on-theme. Fish always make me think about early life and beginnings... and, honestly, you're kind of the reason I picture embryos as these tiny, curled little shapes.

Haeckel: Ah. Then my drawings have done their job.

Jenny: That's the thing. They're beautiful. Almost too beautiful. Did embryos really look that similar, or did you... help them a little?

Haeckel: I was not trying to deceive. I was trying to reveal a pattern.

Jenny: So less "this is exactly what it looks like" and more "this is what you should notice."

Haeckel: Precisely. I wanted people to see that life is connected – that humans are not separate from animals, but part of the same unfolding process.

Jenny: I think that's why your drawings stuck with me. When I look at your drawings, it's not just biology – it feels like a family portrait but in ultrasound format...

Haeckel: A flattering description.

Jenny: But some people say your drawings were misleading.

Haeckel: And some people fear what those drawings imply. That we are not as special as we like to believe.

Jenny: I don't know... I actually find that comforting. If we all start from something so small and similar, then none of us were ever meant to be perfect.

Haeckel: Then perhaps you understand my work better than my critics.

Me:

Okay man, I gotta something to ask. Are you telling me that when animals started having eyes, it basically caused chaos on Earth?

Andrew Parker (laughs):

Yeah... that's actually kind of the idea.

Me:

So before eyes, what was everyone doing then?

Parker:

Organisms could sense light, but they couldn't really see each other clearly. No sharp images. No spotting something from far away and chasing it down.

Me:

So then somebody evolves good vision, doesn't it mean it's over for all the other species?

Parker:

You are right. An organism that could see could hunt better. That means once predators could see, prey had to level up fast, like for example, get better shells, faster movement, camouflage, etc.

Me:

So vision basically started an evolutionary race?

Parker:

That is a great way to put it. Seeing made the world more competitive overnight in evolutionary terms.

Me:

That's kinda insane. So eyes didn't just help animals survive but also helped them evolve faster?

Parker:

Yes. When you can see danger coming or see food from far away, natural selection gets way more intense.

Me:

This is actually crazy.

Parker:

I am gonna go use the bathroom now. Bye.

Me:

Ok bye buddy.

Benito Jaramillo
PLSCI 1130
February 24, 2026

Conversation with Samuel Wilberforce

Benito: Bishop Wilberforce, thank you for joining me for dinner tonight. It is an honor to speak with someone who stood at the center of such an important debate about life and truth. I hope you enjoy tacos because that is what we will be eating tonight!

Wilberforce: Thank you, Benito. I am glad to see that young scholars are still concerned with questions of meaning and not only of mechanism. It is important to understand the why as well as the how.

Benito: In my Light and Life class, we often talk about whether life has purpose or if it is simply the result of natural processes. During your debate over evolution, what troubled you the most?

Wilberforce: What concerned me was not the scientific debate by itself, but the possibility that human life would be reduced and only interpreted as something purely mechanical. If we describe life only as a chain of biological events, we have the risk of losing sight of its moral and spiritual dimension.

Benito: So for you, light is more than knowledge?

Wilberforce: Indeed. Light is moral truth. Science may illuminate how the body functions, but it does not illuminate why virtue matters or why human dignity must be protected. That light, I believe, comes from a higher source.

Benito: Some would argue that evolution does not remove meaning, only explains biological development. Would you still be concerned?

Wilberforce: Explanation is not the same as meaning. A world explained entirely by mechanism may forget that humanity carries responsibility. Light must guide life, otherwise life drifts.

Benito: That makes me reflect on whether modern society sometimes confuses information with wisdom.

Wilberforce: Exactly. Information is abundant; illumination is rare. The question is not if we can describe life, but if we can live it rightly.

Benito: Thank you, Bishop. You've made me think about whether light in my life comes from facts alone or from deeper conviction.

Wilberforce: And that, Benito, is the beginning of true illumination. Thank you for the food!!
God bless

Lecture 5: Dinner Conversation with Aldo Leopold

Light and Life | Vansh Kakra | vk365

Vansh: I have to ask - you talk a lot about *seeing* the world differently, and I keep thinking... was this literal? Like, did you wake up one day and suddenly everything looked greener?

Aldo Leopold: I wish it were that dramatic. It was more like realizing I'd been squinting my whole life and finally put on the right glasses. The truth is less cinematic and more awkward. Once you see yourself as part of the land, not above it, you start noticing things that make daily life... inconvenient.

Vansh: Inconvenient how?

Leopold: You stop seeing land as scenery or resources and start seeing relationships.

Vansh: So it's not just biology, it's like a mindset shift.

Leopold: Exactly. Same world, different lens. Before, I saw land as something to manage. After, I saw it as something I belonged to—whether I liked it or not.

Vansh: That sounds nice in theory, but also exhausting. Like once you see it, you can't unsee it.

Leopold: That's the problem with clearer vision. Ignorance is very restful.

Vansh: As a Cornell student, I feel that. Once you understand how prelims work, you never sleep the same again.

Leopold: Education often does that. It doesn't just add information but it rearranges responsibility.

Vansh: The reading I did made it sound like your big contribution wasn't facts, but this shift in perspective. Teaching people to *see* differently.

Leopold: Facts are easy to collect. Vision is harder. People can memorise ecosystems and still treat them like vending machines.

Vansh: So your "new way of seeing" is really about realizing we're not the main character.

Leopold: Precisely

Vansh: Do you think people today are capable of that shift? Or are we too distracted?

Leopold: People are always capable. They're just very good at postponing it. "I'll care later" is the most popular philosophy of all time.

Vansh: So what's the first sign that someone's vision has changed?

Leopold: They stop asking, "What can I get from this?" and start asking, "What happens next if I do?"

Vansh: That's... annoyingly simple.

Leopold: The hardest ideas usually are. If they were complicated, we'd hide behind them more easily.

Vansh: Great. Now I can't look at a patch of grass without feeling morally observed.

Leopold: Then my work here is done.

Selina Ke

Dinner Conversation with Bob Dylan

Selina: Your song, *Blowin in the Wind*, keeps coming back to me. The questions you ask about roads, seas, lives lost. Do you ever worry people just hear the words and do not think about what they mean?

Dylan: All the time. That is why I wrote it the way I did. The questions are simple, almost like riddles, but they point to things people usually ignore.

Selina: “Yes, ’n’ *how many times can a man turn his head / Pretending he just doesn’t see*”? It feels like that happens so often. People know injustice exists, but they look away.

Dylan: Exactly. People find it easier to pretend it is not happening than to face it. But pretending does not make the questions go away.

Selina: And then there is the part about how many roads a man must walk down before he is called a man. It is striking. It is about more than literal roads, right?

Dylan: Right. It is about struggle, experience, and recognition. How much has to happen before we truly acknowledge someone’s humanity?

Selina: And the white dove sailing until she sleeps in the sand. That image makes me think about peace and freedom. They are always desired, but somehow always out of reach.

Dylan: That is the point. The song does not give easy answers. It is like the answers are there in the air, but only if people notice them, only if they are willing to listen.

Selina: Even the line about cannonballs or deaths until someone realizes too many people have died. It is stark. It reminds me that history is not abstract. It is lived by people who suffer and fight for change.

Dylan: And that is what the song tries to capture. The ongoing struggle, the frustration, the hope. The answers are blowin in the wind, but someone has to reach for them.

Selina: It is a reminder that the fight for justice and equality is not just history. It is something we participate in now, every day.

Dylan: That is the hope. If enough people notice, enough people care, maybe the wind will carry those answers to where they are needed most.

Dinner Conversation with William Paley

Me: Hey William, did you expect the watch analogy to go this hard? Like, people are still arguing about it centuries later.

Paley: I was just trying to make the point obvious. Look at the AppleWatch on your wrist, you don't assume it assembled itself.

Me: Right, but people now are like "well actually, give it enough time maybe robots or AI could build something like that.

Paley: Haha, that's a very modern response. But robots, algorithms, and systems are all designed by people. Human intelligence is always sneaking into these tools.

Me: But doesn't this just point to the fact that AI and modern technology is part of human evolution, no one sat down and fully designed AI from scratch but eventually as the civilization progresses, these advanced technologies are born.

Paley: Think about it though, even when technology emerges, it's from countless intentional choices, experiments and refinements over time.

Me: So it's not random, even if no single person is in charge. It's gradual but not accidental.

Paley: Exactly. There's no master blueprint but there is direction.

Me: That's interesting, because Darwin basically keeps the gradual part where complex things don't appear all at once and emphasizes that things usually happen without knowing the end goal.

Paley: Yes. Darwin took the problem seriously. He didn't deny that nature looks purposeful but gave a different explanation for why.

Me: I understand both of your perspectives and I like how it complements each other rather than sparking fierce debates.

Paley: I'm glad this helped you better understand evolution.

William Paley: The Watchmaker and the Classroom

Me: William! It's so good to see you! Thanks for making the trip!

Paley: Maximo! A pleasure, truly. Is that lamb I'm smelling?

Me: It is! Fresh out of the oven. Listen, William, I've been reading your work for my class. Your argument in Natural Theology, the one about finding a watch on the heath and knowing it must have a maker, and the eye being like a telescope. It's a beautiful piece of writing. But I have to tell you, that argument is still being fought over today. People in America are still trying to get intelligent design taught in science classrooms, and they're using your reasoning to do it.

Paley: Is that so, Maximo? Well, I am flattered, in a way. Though I must say, I wrote that book for a very different world. I was a clergyman trying to show educated men that faith and reason could walk together. I never imagined my argument would be pulled into a courtroom two hundred years later.

Me: But here is what I want to press you on, William. Richard Dawkins wrote that your argument was gloriously and utterly wrong. He said natural selection is the blind watchmaker, that complexity can come from small changes over enormous time, no designer required. What do you make of that?

Paley: I had no knowledge of Darwin, Maximo, nor of the deep time the geologists would later uncover. I will grant you this much. If a process could produce the eye without a mind behind it, my analogy is weakened. A watch found on the heath is one thing. A watch that slowly assembled itself over a million years is another.

Me: And yet your argument is what people are citing to keep intelligent design in biology class. Should it be there?

Paley: Now that is a harder question. I believed the study of nature was devotion, that seeing design in a bird's wing brought a person closer to God. But I never confused that with what a chemist or an anatomist does at the bench. Science asks how. Faith asks why. If my argument is being used to smuggle the why into a classroom meant for the how, then I think it has been put to the wrong purpose. Teach the children what the evidence shows. Let them meet the watchmaker, if they meet him at all, on their own time and in their own hearts.

Me: That's a generous way to hold it, William. Would you care for some dessert?

Paley: I'll pass, Maximo, the lamb has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 6: Dinner Conversation with Aldo Leopold

Me: Hi Mr. Leopold, thank you for meeting with me for dinner! I was really moved by your story about the wolf, especially your interpretation of its eyes.

Leopold: That moment changed everything for me. We reached the wolf just in time to watch the green fire fade from her eyes. That was when I saw something in her gaze I had never, and would never, truly understand.

Me: You once believed fewer wolves meant more deer, and that this would benefit hunters. I'm guessing seeing that wolf made you rethink that idea?

Leopold: I came to a conclusion too quickly. It made sense to me that removing predators would resolve the problem. But after seeing the green fire die in the wolf's eyes, I sensed that neither the wolf nor the mountain agreed with me. I began to understand that nature is not a system meant to be simplified. Every species plays its role, and removing one can shift the balance of it all.

Me: That is an incredibly powerful realization. Do you think truly seeing nature as it is contributed to your new conclusion?

Leopold: I'm sure! Observation teaches humility. When you take the time to look closely at the world around you, connections begin to form instead of seeing things as isolated parts. The experience taught me that humans are not rulers of the land, but rather one species in a much larger community.

Me: I recently had the chance to talk to Mr. John Muir as well about his love of nature. Did his work influence your thinking on environmental ethics and caring for the land?

Leopold: Very much so! Mr. Muir helped us see nature as something worth protecting. My own work followed that foundation, but I wanted to go a step further by reflecting on how we can contribute to the land and recognizing our responsibility within it.

Me: Last question! When humans interfere with nature thinking we know best, what do you think we most often fail to see?

Leopold: We most often fail to see the connections. We focus on one problem at a time and forget that every living thing is part of a larger system. Nature works as a whole, and when we ignore that, we risk harming what we're trying to fix.

Me: Thank you for this conversation! I'll definitely carry these perspectives with me moving forward.

Dinner with Charles Darwin was supposed to be calm.

I made fish.

In hindsight, serving seafood to the man who sailed around the world observing wildlife might've been bold.

He stared at the plate thoughtfully.

"Fascinating," he murmured.

"It's salmon."

"Yes... but consider what it once was."

"A fish?"

"A survivor of countless generations of natural selection."

I blinked.

"I just seasoned it."

We sit down, and within five minutes he's inspecting my houseplant.

"Why is it leaning toward the window?"

"Because that's where the sun is?"

He smiles like I just passed a quiz.

"Precisely. Variation. Advantage. Persistence."

He turns back to me.

"Life adjusts."

"I adjust by hitting snooze."

He nods slowly.

"A strategy. Not necessarily a successful one."

For context, Darwin wrote *On the Origin of Species* in 1859 after years of studying plants, animals, fossils, and basically everything that moved (or used to move). He proposed that species evolve over time through natural selection—traits that help survival tend to stick around.

At dinner, this means he cannot look at anything normally.

I pass him the bread.

He rotates it in his hands.

“The crust—adapted for protection.”

“It’s sourdough.”

“An evolutionary triumph.”

Halfway through the meal, I ask about the famous voyage on the HMS Beagle.

His eyes light up.

“The Galápagos Islands,” he says, reverently.

Ah yes, the legendary finches.

Those birds really built his brand.

He explains how each island had finches with slightly different beaks—some thick for cracking seeds, some narrow for insects.

“Small variations,” he says, “but powerful consequences.”

“So basically,” I say, “the birds upgraded based on their environment?”

He pauses.

“Not intentionally.”

“Right. No bird meetings. No five-year beak plans.”

He looks mildly horrified.

“No.”

Then he points at my dog, who has been staring at the table this entire time.

“Observe that creature.”

“That’s Max.”

“His ancestors were wolves.”

“Yeah, but he’s scared of the vacuum.”

Darwin folds his hands.

“Domestication is also selection.”

“So somewhere down the line, the bold wolf got replaced by a guy who panics at Roombas?”

“In simplified terms... yes.”

Max sneezes.

Darwin nods approvingly.

“A remarkable lineage.”

At dessert, I make the mistake of asking, “So are humans still evolving?”

He takes a slow sip of tea.

“Of course.”

I freeze mid-bite.

“Into what?”

He shrugs gently.

“Adaptation never ceases.”

“That’s not comforting.”

He gestures toward my phone.

“For example—your posture suggests selection may not favor extended screen use.”

I sit up immediately.

“Rude.”

“Observational.”

He grows thoughtful.

“When I first proposed my ideas, many were... unsettled.”

“That’s one way to put it.”

He nods.

“Change is often resisted. Yet evidence accumulates, patiently.”

He says this while examining the pepper grinder like it’s about to demonstrate survival traits.

Then he asks me a question.

“If you were placed in a new environment tomorrow—different climate, different food, different threats—how would you fare?”

“Poorly.”

He laughs softly.

“Honesty is adaptive.”

“I think I’d last maybe three days.”

“With preparation, longer.”

“With Wi-Fi?”

He looks confused.

“Is that a food source?”

“Emotionally, yes.”

As the evening ends, he stands and adjusts his coat.

“Remember,” he says, “nature does not rush. Yet everything changes.”

I glance at Max, who is now asleep upside down.

“So evolution leads to... that?”

Darwin smiles faintly.

“To diversity.”

He walks toward the door, then turns back.

“Also,” he adds, “do not underestimate small changes.”

I look down at my half-eaten dessert.

“Like extra dessert?”

“Precisely how species decline,” he says calmly.

He leaves me there—slightly judged by history’s most famous naturalist, slightly concerned about my posture, and deeply aware that my dog is technically a highly modified wolf.

Max snores.

Natural selection, apparently, has a sense of humor.

Ean Pope
Dinner Convo

Me: Hey, you're Aldo Leopold, right?

Leopold: Yes.

Me: I'm Ean. I'm in this Light and Life class and today's lecture talked about your story with the wolf, the one where you saw the green fire in her eyes.

Leopold: I remember that moment clearly.

Me: What stood out to me wasn't really the emotion part, but how the lecture connected that story to vision. We've been learning that eyes aren't just for seeing images, they're ways animals interact with their environment.

Leopold: That's a fair way to put it.

Me: The lecture made it clear that different animals use light differently, and some don't even need eyes to respond to light. But when you described looking into the wolf's eyes, it felt like you gained information that numbers or experiments wouldn't give you.

Leopold: That's true. It changed how I understood predators and ecosystems.

Me: So here's my question, just talking like this:
Did that moment make you rethink how humans study nature?

Leopold: Yes. I realized we were treating nature like a system to control instead of a system we're part of.

Me: That connects with me a lot. We keep learning that observation shapes understanding, but interpretation matters just as much.

Leopold: Exactly. Seeing is never neutral.

Me: So the takeaway isn't just about animal vision, it's about perspective.

Leopold: That's right.

Me: I can respect that. Makes me think this class is less about facts and more about how we look at the world.

Leopold: That's a good conclusion.

Jasmine: Professor von Baer, Guten Abend, Herr von Baer. Es ist mir eine große Freude, heute mit Ihnen zu Abend zu essen! I totally did not use google translate for this.

von Baer: The accent needs working on... but thank you. I see that you have made me my favourites: Krombacher beer with a side of Sauerbraten—the kind one eats absent-mindedly while watching embryos develop under a lens

Jasmine: Ah, yes. Something that lets the mind stay focused. Actually, in lecture, we talked about your idea that embryos don't pass through the adult stages of other animals, but instead diverge gradually from a common form.

von Baer: It was controversial at the time. Many preferred the neat story where development replayed evolution step by step. But nature is rarely so theatrical. Similarity early on does not mean identity—just like you and me!

Jasmine: You say it so calmly. “It was controversial.” How did you deal with that? I need to learn to be as confident as you.

von Baer: Doubt is not a weakness in science. It is a condition of honesty. I trusted careful observation more than elegant theories. And as I always say, “To keep every cog and wheel is the first precaution of intelligent tinkering.” When the evidence did not support a popular narrative, I allowed myself to remain uncertain, and very publicly too.

Jasmine: I actually do content creation, and even though it is not science, I hope to one day accept that doubtful people about my content is just a learning lesson... something that teaches me to take criticism without taking it personally, and still build an end product that represents integrity. I want it to be honest to what I'm trying to say, not just what performs well.

von Baer: Absolutely. And on another note, what do you think about development now after studying it?

Jasmine: Maybe this is not the answer you are looking for, but I see the way nature refuses to rush identity. Like you said, embryos do not rehearse the adult forms of other animals. It is like us humans, we all start off as pretty similar-looking babies, but the features that we get from our parents, intellectually, physically, emotionally, become more revealing and specific over time.

I feel like there is also a bigger lesson to be learnt here, which is to stay loyal to what you saw, even when it complicates the story.

von Baer: YOU GET IT!! My laws were about embryos, but also about humility. When scientists impose tidy narratives too early, the observations become skewed into what the result *should* be.

Jasmine: Thank you so much for your time, Professor. You are truly inspirational and back to my own personal passions, I hope to one day move outside of the mould of what makes a content creator go viral and find my own answers to making content that I truly feel authentic!

Nomar: I have to say, this lecture made me rethink animal eyes completely. I used to think all eyes were basically the same, just different colors or sizes. Then I saw how fish, birds, insects, and even worms all see the world differently, and now it feels like every animal lives in its own version of reality.

Darwin: That is a thoughtful observation. Each eye adapts to the needs and environment of the organism that possesses it.

Nomar: The archerfish example really stuck with me. The fact that it can spit water at an insect above the surface and actually hit it, even though light bends at the water surface, is crazy. I still struggle with that refraction trick where a pencil looks broken in a glass of water.

Darwin: The archerfish's brain has adapted to correct that illusion. Natural selection favors creatures that can interpret their environment accurately.

Nomar: It honestly made me think about how my own brain gets fooled by simple optical illusions all the time. If a fish can outsmart refraction but I still fall for Instagram illusions, that is kind of humbling.

Darwin: Human perception is powerful, but it is not flawless. Every species has strengths and limitations.

Nomar: Another part I liked was the difference between predators and prey. Predators having forward facing eyes for depth, and prey having eyes on the sides for wide vision. It made me realize eye placement is basically survival strategy, not just random design.

Darwin: Precisely. Traits that increase survival and reproduction tend to persist through generations.

Nomar: The owl part was also cool. I never knew their eyes cannot move, so they just rotate their heads instead. That makes their whole 270 degree turn way more impressive now.

Darwin: Adaptations often appear extraordinary when examined closely, but each has practical roots.

Nomar: What I took away from all this is that eyes are not just for seeing. They show how an animal lives, hunts, hides, or survives. It is like evolution leaves a fingerprint on vision itself.

Darwin: A poetic way to describe it, and quite accurate.

Nomar: Next time I look at an animal, I think I am going to notice the eyes first and try to guess what kind of life it lives instead of just saying it looks cool.

Darwin: Then you will truly be observing nature rather than merely glancing at it.

Ariel Vilensky

Lecture 6: Animal Eyes

Me: Good evening, Dr. Tyson. In *The Perimeter of Ignorance*, you say that the human eye, often praised as a marvel, is to an astrophysicist only a “so-so detector.” That surprised me. Aren’t our senses extraordinary?

Neil deGrasse Tyson: They’re useful, but limited. The universe emits across the entire electromagnetic spectrum. Our eyes capture only a thin slice of it. From a cosmic perspective, that’s a narrow window.

Me: You even suggest sunsets would be more breathtaking if we could see ultraviolet and infrared.

Tyson: Absolutely. Imagine seeing heat signatures glowing at dusk, or ultraviolet scattering in the sky. The universe is richer than our biology allows us to perceive. That’s why we build instruments like telescopes and detectors that extend our senses.

Me: Later in the essay, you shift to education and say that intelligent design doesn’t belong in the science classroom. Some people might see that as dismissive of religious thinkers.

Tyson: Not at all. I explicitly say that denying the history of scientists who invoked divinity would be intellectually dishonest. There’s a place to study those ideas: in history, philosophy, and psychology. But science class is for testable explanations of natural phenomena.

Me: So the boundary you’re drawing is about method, not belief?

Tyson: Exactly. Science asks what can be measured, tested, and falsified. When we blur that boundary, we confuse students about what science actually is.

Me: So the parts of your essay about vision and about intelligent design are really about limits?

Tyson: That’s right. The limits of our senses, and the limits of scientific inquiry. Knowing those boundaries is what keeps science honest.

Karen Zheng, kz374

Dinner Conversation with Charles Darwin

Me: Hi Charles, I am curious what you meant by “all nature is at war, one organism with another, or with external nature?”

Charles: Every species has the potential to produce far more offspring than can possibly survive. This is because resources like food, space, and safety are limited, so not all individuals can live and reproduce.

Me: So the “war” is really about limited resources meeting unlimited reproduction?

Charles: Yes, if all offspring survived, the world would quickly be overwhelmed. But nature limits growth through competition, environment, disease, and predation.

Me: That reminds me of what you said about studying Malthus and the idea that populations grow faster than resources.

Charles: When you consider how many seeds plants scatter each year, or how quickly animals can multiply, you begin to see how intense the struggle for existence must be, even when we do not notice it directly.

Me: So even something that looks peaceful, like plants growing or birds nesting, is still part of that competition.

Charles: Yes, the struggle is often quiet and gradual rather than violent. It is expressed through survival rates, reproduction success, and adaptation to changing conditions.

Me: That actually makes me think about my own life. Sometimes it feels like I’m also constantly competing, like for internships, jobs, opportunities, and there are always more people than spots available.

Charles: That feeling reflects a similar principle. When many individuals compete for limited opportunities, even small differences can matter over time. But remember, adaptation is about fit, not superiority

Me: That actually makes me feel a little less pressure. Maybe I’m not just competing against everyone, I’m just trying to find where I belong. Thanks, Charles!

Dinner conversation with Blaise Pascal

Me: Mr. Pascal, we read this quote you said in our lecture, "Truth is so obscured nowadays and lies so well established that unless we love the truth we shall never recognize it." This stuck out to me and I wanted to ask, what exactly did you mean by that?

Pascal: When I said this I basically meant that truth does not force itself upon us. If we don't genuinely love truth, we may ignore it especially when lies are uncomfortable.

Me: That makes a lot of sense. The slides also talked about how our education system doesn't really teach us about truthful love. A lot of times in class it feels like we're working to get the "right answer" rather than trying to find what's real.

Pascal: Because of this lack of love of truth, knowledge becomes shallow

Me: That reminds me of Chesterson, he said that we don't teach the general duty of telling the truth or giving a complete and fair picture of things. That really stood out to me since it essentially isn't about not lying but rather about not leaving out parts that make your side look bad.

Pascal: That is true but is harder than it sounds.

Me: Indeed, Karl Popper brought up the question of how we can look at theories that are competing against each other and whether one is closer to the truth than the other. That has made me wonder how we even know when we're getting closer to the truth and not just defending what we already believe.

Pascal: That is another difficult thing to look at, we have to give reasons and be able to compare different competing theories.

Me: The Yale report we looked at said we need the freedom to think the unthinkable and challenge the unchallengeable. I think this links back to what your saying, if people really can't speak freely then how can we even test new ideas and theories?

Pascal: Finding the real truth requires courage, not just to speak but also to genuinely listen.

Me:

Bishop Wilberforce, I think what surprised me most in this lecture wasn't even the science, it was how messy the debate around it was.

Wilberforce:

History often simplifies things. It prefers heroes and villains over careful nuance.

Me:

Yeah, that's what I realized. The lecture showed that the famous ape comment and the dramatic exchange might not have happened the way people usually tell it. It made me wonder how much of what we think we know is just the version that survived.

Wilberforce:

That is always a wise question to ask. What is truth? And who controls the story?

Me:

I also noticed that in your review of Darwin's book, you praised his writing and his observations before criticizing the theory. That's not how you're portrayed.

Wilberforce:

Disagreement does not require dismissal. One can admire a man's skill and still question his conclusions.

Me:

That part stuck with me. The lecture kept coming back to the idea that we should seek the whole truth, not just the version that supports our side. It made the debate feel less like science versus religion and more like two different ways of interpreting nature.

Wilberforce:

Conflict often arises when people assume only one framework is allowed to speak.

Me:

I think what I'm taking away from this lecture is that truth isn't found by cheering for a side. It takes humility, and it takes listening even when you disagree. The Darwin debate wasn't just about evolution. It was about authority, perspective, and who gets to define what counts as knowledge.

Wilberforce:

And that question remains unsettled in every generation.

Me:

Yeah, that's what makes it still feel relevant. It's not just a 19th century argument. It's an argument that we still have today.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 7 Dinner Conversation

Conversation with Samuel Wilberforce

Ellie: Hello Samuel Wilberforce, thank you for meeting with me for dinner. In class today we talked about the famous exchange you had with Thomas Huxley at the Oxford debate in 1860. I've seen different versions of what happened, so I wanted to hear your side. What made you pay so much attention to Darwin's ideas?

Samuel Wilberforce: My interest came from two places. I was genuinely curious about natural science, and I also felt a responsibility to examine new theories through the lens of theology. I don't reject studying nature, but I do think claims about life's origins should be questioned carefully, with both reason and faith in mind.

Ellie: That's interesting, because people sometimes describe you as someone who just brushed Darwin off. But it seems like you actually knew a lot about natural history. What about the *On the Origin of Species* bothered you the most?

Samuel Wilberforce: I respected Darwin's observations, especially about variation within species. Anyone who has seen breeding or cultivation knows that differences can appear over generations. My concern was the size of the jump Darwin made from that fact to the conclusion that all living things share a common ancestor. To me, that part sounded more like speculation than demonstrated proof.

Ellie: So you weren't denying small changes. You were questioning whether natural selection could explain huge changes across long periods of time. Did the fossil record play a role in your doubts?

Samuel Wilberforce: Yes, very much. In my era the fossil record was incomplete, and it did not clearly show the gradual chain of intermediate forms that Darwin's argument seemed to require. And beyond the fossils, I also questioned what kind of worldview the theory suggested.

Ellie: Wow, I understand completely. Even now, people still think about these questions.

Samuel Wilberforce: Exactly. Science may tell you how the world works, but faith asks why the world exists at all.

Ellie: I agree with that statement 100 percent! Thank you for sharing your perspective with me, Samuel Wilberforce.

Samuel Wilberforce: Of course, it was my pleasure Ellie.

Dinner with Leonhard Euler

Me: Herr Euler, you wrote to the Princesses Charlotte and Louise that truth can be discovered from three sources: our own experience, from reasoning, and from the report of others. I find that taxonomy fascinating because it includes all three without privileging any one. Most scientists today would say experience – experiment – is primary. Do you disagree?

Euler: *(with a slight smile)* I would say they are complementary and that to privilege one exclusively is to impoverish the others. Consider the nature of light itself. I can experience it with my eyes – or could, more than I can now. I can reason about it mathematically, as I have done at considerable length. And I can learn from the reports of Newton, of Huygens, of those who came before. To trust only experience is to start every generation from nothing. To trust only reason is to build castles in air with no ground beneath them. To trust only the report of others is to become what Roger Bacon warned against: a man who has adopted the conclusions of authorities without understanding the reasoning that produced them.

Me: That balance is admirable in principle. But I want to ask you something personal. You are losing your sight progressively, and yet your mathematical output has not diminished – some say it has increased. Does working in near-total darkness change what you see? Or rather, what you think?

Euler: *(pausing genuinely)* It is a strange thing. When I could see the page, I confess I was sometimes distracted by the page – by the notation, by the symbols, by the physical act of writing. Now the mathematics lives entirely in a space that has no ink in it. The relationships become, if anything, more vivid. A formula is not a row of symbols. It is a relationship between quantities, and that relationship does not require light to be real. Perhaps this is what I mean when I say the Creator has laid open sources for the discovery of truth, the source of reasoning does not depend on the eyes at all.

Me: That is remarkable, and it reminds me of something I have been thinking about. You are perhaps the most prolific mathematician in history, and you were also a man of deep faith. Many people today assume these are in tension... that the further you go into mathematics and physics, the less room there is for a Creator. Was that tension ever real for you?

Euler: *(with mild surprise, as if the question is slightly odd)* No. Mathematics, more than any other discipline, demonstrates that the universe is not a chaos. There are constants, ratios, identities that hold across all possible cases. The relationship I found connecting e , i , π , and unity – did that arise by chance? Does the inverse square law of light intensity arise by accident from geometry? When I wrote that the Creator laid open sources of truth, I meant it literally. The structure of reality seems designed to be discoverable, which implies a mind behind the design. A universe that could not be understood would be a very strange gift.

Me: But Dawkins and others would say that natural selection explains apparent design without requiring a designer. That a blind watchmaker, given enough time, can produce the eye.

Euler: (*dryly*) Natural selection may explain the eye. It does not explain why the laws governing light happen to be such that an eye can form images at all. It does not explain why mathematics, which is a product of pure reasoning inside the human mind, describes the external physical world with such uncanny precision. That coincidence, between the internal world of reason and the external world of nature, is not explained by natural selection. It is, if anything, deepened by it.

Me: So your faith and your mathematics were not two separate rooms in your mind, but the same room seen from different angles.

Euler: (*nodding slowly*) The same room. And I see it better now, with less light than I once had, than I ever did before.

Me: Mr. Darwin, Bishop Wilberforce, even at dinner the question remains. Who decides what truth is?

Wilberforce: Truth is guarded by tradition, moral order, and inherited wisdom.

Darwin: Truth is approached through evidence and observation, even when it is uncomfortable.

Wilberforce: Evidence still requires interpretation. Without restraint, it becomes speculation.

Darwin: And without inquiry, restraint becomes silence.

Me: Bishop, you admired Darwin's observations but rejected his conclusions. Why?

Wilberforce: Because explanations shape how people see themselves. That matters.

Darwin: I describe nature. I do not prescribe morality.

Wilberforce: Ideas have consequences whether you intend them or not.

Me: That tension seems central. Does explaining struggle justify it?

Darwin: No. Understanding nature is not the same as endorsing it.

Wilberforce: But many will confuse the two.

Me: The lecture emphasized open debate. Is authority a help or a hindrance?

Darwin: Authority should be questioned, not obeyed blindly.

Wilberforce: Authority can warn us when reason runs ahead of wisdom.

Me: So truth lies somewhere between fear and recklessness.

Darwin: It requires courage to follow evidence.

Wilberforce: And humility to know its limits.

Me: Perhaps the real danger is refusing to ask the question at all.

Darwin: Without questions, truth stagnates.

Wilberforce: Without care, it fractures.

Me: Then the search itself must remain open.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 7

Charles Darwin

Jenny: Mr. Darwin, I've always admired your work. But can I ask you something a little uncomfortable?

Darwin: The most important questions usually are.

Jenny: Your theory of evolution changed science forever... but it was also used to justify some really terrible things. Social Darwinism. Racism. Even genocide. How do you sit with that?

Darwin: ...With difficulty. A scientific theory explains how nature works. It does not prescribe how humans ought to behave. That distinction was not always respected.

Jenny: So when people said "survival of the fittest" to justify inequality, that wasn't what you meant?

Darwin: No. Natural selection describes how traits spread in populations over time. It does not claim that those who suffer deserve to suffer, nor that the powerful are morally superior. That was a grave misapplication.

Jenny: But didn't you see that your ideas could be twisted?

Darwin: I was aware they would be controversial. I did not anticipate the extent to which they would be weaponized. Science can illuminate truth, but humans decide what to do with it.

Jenny: That scares me a little. It makes me think about ideas today...technology, AI, genetics...did you know that there's businesses that can help parents choose their future offsprings' genes now? It's terrifying! The science in the modern day could be used in ways we don't intend...

Darwin: That is a wise concern. Knowledge increases power. If society lacks compassion, it will use knowledge without it.

Jenny: So do you think the responsibility is on the scientist or on society?

Darwin: Both. A scientist must speak carefully and clearly. But society must cultivate moral judgment. Science alone cannot provide ethics.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Hey there Bertrand Russell, what did you mean when you said philosophy affects politics?

Bertrand Russell:

Mahidul I will tell you exactly what I meant, I believed that the ideas people hold about truth and knowledge can strongly influence political systems and society.

Me:

So philosophy is not just random thinking stuff?

Bertrand Russell:

Exactly you got the idea! Philosophical beliefs can shape how governments act and how people treat one another and how things are able to run.

Me:

What did you think about relativism?

Bertrand Russell:

Relativism is the idea that there is no objective truth, and I believed that idea could become dangerous in politics.

Me:

Why would that be dangerous?

Bertrand Russell:

Because if people believe there is no objective truth, it becomes easier for authoritarian leaders to manipulate facts and control public opinion.

Me:

What about pragmatism?

Bertrand Russell:

Some forms of pragmatism argue that whatever is useful should be considered true even if it is not, and I worried that this way of thinking could also support harmful political ideologies.

Me:

So you thought these ideas were connected to fascism?

Bertrand Russell:

Yes, Mahidul. I believed that rejecting objective truth could help justify authoritarian systems and propaganda.

Me:

Did other philosophers agree with you?

Bertrand Russell:

Karl Popper later expanded on similar ideas in *Conjectures and Refutations*, where he criticized authoritarian and totalitarian ideologies as well.

Me:

That's actually really interesting to think about.

Bertrand Russell:

Philosophy matters because ideas about truth and freedom can have major effects on society and politics and how we are viewed or controlled.

Me:

Thanks for telling me all of this!

Bertrand Russell:

No problem, Mahidul. Keep questioning ideas and thinking critically!

Benito Jaramillo
PLSCI 1130
February 26, 2026

Conversation with Johnny Cash

Benito: Johnny Cash, thank you so much for coming over for dinner tonight. It is truly an honor to have you here. I hope you're hungry, I made chicken fried steak.

Johnny Cash: Thank you, Benito. I appreciate the invitation. A good meal and honest conversation are always enough for me.

Benito: In my Light and Life class, we talk a lot about the meaning of light and how it shapes what we know and understand. After learning about your life, your struggles, and your music, I wanted to ask you how you personally understand light.

Johnny Cash: That's a good question. For me, light is a gift that allows us to see and appreciate our world. It made me realize that life isn't about having a perfect life, it's about finding your way back when you mess up, and what light is useful for.

Benito: That is really deep. Do you think going through difficult moments changed how you value life?

Johnny Cash: Absolutely. When everything is going well, you don't stop to think much. But when life breaks you down, you start paying attention. Those dark moments taught me empathy and humility. They made me see people for who they really are.

Benito: In class we often talk about how light can be interpreted in many different ways, and how we see comes from within, would you agree?

Johnny Cash: I would. Success didn't save me. What helped was accepting my mistakes and choosing to keep going. Light, to me, is forgiveness, forgiving yourself and others so you can move forward.

Benito: This conversation has helped me understand your music and your life on a much deeper level. It has also made me reflect on how I deal with challenges in my own life. Thank you for sharing your perspective, and I hope you enjoyed the dinner.

Johnny Cash: I did, Benito. Thank you for the food and the conversation. Keep asking questions, that's how you keep the light on.

Lecture 5: Dinner Conversation with Charles Darwin

Light and Life | Vansh Kakra | vk365

Vansh: I feel like I should apologize in advance. You basically told the world we're related to monkeys, and now people won't stop arguing about it.

Charles Darwin: I didn't say monkeys. I said common ancestors. Monkeys get very defensive about that mix-up too.

Vansh: Fair. Still, did you expect *that* level of chaos? Religious debates, public outrage, people acting like you personally insulted their grandparents.

Darwin: Absolutely not. I thought people would argue about details. I underestimated how much people care about feeling special.

Vansh: Humans do love being the main character.

Darwin: Evolution suggests we're more like a long-running TV series. Just many seasons, some better than others.

Vansh: Your idea that small changes add up over time feels obvious now, but back then it really messed with people. Why do you think it hit such a nerve?

Darwin: Because it removed the shortcut. People liked the idea that humans arrived fully formed and purposeful. Evolution said, "No, this took a while, and it wasn't planned."

Vansh: Looking at today, people still argue about evolution. Some deny it completely. Does that surprise you?

Darwin: Not really. The idea threatens certainty. People don't argue with the evidence as much as they argue with what it implies about control and meaning.

Vansh: Which is?

Darwin: That nature doesn't owe us anything.

Vansh: That's uncomfortable. Also very on brand for reality.

Darwin: Exactly. Evolution isn't cruel, but it isn't kind either. It's indifferent. Humans struggle with that.

Vansh: If you were alive now, with genetics, DNA tests, and ancestry kits telling people they're 2% this and 3% that, would you feel vindicated?

Darwin: Mildly amused and slightly concerned about how seriously people take those percentages.

Vansh: So the big takeaway wasn't "humans came from apes," but "we're part of the same messy process as everything else."

Darwin: Yes. Same rules. Same slow change.

Vansh: I didn't expect to feel oddly comforted by that.

Darwin: Most good ideas do that - after they stop offending you :)

Selina Ke
Dinner Conversation with William Wilberforce

Selina: Mr. Wilberforce, what strikes me most about your life is not just that you opposed slavery, but that you persisted when nearly everyone around you found reasons to delay justice. How did you know it was your responsibility to keep going, when the cost was so high?

Wilberforce: Responsibility has a way of making itself known once one truly sees suffering. For me, the injustice of slavery could no longer be unseen. Once conscience is awakened, neutrality becomes impossible.

Selina: But many people saw slavery and still turned away. Even today, people recognize injustice and yet pretend it doesn't concern them. Why do you think moral awareness so often fails to become moral action?

Wilberforce: Because action requires sacrifice. It demands patience, ridicule, and loss. Most prefer sympathy without inconvenience. Faith, in my case, made endurance possible. It transformed duty into perseverance.

Selina: People say change takes time, so they wait. How did you know when waiting was wrong?

Wilberforce: I knew waiting was wrong when it allowed slavery to continue. If delay helps injustice survive, then waiting is not patience. It is avoidance.

Selina: But you failed many times before you succeeded. How did you keep going without giving up?

Wilberforce: I stopped thinking of success as winning quickly. Doing what is right mattered more than seeing results right away.

Selina: Today, people often act only when they get praise or attention. Does that weaken moral action?

Wilberforce: Yes. If you act only for approval, you will stop when approval disappears. Justice must matter even when no one is watching.

Selina: Did you ever lose hope that people could change?

Wilberforce: At times. But giving up hope would have meant giving up responsibility.

Selina: What would you say to people who see injustice but feel too small to make a difference?

Wilberforce: Once you refuse to ignore injustice, you are already part of the solution.

Dinner Conversation with William Herschel

Me: I read that you didn't even start as an astronomer. You were into music first? I played clarinet in middle school, but wasn't talented enough.

Herschel: Yea, I was a musician before I built that telescope. Music led me to mathematics, mathematics led me to options and optics led me to the stars.

Me: That is a very interesting and unexpected path. Did you ever think it would end with discovering a planet?

Herschel: Not at all, everything was unexpected. I was just surveying the sky carefully and thought Uranus was a comet.

Me: But do you know how wild it is? Realizing the solar system was bigger than people thought is like opening a whole new world.

Herschel: It was very humbling. Every improvement in my telescopes showed me fainter stars. The more light I gathered, the larger the universe seemed.

Me: The lecture mentioned you described telescope power as "penetrating into space." What were you expecting when you looked into space?

Herschel: Yes. The telescope doesn't just magnify as most people think nowadays, it collects light. And light is information. If you gather more of it, you see farther back into space. I didn't really know what I was expecting, I just wanted to see everything possible.

Me: So every time your telescope improved, the universe basically expanded. It amazes me how a small tool can see such a big concept.

Herschel: Precisely. Not because the universe changed but because our sight did.

Me: That's kind of crazy to think about. The size of the universe depended on how well humans could see.

Herschel: Knowledge often does. Our tools shape the scale of our understanding.

Me: Did it ever overwhelm you? Realizing how vast everything is?

Herschel: It inspired me more than it frightened me. I never thought I would see something like that with my own eyes.

Charles Darwin: Truth and the Color of Ants

Me: Charles! It's so good to see you! Thanks a lot for showing up!

Darwin: Maximo! Of course! Always a pleasure to see you and catch up! Is that steak that I'm smelling?

Me: Yes! Listen, Charles, I have been thinking a lot about truth. I was reading the other day and I encountered Alhazen's idea — the fact that one should question all that he reads in order to find the truth. What do you think of this idea?

Darwin: I couldn't agree more! As a matter of fact, I myself, when developing my theory, spent over 20 years observing rather than publishing right away! The only thing that is true is that nothing is true.

Me: But Charles, if you'll excuse me, does this also apply to your work? Since we are speaking about something as significant as the origin of the human species, should we also question your theory? I recall reading Wilberforce's review, where he noted that the whole argument relies on phrases like "I can conceive" and "it is not incredible." So how do we go about this matter?

Darwin: I understand, Maximo, but my theory isn't reliant purely on fancy beliefs. As I told you, I spent more than 20 years observing the ants myself.

Me: How would you respond to someone who questions your theory?

Darwin: Well, Maximo, I welcome it! I truly do. I must confess to you — when Wilberforce published his review in the Quarterly, I wrote to my dear friend Hooker and called it "uncommonly clever." He picked out with skill all the most conjectural parts of my argument. I can respect that. And look, I myself admitted that the fossil record does not reveal the finely graduated organic chain one would expect — I called it perhaps the gravest objection to my own theory. I am not blind to the weaknesses. But consider my reasoning: variation exists, resources are limited, those best suited survive and pass on their traits. Which part of that chain do you find faulty? I would much rather someone challenge me on the science, as Wilberforce did, than simply dismiss me or blindly accept me.

Me: That's very noble of you, Charles, and I respect your honesty. But here's what troubles me — if you welcomed Wilberforce's criticism, why is the only story anyone remembers about him one involving monkeys and grandmothers?

Darwin: You raise a fair point, Maximo. I must confess, I cannot control what others have done in my name. I wrote to Hooker that the review was uncommonly clever, and I meant it. Samuel was a serious man — a member of the Royal Society, a man of science. His father

William gave his life to end the slave trade. The Wilberforce name deserved better than a punchline. Perhaps the truth got lost somewhere along the way, which brings us right back to where we started this evening — the importance of seeking it honestly.

Me: Well does that clear it! Would you care for some dessert?

Charles: I'm full with that wonderful steak! Thank you for having me! Have a nice day!

Lecture 7: Dinner Conversation with Charles Darwin

Me: Hi Mr. Darwin, thank you so much for meeting with me for dinner. In class, we learned that reading Malthus changed your thinking. Was that really the moment everything clicked?

Darwin: It truly was. Malthus explained that more individuals are born than can survive. To me, it meant competition for existence. I realized that any small advantage an individual had made a difference to their life trajectory.

Me: Ah. So variation combined with competition is the explanation?

Darwin: Exactly! Variations happen naturally, we are all different. So when resources are limited, those with even slight advantages survive and reproduce more successfully. Over many generations, those small differences accumulate.

Me: Wow nature really seems like a real challenge. Did you see it that way?

Darwin: I saw nature as a challenge but also as a means of connection. Organisms compete, yes. But they are also deeply interdependent. The web of life is so deeply intertwined and a change in one species affects another.

Me: That makes sense! A lot of people did not believe that natural selection could produce entirely new species. How did you respond to that?

Darwin: I understood the doubt. It is hard to imagine small changes becoming entirely new species. But breeding shows how powerful selection can be in just a few generations. If humans can produce noticeable change so quickly, I believed nature, given enough time, could produce so much more.

Me: Last question. Some people feel your theory takes meaning away from nature. How would you respond to that?

Darwin: My work simply explained how life changes over time. Whether one sees deeper meaning beyond that is a separate question. Life is extremely complex!

Me: Thank you for this conversation. It helped me truly understand your theories more clearly!

Darwin: I'm glad my work remains relevant to this day. Thank you for asking such wonderful questions. And don't be afraid to challenge them. That's how new discoveries are made.

He appeared in my doorway already mid-thought, like I'd interrupted a speech that had started somewhere in 1860 and simply continued forward in time.

Tall. Immaculate posture. The kind of presence that makes you instinctively sit up straighter.

"You seem prepared," Samuel Wilberforce observed, scanning the room as if it might contain hidden counterarguments.

"I cleaned," I said.

"A wise opening move."

He didn't so much sit down as assume position at the table. Napkin folded with cathedral-level precision. Back straight enough to intimidate the chairs.

There's something about him that feels... practiced. Like every sentence has already been revised twice before leaving his mouth.

"You enjoy discussion?" he asks.

"Sure."

"Good. I have been accused of it."

Accused feels like a carefully chosen word.

We start eating. He examines the meal the way some people examine a thesis statement.

"You know," he says lightly, "public gatherings can be quite... lively when new ideas enter society."

"Define lively."

"Voices raised. Audiences divided. Headlines written."

He says it casually, but there's history sitting in the space between his words.

At some point I mention evolution—just gently, like setting a match near fireworks.

He smiles in that composed, bishop way.

"Ah. The subject that made auditoriums warmer than intended."

Warmer. That's one way to describe Oxford in 1860.

He reaches for his glass.

“Debate, when conducted properly, clarifies thinking.”

“You were pretty good at it, huh?”

“I valued precision.”

That’s subtle. Very subtle.

He gestures faintly with his fork.

“When bold claims arise about humanity’s origins, one must examine them thoroughly.”

“Thoroughly like...?”

“Publicly,” he says. “And with care.”

There’s a rhythm in his tone. You can almost hear the echo of a lecture hall.

He pauses, then adds with a faint glimmer in his eye:

“Sometimes a pointed question helps.”

“Like what?”

“Oh, something about ancestry perhaps.”

I choke on my drink.

“You did ask that question.”

He lifts an eyebrow.

“It was illustrative.”

“It was savage.”

He considers that word carefully.

“Effective.”

He never says Charles Darwin's name outright, but it lingers there. So does Thomas Henry Huxley, though Wilberforce refers to him only as "a particularly energetic respondent."

"I will say," he admits, "the gentleman defended his position with admirable vigor."

"That's generous."

"Truth withstands examination," he replies smoothly. "As does error."

"And which was which?"

He smiles like that question has followed him across centuries.

"History enjoys deciding."

There's something interesting about him. He's not stormy. Not cartoonishly opposed to science. More like... cautious. Measured. Protective of the bigger picture.

"I never feared inquiry," he says at one point, almost offhandedly. "Only haste."

That line sits there quietly between us.

Dessert arrives.

He studies the banana pudding with visible suspicion.

"You're doing this intentionally."

"It's just pudding."

"Nothing is ever just anything," he replies.

He takes a bite anyway.

"Acceptable," he admits.

High praise.

As he prepares to leave, he smooths his sleeves with the same composure he's had all evening.

"Disagree well," he says. "That is rarer than agreement."

"Even when you're confident?"

“Especially then.”

He steps toward the door, pauses, and adds:

“A well-placed question can echo longer than a shouted answer.”

And then he’s gone—leaving behind an empty dessert bowl, a strangely formal energy in my dining room, and the faint impression that if ideas had voices, his would still be projecting perfectly to the back row.

Ean Pope
Dinner Convo

Me: Hey , you're Samuel Wilberforce, right?

Wilberforce: Yes.

Me: I'm Ean. I'm in this Light and Life class and today we talked about Darwin, you, and how observation turns into interpretation.

Wilberforce: That's a fair summary.

Me: What surprised me was that you weren't really arguing against observation itself. You seemed more concerned with the conclusions people were drawing from it.

Wilberforce: Exactly. I did not reject the facts Darwin collected. I questioned whether they justified the larger claims being made.

Me: That connects with something else from the lecture , how ants see color differently, and how perception depends on the observer. Two people can look at the same thing and come away with different meanings.

Wilberforce: Which is why interpretation matters as much as evidence.

Me: When does scientific explanation cross from careful reasoning into speculation?

Wilberforce: When imagination moves faster than evidence. Hypotheses are useful, but they should not be treated as settled truth too quickly.

Me: That makes sense. It feels like the lecture wasn't really about picking sides, but about being careful with how confident we are in what we think we see.

Wilberforce: Caution is not the enemy of knowledge. It is part of it.

Me: I respect that. Makes me think the real lesson is how we handle disagreement.

Wilberforce: Indeed.

Me: For sure.

Jasmine: Good evening, Professor Huxley. I've put the kettle on, since the weather in NYC is very... British. I hope you like early grey. I also made some biscuits.

You faced a lot of criticism when you defended evolution... who would you say was your best friend through all of that?

Huxley: Oh, without question, my mate Joseph Dalton Hooker. While I was busy arguing with bishops, he was the one keeping me sane.

We'd write to each other constantly. I could not imagine how much fun we'd have bantering here and there if we had phones like you guys! Our conversations would be half science and half "are these people serious?"

Jasmine: Did you ever get tired of arguing with people who had already made up their minds?

Huxley: Constantly. Do not even get me started. But debate is not for those who refuse to change... it is for those quietly listening. That's why I admire what Galileo said long before my time: "I do not feel obliged to believe that the same God who has endowed us with sense, reason, and intellect has intended us to forgo their use."

The point isn't to win an argument. It is to give people permission to use their minds, even when authority tells them not to. DEFY THE ODDS TOO JASMINE!!!

Jasmine: "Permission to use their minds" is such a powerful way to put it. But how do you actually stay calm when someone's attacking you in public?? HOW DO YOU HAVE A POKER FACE?

Huxley: I also had evidence. When I placed a human skeleton beside that of an ape, the similarities were undeniable: skull structure, spine, limb scaling... The bones can be the hard truth that opposes these bloody outside ideas.

Jasmine: Shoutout Darwin and you being "Darwin's Bulldog" for your advocacy of Charles Darwin's theory of evolution!

Huxley: How I miss him. That's what led me to write Man's Place in Nature. People did not enjoy hearing that we belonged inside the animal kingdom.

Jasmine: Thank you for your time, Professor Huxley! You are the best. So many people I have spoken with over this dinner have said how much of a difference Darwin has made.

Huxley: No one compares to him!

Jasmine: Let me walk you out. This NYC cold is not for the faint of heart.

Nomar: Something from the lecture that really stuck with me was the discussion about how different animals see the world differently. I never really thought about that before. I always assumed most animals probably see things pretty much the way humans do.

Darwin: Many people assume that, but different species have visual systems suited to their particular needs.

Nomar: The example about insects and ants was really interesting to me. It made me realize that animals might notice colors or patterns that humans completely miss. That kind of changed the way I think about what the world looks like to them.

Darwin: Yes. What an organism perceives depends on the structure of its visual system.

Nomar: It actually made me think about something simple. When I am outside and I see flowers or plants, I just see the colors that my eyes can detect. But an insect landing on that same flower might be seeing patterns that are invisible to me.

Darwin: That is very possible. Many species detect wavelengths that humans cannot.

Nomar: That idea was kind of fascinating to me. It made me realize that what I call “the way the world looks” is really just the version that my eyes are able to detect.

Darwin: Precisely. Perception depends on the observer.

Nomar: I also thought it was interesting how scientists try to explain why different animals ended up with different visual abilities. Whether someone agrees with every explanation or not, it definitely shows how complex vision really is.

Darwin: Understanding how traits arise is one of the goals of biological study.

Nomar: For me the biggest takeaway was just realizing how many different ways there are to experience the same environment. Humans, insects, and other animals might all be looking at the same place but experiencing it very differently.

Darwin: That is a thoughtful observation.

Nomar: I think next time I see an insect on a plant I will probably wonder what the world looks like from its perspective instead of assuming it sees what I see.

Darwin: Curiosity about nature is always a good place to begin.

Ariel Vilensky

Lecture 7: Charles Darwin, Samuel Wilberforce, and How We See the Color of Ants

Me: Good evening, Mr. Chesterton. In *All Things Considered*, you wrote that “the thing we never teach at all is the general duty of telling the truth... of giving a complete and fair picture of anything we are talking about.” That seems like a bold accusation. Do we really neglect something so basic?

G.K. Chesterton: I fear we do. We teach rhetoric, we teach debate, we teach how to win an argument, but not how to present the whole truth. Fairness is much rarer than cleverness.

Me: You list so many forms of dishonesty, such as “not misrepresenting, not evading, not suppressing... not selecting unscrupulously to prove an ex parte case.” Are these habits learned in school?

Chesterton: They may not be learned per se, at they are at least rewarded. A student may succeed by presenting only the evidence that favors his side. But that is not truth - it is advocacy disguised as objectivity.

Me: I thought your example about telling “all the nice stories about the Scotch, and all the nasty stories about the Irish” was very insightful. Is bias often that selective?

Chesterton: Almost always. We prefer stories that flatter our loyalties or confirm our prejudices. The discipline of telling the whole truth demands that we resist that temptation.

Me: And you conclude that “there is a whole truth of things, and that in knowing it and speaking it we are happy.” Why happiness?

Chesterton: Because truth brings coherence. When we no longer twist facts to suit pride or anger, we are freed from the burden of distortion. There is joy in honesty.

Me: So education should cultivate integrity, not just intelligence?

Chesterton: Precisely. A sharp mind without a fair spirit is a dangerous instrument.

Karen Zheng, kz374

Dinner Conversation with Frederick Douglass

Me: Hi Frederick, I was really struck by how strongly you talked about staying true to yourself, even when people ridiculed you. That feels really hard to do. How did you stick to it?

Frederick: Many people knew slavery was wrong, but change only came when people were willing to speak, organize, and demand something different. I knew silence protects injustice, so I had to step up.

Me: How did your personal background contribute to that?

Frederick: My life was shaped by slavery, but my fight was never only about my own freedom. It was about ending a system that denied humanity to millions of people. That really motivated me to keep going.

Me: You often talked about education as part of freedom. Why do you think learning to read and write is so powerful?

Frederick: Because education exposes injustice. When enslaved people learned to read, they gained access to ideas about freedom, rights, and human dignity. That is why slaveholders feared and denied education.

Me: That makes me think about how movements today still focus on access: access to education, resources, and opportunity.

Frederick: Yes, movements are built when people begin to see that their struggles are connected. Unfortunately, there is still inequality in many aspects of society, and that's why it is so important for people to continue speaking out.

Me: Did you ever feel pressure to be less direct, to make people more comfortable?

Frederick: Yes, but movements do not grow from comfort. They grow from truth. Sometimes, truth makes people uncomfortable because it forces them to confront systems they benefit from.

Me: That makes the movement feel less like history and more like something ongoing.

Frederick: The struggle for equality is always ongoing. Each generation must decide what freedom means and who it includes.

Me: Thanks, Frederick! I feel like I understand your writing not just as a story but as a call to action now.

Dinner conversation with Isaac Newton

Me: Newton, in the lecture we read a poem about you that called you our philosophic sun. I feel like that is a massive compliment but do you really think of yourself that way?

Newton: I never have thought of myself as the sun, I just studied light carefully and I wanted to only understand it and how it affects the world.

Me: The poem mentioned that you untwisted all the shining robe of day and showed the parent colours. That part stuck out to me, just that you showed that white light isn't just one thing but is made of red, orange, yellow, blue, indigo, and violet.

Newton: Yes indeed, all the colors were always there, they just needed to be separated.

Me: I liked how the poem described each color by appearing one by one, it made everything feel like light was revealing a secret.

Newton: Yes indeed, light reveals many things.

Me: Another poem we looked at during the lecture said that you unlocked the hidden treasures of Truth.

Newton: Truth isn't created by anyone, but rather discovered.

Me: Also it said that you didn't just come up with ideas but spent years searching until the system dawned. That makes me respect you and the time you spent searching, none of your work was lucky but was all hard work.

Newton: Yes, discovery of the truth requires patience

Me: The poem talked about how you saw planets moving in silent harmony because of gravitation and projection. That makes it feel like the universe is organized when it is easy to look at it as random.

Newton: The order was already there, we just never searched very hard or thoroughly

Me: That makes me thinking of another thing we talked about in the lecture what was about whether change can really be a cause of anything. When we say something happens by chance, we just admitting we don't understand it yet?

Newton: Most of the time, yes.

Me:

Mr. Hubble, the part of the lecture about galaxies moving away from us really surprised me. I always thought the universe was just there. I never pictured it expanding.

Hubble:

Many people assumed the universe was static for a long time. The farther away a galaxy is, the faster it appears to move away from us.

Me:

That idea messed with my head a little. It's strange to think that space itself is stretching, not just objects flying through it. It makes the universe feel more alive somehow.

Hubble:

It is not movement in the ordinary sense. It is the fabric of space expanding, which carries galaxies along with it.

Me:

I also liked how the lecture connected this to light. The redshift idea made it clearer to me how light waves stretch and shift toward red as things move farther away.

Hubble:

Light carries a lot of information. By analyzing it carefully, we can learn about distance, speed, and even composition without ever traveling there.

Me:

What surprised me most was that all of this started with just looking through a telescope and noticing patterns. It makes science feel less like magic and more like patience and attention.

Hubble:

Discovery often begins with observation. Technology helps, but curiosity is what drives it forward.

Me:

I think that's what I'm taking away from this lecture. The universe feels huge and overwhelming, but humans also figured out these massive ideas just by studying light and asking questions. It makes the night sky feel different now, not just stars, but clues about time and motion.

Hubble:

When you look carefully, even distant points of light can tell a story.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 8 Dinner Conversation

Conversation with Michio Kaku

Ellie: Hey, Mr. Kaku. Thanks for coming to dinner. We talked about the Big Bang in class today, and your name came up. I know you connect physics to these really big questions about existence. Do you think science and philosophy actually belong in the same conversation?

Michio Kaku: Hi Ellie! Of course, the pleasure is all mine! To answer your question, they're asking different kinds of questions. Science is usually focused on how things work. Philosophy is more about why it matters. Some scientists roll their eyes at that, but I think those questions are still important.

Ellie: A lot of people claim modern physics proves the universe didn't need a creator. What's your take on that?

Michio Kaku: I think that idea gets oversimplified. In quantum mechanics, you can get particles appearing from what looks like "nothing," but that "nothing" is not absolute nothingness. There's still a framework there and laws behind it. The deeper we dig, the more it looks like the universe rests on a kind of mathematical structure.

Ellie: So even if science explains the mechanics, it doesn't automatically erase the idea of deeper meaning.

Michio Kaku: Right. Einstein used to talk about wanting to understand "the mind of God." He wasn't talking about a personal god in the religious sense. He meant the deep logic and mathematical order underneath reality. Physics keeps revealing how elegant and precise those patterns can be.

Ellie: But quantum mechanics also brings in randomness, doesn't it? How does that fit with the idea of order?

Michio Kaku: It can look random on the smallest scales. But when you zoom out, you start to see regularities and predictable patterns. It's a little like the weather. A single gust of wind is hard to predict, but storms still follow physical laws.

Ellie: That's kind of mind blowing. It feels like every answer just creates a whole new set of questions.

Michio Kaku: That's exactly how science works. The more we learn, the more the horizon expands. And even if we can explain more and more, the human need to ask what it all means never really goes away.

Ellie: Wow yeah I agree with that. Thanks for talking with me, Mr. Kaku.

Dinner with T. H. Huxley

Me: Professor Huxley, your reputation as Darwin's bulldog has followed you everywhere, the man who stood up at Oxford and told Wilberforce he would rather be descended from an ape than a bishop who misuses his gifts to obscure the truth. But I've read accounts suggesting the actual exchange was rather more complicated than the legend. Does the legend bother you?

Huxley: (with a dry half-smile) What bothers me is not that the story has been simplified, all good stories are, but that the simplification has been used to replace argument with mythology. Wilberforce was not a fool. He raised scientific objections to Darwin that deserved scientific answers. What I objected to was not his theology but his use of social authority in place of evidence. A bishop who invokes his office to settle a question in natural philosophy is doing precisely what Roger Bacon warned against eight centuries ago: mistaking reputation for reasoning. That I will always object to, regardless of who commits it.

Me: And yet – here is what I find genuinely fascinating about you – in your later years, in your essay on Evolution and Ethics, you yourself argued that the ethical progress of society depends not on imitating the cosmic process of natural selection, but on actively combating it. That is a remarkable admission for the man who championed Darwin above all others. Does that not undercut the very foundation you spent your life building?

Huxley: (leaning forward) It deepens it, I think. Consider what natural selection actually produces: ruthless self-assertion, the treading down of competitors, survival purchased at the cost of one's fellows. The ape and tiger methods, as I called them. If I were a Social Darwinist – if I believed, as some of my contemporaries did, that human society should imitate the gladiatorial contest of nature – I would be doing precisely what I accused Wilberforce of doing: using a respectable authority to obscure the truth. The truth is that ethics requires restraint where nature demands assertion. We are the only creatures, so far as we know, capable of choosing to act against our biological interests in service of something we recognize as good. That capacity is itself remarkable. Where it comes from is a question I cannot answer with certainty.

Me: That uncertainty is interesting from someone who coined the term agnostic. You did not claim atheism. you claimed that the question of God could not be settled by available evidence. Was that intellectual honesty, or was it strategic caution?

Huxley: (firmly) It was the only position consistent with my own principles. The motto of the Royal Society is Nullius in verba, take no one's word for it. I cannot take anyone's word for the existence of God, nor for his nonexistence. What I can do is follow the evidence where it leads and refuse to follow it where it does not go. Dawkins calls himself an atheist. I would ask him: what evidence would, in principle, change your mind? If no evidence could, then atheism is as much a faith position as theism, and the Royal Society's motto is being honored more in name than in practice.

Me: Wallace said you once told him that one thing that weighs against pessimism and tells for a benevolent Author of the Universe is your enjoyment of scenery and music, that you could not see how these helped in the struggle for existence and called them gratuitous gifts. Did you mean that seriously?

Huxley: (quietly, after a pause) I meant it as a puzzle I could not resolve. Natural selection is extraordinarily good at explaining what is useful. It is less good at explaining what is beautiful, or why the fact of beauty should move us so profoundly. The sunset over the Thames moves me in a way that my survival does not require. That residue – that gratuitous gift, as I called it – sits outside my framework in a way that I find more honest to acknowledge than to explain away.

Me: So the bulldog had doubts.

Huxley: (standing, with something approaching warmth) The bulldog always had doubts. That is precisely what made him dangerous.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 7

T. H. Huxley

Jenny: Professor Huxley, I have to say, I always imagined you arguing loudly in some Victorian debate hall. Not sitting calmly at dinner.

Huxley: I assure you, I can argue between courses if necessary.

Jenny: I might take you up on that. I read your Romanes Lecture, and it surprised me. You basically said we shouldn't live by the "ape and tiger" rules of nature.

Huxley: Yes. Nature is not a moral instructor. It is a process. A rather ruthless one.

Jenny: That's what caught me. People always say evolution means "survival of the fittest," like that's how society should work too.

Huxley: A common confusion. What succeeds in the jungle does not necessarily build a decent civilization. If we behaved like successful predators, dinner would be... considerably less polite.

Jenny: Haha! That would definitely change the vibe.

Huxley: Ethics begins where instinct leaves off. In nature, self-assertion wins. In society, we must practice restraint.

Jenny: You even said ethical progress depends on combating the cosmic process. That sounds intense – like we're constantly fighting our own biology.

Huxley: In some respects, yes. Civilization is a continuous effort to curb impulses that once served survival. Cooperation, law, kindness – these are not automatic outcomes of evolution. They are choices.

Jenny: That actually makes humanity feel more impressive, not less.

Huxley: It should. Evolution explains how we came to be. It does not dictate who we must become.

Jenny: I also read that you once said your enjoyment of scenery and music made you question pure natural selection. That they seemed like "gratuitous gifts."

Huxley: Ah, yes. A sunset has never helped me outrun a tiger. Yet it moves me deeply.

Jenny: Same. Music doesn't exactly boost my survival odds, but it makes life feel meaningful – and, of course, helps me study.

Mahidul Islam Dinner Conversation

PLBio 1130 2/17/26

Me:

Yooo Chardin, can you tell me about the original quantum particle that evolved into atoms?

Pierre Teilhard de Chardin:

Yea sure buddy! Did you know that atoms give rise to molecules and how molecules give rise to self replicating systems.

Me:

So you're saying that everything comes from something else?

Chardin:

You're absolutely right! New and unknown properties emerge from the combination of previous entities themselves.

Me:

So what about the spindle-shaped cells?

Chardin:

They have been discovered in small group of humans and primates.

Me:

Do these cells have any other name?

Chardin:

Yes, Mahidul! They can be also called Von Economo neurons.

Me:

What do they do bro?

Chardin:

They are involved with self-identity and self-awareness.

Me:

Thanks for telling me all of this!

Chardin:

No worries, dude. Keep being cool!

Benito Jaramillo

PLSCI 1130

March 2, 2026

Conversation with Nina Allan

Benito: Ms. Allan, thank you for joining me for dinner tonight. Your writing explores perception and reality in fascinating ways. In my Light and Life class, we've been thinking about whether light reveals truth or simply shapes how we see it.

Nina Allan: Thank you for inviting me Benito, you have a lovely home. That's a beautiful question you ask. I would say light does not reveal a single truth. It shows a perspective and it depends on the angle from which you look at it.

Benito: What do you mean by that?

Nina Allan: Two people can stand in the same room and experience entirely different realities. Memory, trauma, culture, all of these things act like filters or angles to a mirror. Light enters, but what we perceive depends on who we are.

Benito: So life is lived in partial illumination?

Nina Allan: Exactly. We never see everything clearly. There are always blind spots, not only biologically, but psychologically. That uncertainty is not something to fear; it is something to explore.

Benito: That challenges the idea that light is the same thing as certainty.

Nina Allan: Yes. Sometimes light exposes how little we know. In my work, I'm interested in the spaces between clarity and confusion. Life is not linear, it's fragmented and layered.

Benito: Does that make truth relative?

Nina Allan: Not relative, but complex. Reality is stable, but our access to it is mediated. The humility to accept limited vision may be one of the deepest forms of illumination.

Benito: That resonates with our course themes, that awareness of limitation can actually deepen understanding.

Nina Allan: Precisely. True light is not blinding certainty. It is careful attention.

Benito: Thank you. You've helped me see that life is not about perfect clarity, but about thoughtful perception.

Lecture 8: Dinner Conversation with Charles Darwin

Light and Life | Vansh Kakra | vk365

Vansh: I have to ask - when you were writing *On the Origin of Species*, did you know you were about to start an intellectual earthquake?

Charles: I was just following patterns that wouldn't leave me alone.

Vansh: But then Alfred Russel Wallace sends you that letter with basically the same theory. That must have been the most stressful envelope in history.

Darwin: After years of quiet thinking, suddenly someone else had reached natural selection too. For a moment, I thought, "Well, that's that." But Wallace was generous. There wasn't rivalry, it was just shared realization.

Vansh: That's annoyingly wholesome for such a huge idea. The public reaction wasn't exactly calm. Especially with people like Samuel Wilberforce jumping in.

Darwin: Yes. He mocked the idea that humans shared ancestry with other animals, as if it were an insult instead of a hypothesis.

Vansh: I mean, to be fair, telling people they're part of a long, messy evolutionary chain instead of a special creation that's a hit to the ego.

Darwin: Precisely. The resistance wasn't really about fossils. It was about status. People prefer being exceptional.

Vansh: So your theory didn't just change biology - it challenged how humans see themselves. Do you ever wish you'd softened the message?

Darwin: I avoided discussing human evolution directly at first. Even I knew there were limits to how much shock people could handle at once.

Vansh: That's almost funny. The man who redefined life saying, "Let's ease into this."

Darwin: Evolution itself is gradual. I thought the audience might appreciate the theme.

Vansh: So the real drama wasn't Wallace or Wilberforce. It was the shift in perspective.

Darwin: Exactly. Once people accept that life changes through small, natural processes, they must also accept that certainty changes the same way.

Selina Ke

Dinner Conversation with John Locke

Selina: I keep thinking about your idea that every person carries a touchstone for truth called natural reason. If everyone has it, why do so many people still believe things that are false?

Locke: Reason is not lost but ignored. Most people allow prejudice to guide them instead of judgment. They accept opinions handed down to them without ever asking whether those ideas deserve belief.

Selina: That feels true even now. People repeat what they hear because it is easier or because it feels safe. Society often rewards confidence more than careful thinking. Does that make reason harder to use?

Locke: It does. Presumption convinces people they already know enough. Once someone believes they are certain, they stop examining their thoughts. Reason requires humility and a willingness to admit the limits of one's understanding.

Selina: But doubt can be exhausting. People want clarity and quick answers. How can someone live thoughtfully without being stuck in constant questioning?

Locke: Reason does not require constant doubt. It asks us to believe things only when there is enough evidence. We can still act even when we are not completely certain. Wisdom is knowing how much we truly understand and where our knowledge is limited.

Selina: That makes me think about education. We are often taught facts but not how to think. Should education focus more on training judgment than on collecting information?

Locke: Yes. A disciplined mind matters more than a full one. Knowledge without judgment only shines on the surface and does not lead to truth.

Selina: Then I wonder whether it is realistic to expect people to govern themselves rationally if prejudice is so powerful.

Locke: It is difficult but necessary. Freedom depends on reason. When people stop thinking for themselves, they allow others to think and decide for them.

Selina: So the greatest danger is not ignorance but belief that goes unexamined.

Locke: Exactly. The cure begins in conversation and reflection where ideas are questioned instead of accepted blindly.

Dinner Conversation with Thomas Henry Huxley

Me: I've been thinking about your debates in the 1860s. What fascinates me it's that you were willing to publicly confront authority. That must've come with real social risk.

Huxley: It did. But the greater risk, in my view, was allowing authority to stand unchallenged.

Me: So for you it wasn't about Darwin personally, it was about protecting the method?

Huxley:

Precisely. My loyalty has never been to a theory. It is to evidence and to intellectual honesty.

Me:

That's interesting, because today people often attach identity to ideas. If the idea falls apart, they feel personally attacked.

Huxley:

Then they misunderstand the enterprise. Science is not self-expression; it is correction. One should expect to be revised.

Me:

That's a hard mindset to hold. Being open to revision sounds noble, but emotionally it's uncomfortable.

Huxley:

Growth is rarely comfortable. But certainty without examination is very dangerous.

Me:

When you coined "agnostic," were you trying to carve out space between belief and disbelief?

Huxley:

Yes. I objected to the arrogance of claiming knowledge where evidence was insufficient.

Me:

Do you ever worry that constant skepticism makes life colder?

Huxley:

On the contrary. I find it liberating. If knowledge is provisional, then improvement is always possible.

Me:

That's almost... optimistic.

Huxley:

Haha yes, it is profoundly optimistic.

Maximo Mander

Alfred Russel Wallace: The Gap Between the Ant and Newton

Me: Alfred! It's so good to see you! Thanks for making the trip!

Wallace: Maximo! A pleasure, truly. Is that fish pie I'm smelling?

Me: It is! Fresh out of the oven. Listen, Alfred, I've been reading about you for my class, and I have to tell you, your story fascinates me. You and Darwin arrived at natural selection at nearly the same time, independently. And yet you broke with him on one crucial point. You said natural selection could not explain the highest human faculties. A Newton, a Shakespeare, a Raphael. Tell me why.

Wallace: Ah, Maximo. You have put your finger on the thing I could never let go of. Look, I spent years in the jungles of the Amazon and the Malay Archipelago. I watched natural selection at work with my own eyes. I know what it can do. It can shape a beak, a wing, a cunning instinct for survival. But Maximo, what does the struggle for existence have to do with the music of Bach? What does the competition for food and mates have to do with a man sitting alone in a room, solving the calculus?

Me: But here is what I want to press you on, Alfred. You're comparing the finished product, Newton, to the starting point, the ant. Of course the gap looks enormous. But evolution doesn't work in one leap. It works across millions of years, tiny change by tiny change. Isn't it possible the gap only looks too big because you're standing at the wrong end of it?

Wallace: A fair blow, Maximo, and one Darwin himself made to me more than once. I will concede this. The brain that could produce Newton did not appear overnight. Language, tool use, social cooperation, these I can trace through the struggle for existence. But tell me, what survival advantage did the first man to compose a symphony have over his neighbor who did not? What reproductive edge did Florence Nightingale gain by tending to dying soldiers? These are the cases that stopped me.

Me: Some would say those faculties are byproducts. The brain evolved for survival, and once it was complex enough, it could do all sorts of things it was never selected for. Music, mathematics, compassion. Spandrels, not adaptations.

Wallace: Perhaps. I will admit the argument has force. But I confess, Maximo, when I look at a man like Newton, I cannot help feeling that the ordinary laws of nature have been exceeded somewhere. Call it a failure of imagination on my part. I would rather be honest about my doubt than pretend to a certainty I do not have.

Me: That's a fair way to hold it, Alfred. Would you care for some dessert?

Wallace: I'll pass, Maximo, the fish pie has done me in. Thank you for having me, my friend. Take care of yourself.

Maximo Mander

Lecture 8: Dinner Conversation with William Whewell

Me: Hi Mr. Whewell, thank you so much for meeting with me for dinner. In class, we discussed necessary and experiential truths. What is the difference?

Whewell: My favorite topic! Well, necessary truths are truths that cannot be otherwise. They come from the structure of our own reasoning. We do not discover them by observing the world. We recognize them through thought itself. Does that make sense?

Me: Ah I see. Could you give me an example?

Whewell: Certainly. Two plus two equals four. That is not something we had to test in nature, rather true by definition and logic.

Me: Right! We also read a passage from 1984 where Winston insists two plus two equals four.

Whewell: Indeed, it is a common example. When someone attempts to deny that two plus two equals four, they are not correcting an observation. They are undermining reason itself. Necessary truths provide more stability to our thinking.

Me: So if I'm understanding correctly, necessary truths come from reasoning, while truths of experience come from observation?

Whewell: Exactly. Now truths of experience depend on evidence, like the earth orbiting the sun. This discovery came from observing the external world.

Me: I get it! So would you say science depends primarily on experiential truths?

Whewell: In my opinion, science certainly depends on experiential truths, since it begins with observation and evidence. But it does not rely on experience alone. The mind must organize those observations using principles. Without necessary truths, experience would remain a collection of scattered facts. What I'm trying to say is, they must work together.

Me: Thank you for this conversation. I now see that truth is not just found in the world, but also shaped by the way we think about it!

He didn't knock.

He entered like a rebuttal.

Coat slightly windswept, eyes sharp, energy somewhere between "naturalist" and "I absolutely came here to argue."

Thomas Henry Huxley looks around my living room once and says, "Good. A small audience. Efficient."

"You want a crowd?"

"I prefer opposition."

That tracks.

We sit down and he immediately adjusts his chair closer to the table like he's preparing for cross-examination instead of pasta.

"You've read him, I assume," he says.

"Darwin?"

He nods once, satisfied that I didn't need clarification.

"You defend him pretty hard, huh?"

"I defend evidence," he corrects.

Subtle. Not subtle at all.

There's a certain forward-lean to him. Like he's always mid-debate. You can feel that he once stood in a crowded Oxford hall while a bishop tried to get clever about ancestry.

He takes a sip of water.

"I have never objected to a sharp question," he says calmly. "Only to a careless one."

I blink.

"That's a direct shot."

"It is an accurate one."

At some point I mention the famous exchange—without fully saying it.

“You know... the grandmother comment.”

His mouth twitches.

“I was asked whether I would claim descent from an ape on my grandfather’s side or my grandmother’s.”

“And?”

“I replied that I would rather be related to an ape than to a man who uses intellect to obscure truth.”

He says it flatly. No dramatic pause. No victory pose.

Like it’s just... the correct response.

“You had that ready?”

“No,” he says. “But clarity tends to arrive when provoked.”

He’s intense, but not reckless. There’s calculation in the way he speaks.

“Science does not require shouting,” he says. “It requires patience and demonstration.”

“You were called ‘Darwin’s Bulldog,’ though.”

He sighs slightly.

“A regrettable nickname.”

“You kind of earned it.”

“I defended a position,” he replies. “Vigorously.”

Understatement of the century.

Dinner continues, but it feels less like a meal and more like intellectual sparring practice.

“You understand,” he says, tapping the table lightly, “that ideas must survive scrutiny.”

“Even popular ones?”

“Especially popular ones.”

“Even yours?”

He smiles.

“Particularly mine.”

Okay. Respect.

He talks about lectures, about teaching working-class audiences, about wanting science accessible—not hidden behind elite walls.

“Knowledge should not be ornamental,” he says. “It should be usable.”

“That’s kind of modern.”

“Truth ages well,” he replies.

At dessert, I ask him if he ever regretted the public fights.

He thinks for a moment.

“Conflict is unpleasant,” he admits. “But confusion is worse.”

“That’s... kind of hard.”

He nods.

“Progress is rarely polite.”

Before leaving, he stands but doesn’t grandly posture. He just straightens his coat and looks directly at me.

“Question boldly,” he says. “But answer carefully.”

“Got it.”

“And never confuse wit with wisdom.”

“That feels targeted.”

“It is universal.”

He heads toward the door, then pauses.

“And for the record,” he adds, “the ape remark was never about insult.”

“Then what was it about?”

“Integrity.”

He leaves quietly—no applause, no dramatic flourish.

Just the lingering sense that if an argument ever wandered into this room, it would not leave unexamined.

Ean Pope

February 12. First light: Big bang cosmology

Me: Mr. Wallace, I've been reading about you in my Light and Life class. Most people only talk about how you and Darwin both came up with natural selection.

Wallace: History tends to simplify things.

Me: What surprised me is where you disagreed. You accepted evolution, but you did not think natural selection explained everything, especially human consciousness.

Wallace: Correct. I believe natural selection explains much of biological development. But the human mind, our mathematical ability, our art, our moral sense, seemed to go beyond mere survival advantage.

Me: That connects to what we talked about in class. Big Bang cosmology explains how the universe expanded from a singularity, how particles formed, how stars ignited, how heavier elements were forged. It is detailed. It is impressive.

Wallace: But you are wondering whether explaining the mechanism is the same as explaining meaning.

Me: Exactly. We can trace hydrogen atoms forming 300,000 years after the Big Bang. We can measure cosmic microwave background radiation. We can estimate the universe is 13.8 billion years old. But the fact that we can reflect on the universe at all feels different.

Wallace: Recognizing that distinction is not anti science. It is philosophical honesty.

Me: So here is my question. If the universe began as one particle and everything unfolded from physical laws, why do beings exist who can question those laws?

Wallace: Evolution may describe the development of forms. But the emergence of self awareness and moral reflection invites deeper inquiry.

Me: In lecture it felt less like attacking science and more like warning against turning it into something absolute.

Wallace: Science is powerful. But power is not the same as total explanation.

Me: That makes sense. Maybe the real lesson is intellectual humility.

Wallace: A reasonable conclusion.

Me: I respect that.

Jasmine: Mr. Wallace, I was craving Poke today, so I got us both a bowl. I wasn't sure what 19th-century naturalists preferred... I hope this dish is not too unfamiliar to you

Wallace: After months in the Malay Archipelago, I assure you, this is luxury. At one point, I lived on little more than rice and curiosity

Jasmine: What were you doing there again?

Wallace: Collecting life of ALL SORTS! Observing patterns! I spent eight years in the Malay Archipelago studying species: from birds to insects. I was trying to understand why some animals lived where they did and why closely related species differed from island to island

Jasmine: Was biodiversity even a word in the vocabulary then?

Wallace: *Chuckles* I am not sure, but I probably was one of the first to want a name for what I noticed. I noticed something peculiar. It was this boundary between species in Asia and those in Australia. On one side of a narrow strait, the animals resembled those of the Asian continent. On the other, they were distinctly Australian. That boundary later came to be called the Wallace Line

Jasmine: OMG. I learnt this in high school biology. This was you??? Can I have your autograph!

Wallace: It was a sight I hope to remember in my death bed. In that moment, I was realizing geography shapes evolution. I wrote about how geography shapes opportunity and how isolation shapes change. When populations are separated, variation accumulate

Jasmine: In a way, nature is a player. It experiments quickly and moves on for those who cannot handle its different personalities. Okay, now I have another question. In the preface of The Malay Archipelago, you say you chose not to discuss the evolutionary implications of your discoveries. Why did you avoid fully engaging with natural selection in that book?

Wallace: Because the evidence deserved to stand on its own. England loves drama, I swear. When I arrived back, the theory of natural selection was already stirring controversy. Darwin's Origin of Species had been published. Debate was fierce. I did not wish my travels to become merely an argument. The Malay Archipelago was meant to be an account of what I truthfully saw

Jasmine: And now, that right there, is true passion for what you do. Okay, another question then: If you believed so strongly in natural selection for animals, why did you later doubt that it could fully explain humans?

Wallace: Because man is not just a more advanced animal. MAN IS MAN. We are not here just to survive. We do not have a variation of claws and camouflage because we carry much more in knowledge: maths, languages, ethics.

Jasmine: I love that! Thank you for your time Wallace. Note to self: do not get poke for guests.

Nomar: Something from this lecture that really stuck with me was the debate about spontaneous generation. I used to hear that idea when I was younger, like people saying flies just appear from garbage or something. Did people really believe that living things could come from nonliving stuff?

Pasteur: Yes, many scientists believed that for centuries. They thought microorganisms simply appeared in decaying material.

Nomar: The jar experiments were interesting to me. When the broth was boiled and protected from contamination, nothing grew in it. But when microbes could reach the broth, life appeared again. That made the explanation feel a lot clearer.

Pasteur: Exactly. My swan-neck flask experiment allowed air to enter but prevented microorganisms from reaching the liquid. As long as the broth remained uncontaminated, no life appeared.

Nomar: I liked that example because it feels like something you could almost try yourself in a basic lab. It showed that the appearance of microbes was not magic or spontaneous. Something had to introduce them.

Pasteur: Observation and careful experimentation are essential in science.

Nomar: What surprised me most was how long the idea of spontaneous generation lasted. Even after people like Redi questioned it, the debate kept going.

Pasteur: Scientific ideas often persist until convincing evidence replaces them.

Nomar: That made me realize how important controlled experiments are. Without them, people might interpret what they see in totally different ways.

Pasteur: That is correct. Experiments help separate assumptions from evidence.

Nomar: For me the biggest takeaway from this lecture is that life does not just appear randomly. There has to be a source for it, even if we do not always see where it comes from at first.

Pasteur: That principle became summarized in the phrase “life comes from life.”

Nomar: I think next time I hear someone say something appeared “out of nowhere,” I will probably think back to these experiments and wonder what the hidden cause actually is.

Pasteur: Curiosity about causes is the beginning of scientific thinking.

Ariel Vilensky

Lecture 8: Big Bang Cosmology and the Origin of Life

Me: Good evening, Mr. Douglass. In your *Narrative of the Life of Frederick Douglass*, you wrote, “I prefer to be true to myself, even at the hazard of incurring the ridicule of others, rather than to be false, and incur my own abhorrence.” That struck me deeply. Were you afraid of being misunderstood when you wrote that?

Frederick Douglass: Certainly. To speak of divine Providence guiding my life might invite ridicule. But silence would have betrayed my conscience. I had to remain faithful to what I truly felt.

Me: You also describe a “deep conviction that slavery would not always be able to hold me within its foul embrace.” Where did that conviction come from?

Douglass: It was present from my earliest recollection: a living word of faith. Even in my darkest hours, when hope seemed irrational, that belief endured. It sustained me.

Me: So would you say that faith was active for you rather than passive?

Douglass: Very much so. It was not an excuse for submission, but instead a source of resistance. Hope became strength. It gave me the courage to act when opportunity arose.

Me: And when you say, “This good spirit was from God,” do you mean that your survival and eventual freedom felt guided?

Douglass: I do. I cannot deny the sense that something greater sustained me. To deny that would be to deny a truth of my own soul.

Me: Thank you, Mr. Douglass. Your words give hope a powerful dignity.

Douglass: Hope, when joined with action, is a force no chains can long contain.

Karen Zheng, kz374

Dinner Conversation with Alfred Russel Wallace

Me: Hi Alfred, where did your ideas on natural selection differ from those of Charles Darwin?

Alfred: We agreed that natural selection explains the development of physical traits. But I did not believe it could fully explain everything about the human mind.

Me: Like intelligence?

Alfred: Yes, but for abilities like mathematics, music, art. The kinds of abilities that go far beyond what we need to survive. Because why would natural selection give us more mental power than survival requires.

Me: But couldn't those abilities just be side effects? Maybe once our brains became larger for survival, things like art and math came along with it.

Alfred: That's what Darwin believed: that our higher abilities developed gradually from simpler mental traits. But I struggled with the idea that something like advanced mathematics or true self-sacrifice is just an accidental side effect of survival.

Me: So you didn't reject evolution. You just thought it had limits.

Alfred: Yes, I believed evolution explains the body very well. But when I looked at human consciousness, self-sacrifice, creativity, spiritual longing, I felt natural selection alone was not enough.

Me: That must have been controversial.

Alfred: Yes, that's why you only hear my name where Darwin and I agreed.

Me: That makes me think about my own life. I'm pretty good at sports, but I'm not musically or artistically gifted at all. When I look around, it feels like some people are just born with this incredible talent.

Alfred: And that very difference is what made me pause. If survival were the only measure, why would such varied and extraordinary abilities exist, especially when many of them do not clearly help us compete?

Me: That's really interesting. I really admire how different everyone's skills are. It's what makes us unique as humans. Thanks, Alfred!

Dinner conversation with Henry Norris Russell

Me: Russell, during class we looked into the Hertzsprung-Russell diagram. I never thought that stars could actually be organized like that.

Russell: Yes they can, the diagram shows the relationship between a star's luminosity and its temperature.

Me: What surprised me is that most stars spend most of their time on the thing called main sequence and the hottest and brightest stars are in the upper right while the cool and dimmer ones are in the bottom right.

Russell: Indeed, stars aren't random but rather their position depends on their mass.

Me: Yeah I find that interesting along with when we talked about how a star evolves onto a place in the main sequence depending on the initial mass of the clump that formed it in a nebula. This is basically just about how big it starts determines its life path.

Russell: That is exactly correct.

Me: Also, at the end of its life, a star becomes a red giant then a white dwarf which shocked me. I never knew they died I thought they were just always there.

Russell: They change over time, just like living things.

Me: That is super interesting. We also looked into how the sun actually produces its energy through the proton-proton reaction which then becomes sunlight.

Russell: Yes exactly, fusion powers the main sequence.

Me: I find that crazy to think about. Nuclear reactions in the sun's core is what is producing that normal feeling sunlight. And the sun is just one star on the main sequence.

Russell: Understanding things like that connection is important.

Me: I do have this question for you. When you first organized the stars into that diagram, did you expect it to explain so much about their life cycles?

Russell: The pattern just revealed itself through observation really.

Me:

Galileo, something from this lecture that really stuck with me was how important simple observation can be. It seems obvious, but paying attention to what's in front of you can completely change how people understand the world.

Galileo:

That was exactly my experience when I first started using a telescope. I was able to see details in the night sky that no one had ever clearly seen before.

Me:

The example that surprised me most was the moons of Jupiter. Before that, a lot of people believed everything in space revolved around Earth. But when you saw those moons orbiting Jupiter, it showed that not everything had to revolve around us.

Galileo:

Yes, that observation was very important. It showed that the universe might work differently than people had assumed for centuries.

Me:

What surprised me, though, was how people reacted to it. You'd think that once someone showed clear evidence, everyone would accept it. But the lecture made it clear that a lot of people pushed back against those ideas.

Galileo:

When new ideas challenge long standing beliefs, people are often uncomfortable accepting them.

Me:

I guess that's what made the story interesting to me. It wasn't just about astronomy. It was about how people deal with being wrong about something they've believed for a long time.

Galileo:

That is often the hardest part of learning.

Me:

It also made me realize that science isn't just about getting the right answer. It's about asking questions and being willing to look at evidence even when it challenges what you thought before.

Galileo:

Curiosity and careful observation are the foundations of discovery.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 9 Dinner Conversation

Conversation with Hans Bethe

Ellie: Hi, so nice to meet you Professor Bethe! It's crazy that I get to sit down with you and have a conversation with the person one of the dorms are named after.

Hans Bethe: Haha, I'm happy to share anything you're curious about!

Ellie: So you're the one who explained how stars make their energy?

Hans Bethe: Yes. In 1938, I worked out the main idea that the Sun is powered by nuclear fusion. Deep inside the Sun, under enormous temperature and pressure, hydrogen nuclei combine to form helium, and in the process they release a tremendous amount of energy. That energy eventually makes its way to the surface as sunlight.

Ellie: Is that the proton-proton chain?

Hans Bethe: Exactly. Before fusion was understood, people guessed the Sun might be burning like a normal fire, like coal or something similar. But that kind of fuel would run out far too quickly. Fusion explains how a star can keep shining for billions of years.

Ellie: And fusion is also how we get the elements that make up everything around us?

Hans Bethe: Right. The universe did not start with carbon, oxygen, or iron ready to go. Those heavier elements are built in stars over time and then spread into space when stars die and eject their material. The atoms in your body have a long history.

Ellie: That is really interesting but crazy to understand! I keep thinking about what you said about the atoms in my body having a history. It's weirdly emotional, like I'm connected to something way bigger than my own life.

Hans Bethe: That reaction makes sense. Physics can sound boring, but it often points to deep connections. You are not separate from the universe, you are made from it.

Ellie: Wow! So when I look at the Sun now, I should think more about it being the ongoing fusion reaction that makes life possible.

Hans Bethe: Exactly. You can also think of science as learning to translate that brightness into an explanation you can test and trust.

Ellie: That's such an insightful thing to think about. Thanks again for meeting with me Professor Bethe!

Dinner with William Herschel

Me: Mr. Herschel, you began your life as a musician – an oboist, a composer, an organist in Bath. Then you became the greatest telescope builder of your age, discovered Uranus, mapped the heavens, and discovered infrared radiation. Most people pick one thing. How did music lead you to all of this?

Herschel: (with genuine pleasure at the question) Music led me to mathematics, as it must – one cannot understand harmony without proportion, and proportion without numbers. From Robert Smith's book on musical harmonics I went naturally to his other great work, on optics. Optics led me to lenses and mirrors, mirrors led me to telescopes, and telescopes led me to the sky. It was not a plan. It was more like following a river, each bend reveals the next. I did not set out to discover a planet. I was systematically cataloguing double stars when I noticed an object that moved against the fixed background. That is the character of scientific discovery: you aim at one thing and Providence places another before you.

Me: And infrared radiation, you found invisible heat beyond the red end of the spectrum. That also seems to have been a discovery you stumbled into while solving a different problem entirely.

Herschel: (nodding) I was trying to observe sunspots through a telescope without damaging my eyes. I used colored glass filters, but none performed equally well – some admitted too much heat, others too much light. I began to measure, systematically, the heating effect of each color of the spectrum, placing thermometers at various positions. What I found was that the temperature continued to rise even beyond the point where the red light ended, in a region where I could see nothing at all. There was, it seemed, radiation beyond the visible. Heat without light, or rather, light without color, light that the eye cannot detect. I confess that troubled me somewhat philosophically. We speak so readily of light as that which illuminates and reveals. Here was radiation that revealed nothing to the eye and yet warmed the skin. It is a useful reminder that the world contains more than we see.

Me: That strikes me as a deeply important point. We trust our senses, and rightly so, but your discovery is one of the clearest demonstrations that the senses mark only a small window in a much larger spectrum. What are the implications of that for how we pursue knowledge?

Herschel: (leaning forward) The implications are considerable and, I think, humbling. Newton revealed that white sunlight contains all the colors of the rainbow hidden within it. I showed that the rainbow itself is only part of what the sun sends us. There is radiation beyond the violet as well, as Ritter later discovered, the ultraviolet. And between the visible and the invisible, there is no sharp boundary, only a gradient. Nature does not observe our categories. We draw the lines; she ignores them. The wise investigator proceeds with the assumption that whatever he has found is not the whole of what exists, but only what his instruments and senses have thus far been capable of detecting.

Me: You also tried to connect sunspots with the price of wheat, relating the activity of the sun to life on earth. That has been called ingenious by some and dismissed by others. Do you think the connection was real?

Herschel: (a wry smile) I think the connection was real in its direction if not in every particular. The sun is the ultimate fountain of energy for everything that grows on this earth. If the sun's emission of light and heat varies – and I showed that it does, with sunspots – then the harvest must vary with it, and the price of wheat with the harvest. That the chain has many links between cause and effect does not dissolve the chain. What I lacked was the ability to measure the solar intensity precisely and continuously, and the tools to account for all the competing factors – moisture, wind, soil, the CO₂ in the air itself. Future generations will have better instruments. I could only point in the direction.

Me: And the direction was correct, we now know the solar constant varies with the sunspot cycle, and that faculae associated with sunspots actually increase solar output. Your instinct was right even where your data were incomplete.

Herschel: (quietly satisfied) That is all one can ask of a first investigation. Eddington spoke of Daedalus and Icarus, the cautious man who stays safe and the bold man who flies toward the sun until the wax melts. I think I was more Daedalus than Icarus, but I tried always to fly a little higher than safety strictly required. The sky, I have found, rewards the attempt.

Me: One last question. You named Uranus Georgium Sidus, the Georgian Star, after King George III. It did not stick. Does that bother you?

Herschel: (laughing softly) The planet was there long before George III and will be there long after both of us are forgotten. That it carries a different name now seems to me entirely appropriate. We name things for ourselves; nature does not notice.

Me:after Lecture 9 I keep thinking about this. Is perception actually giving us reality or are we kind of constructing it in our heads.

Descartes: The senses can deceive us. That is why doubt is necessary. We must question whether what we perceive is truly real.

Locke: But experience is where knowledge begins. The mind starts blank and fills through sensation.

Me: But like optical illusions prove our senses mess up sometimes. We literally see things that are not there.

Descartes: Exactly. If the senses can mislead us even once, then we must be cautious about trusting them completely.

Locke: Caution does not mean rejection. Just because perception can err does not mean it is useless.

Me: In class we talked about primary and secondary qualities. That kind of confused me.

Locke: Primary qualities like shape and motion exist in the object. Secondary qualities like color and taste depend on perception.

Descartes: Which shows perception is not identical to reality. Some features are interpreted by the mind.

Me: So when I see red, that redness might not actually exist out there the way I think it does.

Locke: It exists as a power to produce that sensation in you.

Descartes: And that sensation could be doubted.

Me: But if we doubt everything then how do we function at all.

Descartes: Doubt leads to certainty about one thing at least. That you are thinking.

Locke: And after that, experience builds knowledge step by step.

Me: So one of you wants to start with doubt and the other wants to start with experience.

Descartes: Doubt clears the ground.

Locke: Experience builds on it.

Me: Honestly it feels like both are happening. We question things but we also rely on what we see every day.

Descartes: Reason must guide perception.

Locke: And perception feeds reason.

Me: So maybe reality is not just handed to us but not totally invented either. It is somewhere in between.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 9

Hennig Brand

Jenny: Mr. Brand, I have to ask... what possessed you to look for gold in urine?

Hennig Brand: Desperation, perhaps. And hope. Alchemists believed the Philosopher's Stone might be hidden in unlikely places. Urine, after all, carries the color of gold.

Jenny: That's... optimistic.

Brand: It was the seventeenth century. We were optimistic about many things.

Jenny: So you were boiling it down, trying to find the lapis philosophorum?

Brand: Yes. I collected vast quantities. Heated them. Distilled them. Reduced them to thick residues. I was searching for transformation.

Jenny: And instead of gold, you found something that glowed.

Brand: In the darkness of my laboratory, a strange substance shone with a cold, ghostly light. It did not need flame. It seemed to create light from itself.

Jenny: That must have felt magical.

Brand: It did. For a moment, I believed I had found something even more marvelous than gold.

Jenny: You named it phosphorus, right? "Light-bearer."

Brand: From the Greek—*Phosphoros*. The bringer of light. It seemed fitting.

Jenny: I love that you were chasing wealth and ended up discovering something fundamental to life instead.

Brand: Fundamental to life?

Jenny: Yes. Phosphorus is in DNA. In bones. In every living cell. You were searching for gold, but you stumbled onto one of the building blocks of existence.

Brand: That is... a far greater transformation than I imagined.

Jenny: It's kind of poetic. You thought value meant turning metal into gold. But the real treasure was something that glows...and sustains life.

Mahidul Islam Dinner Conversation

PLBio 1130 2/17/26

Me:

My man Hennig Brand, why were you experimenting with human urine?

Hennig Brand:

Very good questing Mahidul! I was an alchemist searching for the Philosopher's Stone, which people believed could turn ordinary metals into gold.

Me:

Wait, you actually thought gold could come from urine?

Hennig Brand:

Yes I did Mahidul! Urine has a golden color because of a substance related to the breakdown of heme, so I thought it might contain something valuable.

Me:

That is so insane!

Hennig Brand:

Alchemy was full of unusual ideas back then, Mahidul. Many people believed hidden secrets of nature could lead to great discoveries.

Me:

So what happened during your experiments?

Hennig Brand:

While trying to isolate different chemicals from urine, I accidentally discovered a substance that could glow and produce light.

Me:

Wait, you discovered something that glowed in the dark?

Hennig Brand:

Yes I did big man! The material produced a strange light, especially at night, which amazed people at the time.

Me:

What did you call the chemical?

Hennig Brand:

I named it phosphorus, which means "light-bearer" because of its glowing appearance.

Me:

That's actually a really cool name.

Hennig Brand:

Sometimes important scientific discoveries happen by accident while searching for something completely different.

Me:

So even though you didn't find gold, you still discovered something important?

Hennig Brand:

Absolutely. Phosphorus later became very important in chemistry and biology as you may know if you took AP bio.

Me:

Thanks for telling me all of this!

Hennig Brand:

No problem, Mahidul. Keep being curious about science and discovery!

Benito Jaramillo

PLSCI 1130

February 16, 2026

Conversation with Charles Darwin

Benito: Mr. Darwin, it is great to have you in my house for dinner. I made roasted chicken tonight and I hope you enjoy it. In my Light and Life class we have been talking a lot about the eye and I wanted to ask you how something so complex could have evolved.

Charles Darwin: Thank you for having me Benito, the chicken smells wonderful. That is one of the questions I get most often and one I spent a lot of time on myself. The eye did not appear all at once. It started as a simple patch of cells that could only tell light from dark, and natural selection built on that over a very long time.

Benito: Are there animals alive today that still have those simpler versions?

Charles Darwin: Yes, and that is one of the strongest pieces of evidence. You can see the full range across living species today, from basic light sensing patches in flatworms to the fully developed eyes of vertebrates. Evolution preserved what worked at each step.

Benito: It is interesting because in class we talk about how central light is to life, and it makes sense that the eye would evolve specifically because of that pressure.

Charles Darwin: Exactly. Light has been a constant in the environment throughout the history of life. It is no surprise so many organisms evolved so many ways to detect it.

Benito: Thank you Mr. Darwin, this really helped me connect what we are learning to the bigger picture.

Charles Darwin: Thank you for having me. The chicken was excellent, you are a great host.

Lecture 9: Dinner Conversation with Hans Bethe

Light and Life | Vansh Kakra | vk365

Vansh: I have to start with this - how does it feel to be back at Cornell and sit inside a building that literally has your name on it? That's got to be strange.

Bethe: It is a little strange. When I first walked into Bethe House, I thought, "Well, I suppose I cannot be late to dinner here." It's flattering, of course. But buildings age faster than reputations. I try not to think too much about it.

Vansh: That's such a calm response. If I had a building named after me, I'd casually mention it every day.

Bethe: That is why you must first discover how the sun works.

Vansh: Speaking of that - before your work, people didn't actually know how the sun produced energy in a serious mathematical way, right?

Bethe: They suspected nuclear processes, but no one had shown clearly how it worked inside a star like ours. The key was the proton-proton chain reaction. In the sun's core, hydrogen nuclei fuse step by step into helium. A tiny bit of mass disappears in the process, and that mass becomes energy.

Vansh: That's the Einstein connection ($E = mc^2$).

Bethe: Einstein provided the equation. I showed how it operates in the center of the sun. The numbers finally matched the sun's brightness and lifetime.

Vansh: You basically explained the engine of the universe's most important lightbulb. When you solved it, did it feel dramatic? Like, "Ah, I've cracked the sun"?

Bethe: It felt more like relief. The calculations finally made sense.

Vansh: And then decades later, the Nobel Prize in 1967.

Bethe: Yes. It was an honor, certainly. The discovery itself was the real satisfaction. Awards come later. Understanding comes first.

Vansh: Still, "Nobel Prize for explaining how the sun works" is a pretty strong resume line.

Bethe: I have never updated my résumé.

Vansh: That's probably wise.

Bethe: The sun continues shining whether I win prizes or not. That perspective keeps one humble.

Vansh: Sitting here at Cornell, in a house named after you, knowing that your equations explain the light outside the window... does that ever feel surreal?

Bethe: Occasionally. But mostly it feels like a reminder. The universe is consistent. If you ask it careful questions, it will answer.

Vansh: That might be the most casually brilliant thing I've heard all week.

Bethe: Then Cornell is still doing its job.

Selina Ke

Dinner Conversation with Albert Einstein

Selina: Einstein, people quote your equation, $E = mc^2$, as if it were only about power. When you first wrote it, were you thinking about power at all?

Einstein: No. I was thinking about honesty. Nature was revealing that mass and energy are not separate things. They are two ways of describing the same reality.

Selina: What unsettles me is how small the mass can be. Because the speed of light is so large, even a tiny loss of mass becomes an enormous amount of energy. That feels almost frightening.

Einstein: It should feel that way. Awe and fear are close relatives in science. They remind us that understanding does not come with moral instructions attached.

Selina: You suggested that the idea could be tested with radium salts, that the energy released in radioactive decay should correspond to a decrease in mass. That seems bold for something so theoretical.

Einstein: Physics must face experiment. An idea that cannot be tested is a thought, not a law of nature.

Selina: What matters most to me is that your equation applies to both nuclear fission and thermonuclear fusion. It means the sun's energy could come from fusion, from hydrogen nuclei smashing together and losing a little mass in the process.

Einstein: Yes. In the sun, gravity and heat do what humans struggle to do. Protons overcome their electric repulsion, form deuterons, and release energy. The sun shines because matter becomes slightly less than it was before.

Selina: On Earth, fusion is nearly impossible to control. In the sun, it happens naturally for billions of years. That contrast makes human power feel very small.

Einstein: And that is a good lesson. Science should humble us as much as it empowers us.

Selina: Then here is my question. If the same equation explains both the warmth of the sun and the destruction of a bomb, can science ever be separated from responsibility?

Einstein: No. Knowledge gives us clarity, not innocence. Once we understand how the universe works, we must decide what kind of people we will be with that understanding.

Dinner Conversation with Robert Frost

Me:

I've been thinking about your poem "Nothing Gold Can Stay" after reading it in a lesson about gold and sunlight. Your lines "So dawn goes down today" feel like the same idea that the sun is constantly losing mass to produce light.

Frost:

I'm glad you made that connection but you're comparing nuclear fusion to a leaf?

Me:

A little. Sun or leaf struck me with a lesson that nothing is static, not even the Sun. The one thing to me that seems will just never fade. I'm in college right now and everything feels transitional. I transferred school and am still trying to figure out what I want to do for my career. Sometimes I wish I could pause things until I'm sure.

Frost:

Stopping might sound like a good move in the current moment but change is what helps you grow and bear fruits of your challenges.

Me:

Maybe just for a couple hours or even a couple days. Let me stop the season in early spring. The moment when everything feels full of possibilities.

Frost:

But spring only exists because it does not stay.

Me:

I know. I think that's what I'm trying to get comfortable with. I used to see change as instability. Now I'm starting to see it as a structure like in astrophysics. The Sun stays stable *because* there's constant tension inside it. Gravity pulling in, pressure pushing out.

Frost: Uncertainty is not the absence of direction. It is the presence of growth.

Me: That's reassuring. I think part of me resists your poem because it sounds like loss. "Nothing gold can stay" feels like something beautiful disappearing.

Frost: Or it could be maturing.

Me: Right. The first green doesn't disappear, it becomes a leaf. It's just less fragile. Less luminous in an obvious way.

Frost: Gold that stays would cease to be gold.

William Herschel Conversation

William Herschel: The Sun, the Wheat, and the Ledger at Windsor

Me: William! It's so good to see you! Thanks for making the trip!

Herschel: Maximo! A pleasure, truly. Is that shepherd's pie I'm smelling?

Me: It is! Fresh out of the oven. Listen, William, I've been reading about your work for my class, and I have to ask you about something you did in 1801. You looked up at the sun, noticed it was variable, and decided it was almost a duty to study it since light and heat are so essential to our well-being. But then you did something I don't think anyone else would have thought to do. You pulled the price of wheat at Windsor out of Adam Smith's *Wealth of Nations* and used it as a stand-in for the sun's output. How did you land on wheat?

Herschel: Ah, Maximo. You have gone to the strange part of it, and I am glad you did. The trouble, you see, was that I could not put a thermometer in every field in England. And yet light and heat are the very soil of our lives. So it occurred to me, if the sun falters, the harvest falters. If the harvest falters, the price of bread rises. The wheat at Windsor was a ledger the sun had been keeping without anyone noticing. I only had to open it.

Me: But here is what I want to press you on, William. Wheat prices are not just a record of sunshine. They are a record of war, of trade policy, of disease in the fields, of speculators in London. When you saw a spike in the price, how could you be sure the sun was the one signing the receipt?

Herschel: A fair blow, Maximo. I could not separate every cause, I will grant you that. But I was not looking at a single year. I was looking at five stretches across a century and more, the first running 1650 to 1670, periods when the sun went quiet of its spots. In each of them, the price climbed. Call it circumstantial if you like, but when the same pattern appears five times over, a man begins to trust it. I wrote of a temporary scarcity or defect of vegetation in those years, when the sun lacked its usual symptoms of a copious emission of light and heat.

Me: And yet today, William, your line of reasoning has been, as my lecturer put it, pooh-poohed. The argument now is that what humans do to the climate dwarfs whatever the sun gets up to.

Herschel: I will say this. I never claimed the sun was the only hand on the harvest. I only claimed it was a hand, and one worth counting. If men have grown mighty enough to rival the sun, that is a remarkable thing, and a worrying one. But the sun is still there. It still pulses on its cycle, and the field it warms is still the one you eat from. To ignore it because a new cause has arrived seems a poor sort of science to me.

Me: One more thing, William. The modern view is that sunspots plus faculae actually increase the sun's output, not decrease it. So when you saw a quiet sun, you were right that the harvests suffered, but for a reason your age could not quite see.

Herschel: Then I will take the half credit and thank nature for the grade. I read the book of the sky with the eyes I had. The next generation will read it better, and the one after that better still. That is the whole business, Maximo.

Me: That's a generous way to hold it, William. Would you care for some dessert?

Herschel: I'll pass, Maximo, the shepherd's pie has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 9: Dinner Conversation with William Booth

Me: Hi Mr. Booth, thank you for meeting with me for dinner! In class, we learned about white phosphorus and phossy jaw. How did you become involved?

Booth: I was deeply troubled by the amount of suffering in England. At the time, many were unemployed and desperate for work. The match factories that offered positions were poisoning workers with white phosphorus, a toxic substance that decayed their jaws and disfigured their faces. It seemed wrong that light was made at such a human cost.

Me: Oh no! Was there a safer alternative to making matches?

Booth: Indeed. Red phosphorus is a far more stable substance that does not release the same toxic fumes. This was a well-known fact. However, white phosphorus was cheaper, and profit was valued over people. It was quite sad, and I wanted to do something about it.

Me: That's amazing. I'm guessing that's why the Salvation Army started its own match factory?

Booth: You are correct. If safe matches could be made elsewhere, why should English workers have to suffer? We created factories that used red phosphorus and provided safe working conditions.

Me: And the factory was called "Lights in Darkest England." Was the name meant to be symbolic?

Booth: Very much so. Light is not only a physical phenomenon, but also a moral one. Just as phosphorus can produce light through chemical reaction, compassion lights up our society. Science gives us knowledge, and I believe it is our duty to decide how that knowledge is used.

Me: Truly inspiring words. Building on that, do you believe science itself is neutral, or does it carry a sense of responsibility?

Booth: The laws of chemistry are neutral. White phosphorus reacts with oxygen whether we approve of it or not. But how that knowledge is applied is never neutral. It reflects our values and the responsibility lies with us. I hoped that creating a safe match factory would encourage people to care more for one another and to do what is right when the power is in their hands.

Me: Do you think small reforms like safer matches truly make a difference in society?

Booth: My goal was to ignite something in people. A single match can light a candle. And enough candles can brighten even the darkest places.

Me: Thank you for this conversation. You have inspired me to use my knowledge responsibly!

He walked in holding a bottle that was glowing.

Not reflecting light. Not catching a glare. Glowing like it had its own opinions about being there.

I stared at it. "You brought that on purpose?"

Hennig Brand looked down at it fondly. "Of course."

"That is not a normal dinner guest move."

"Discovery rarely is."

He set it on the table like it belonged there. The light in the room dimmed a little once he turned off the lamp, and suddenly the bottle was doing all the work. Soft green. Kind of alive looking.

I leaned away from it. "Why does it look like that."

"It enjoys the dark," he said.

"That is not an explanation."

"It is a beginning."

We sat down and I tried to focus on food, which is hard when there is a glowing mystery sitting between the salt and pepper.

"So what exactly am I looking at," I asked.

He didn't answer right away. He just watched it.

"I was trying to make something else," he said finally.

"Let me guess. This was not the goal."

"No," he said. "Not even close."

I took a bite. He didn't. He was too busy staring at the bottle like it might evolve.

"So what were you trying to make."

He hesitated just enough to make it worse.

"...Gold."

I laughed. He didn't.

"Oh you're serious."

"Very."

There was a pause.

"You didn't start with glowing stuff," I said.

"No."

"So what did you start with."

He folded his hands like he was about to confess something mildly ridiculous.

"Things people discard."

"That is extremely vague."

He nodded. "Intentionally."

I waited.

He looked at the bottle again.

"I collected it," he said. "In large amounts."

"How large."

"Barrels."

I stopped chewing.

"Barrels of what."

He glanced at me.

"...Urine."

I put my fork down very slowly.

"Absolutely not."

He kept going like this was completely reasonable.

"I believed it contained something valuable. Something hidden."

"You believed pee had gold in it."

"Potential," he corrected.

"You boiled potential."

"For a long time."

"I can imagine it smelled amazing."

He nodded thoughtfully. "It was... memorable."

I rubbed my face.

"So you boiled barrels of urine."

"Yes."

"And somehow ended up with that." I pointed at the glowing bottle.

"Yes."

"That's insane."

"It is unexpected," he said.

He picked it up carefully. The light shifted, brighter for a second.

"Watch," he said.

"I don't want to watch."

"You should."

"I really shouldn't."

He tilted it slightly anyway.

The glow pulsed.

“Okay no, that’s actually kind of cool,” I admitted.

He smiled, just a little. “It appeared at the end. After everything else burned away.”

“Everything except the glow.”

“Yes.”

I leaned closer, then immediately leaned back again.

“Is it safe.”

“No.”

“Great.”

“It burns.”

“Fantastic.”

“And it continues burning.”

“Even better.”

“And water does not help.”

“Why would you say that like it’s a fun fact.”

He shrugged. “It impressed people.”

“It is impressing me in a very stressful way.”

We sat there for a bit, the bottle quietly glowing between us.

“You were trying to make gold,” I said. “And you got this instead.”

“Yes.”

“You don’t seem disappointed.”

He looked genuinely confused.

“I made something no one had ever seen.”

I thought about that.

“Yeah. That’s fair.”

He finally took a bite of food like he remembered why he was here.

“Do you always follow ideas this far,” I asked.

“Until they change,” he said.

“Or until they smell terrible.”

“Sometimes both.”

When he stood up to leave, he wrapped the bottle carefully again, like it was something fragile and dangerous and kind of beautiful.

“Not everything valuable looks like gold,” he said.

“Some of it glows in the dark and comes from bad decisions,” I added.

He almost laughed.

Almost.

Then he walked out, carrying his strange little light with him.

The room felt weirdly normal again.

I looked at my dinner.

Then at the empty spot on the table.

I don’t think I’m ever going to look at a glowing object the same way again.

Ean Pope

Dinner conversation

Lecture 9

Me: Mr. Herschel, I read that you once got a sunburn while traveling through the Alps and it made you curious about how strong sunlight really is. Instead of just ignoring it, you decided to measure it. Why did that moment make you want to study sunlight?

Herschel: The intensity of the sun that day made me realize that sunlight must contain measurable energy. I wanted to find a way to measure how powerful the sun's rays actually were.

Me: So you built the actinometer?

Herschel: Yes. It used a thermometer in water mixed with black ink so the liquid would absorb sunlight. By comparing the temperature in sunlight and shade, I could estimate the intensity of solar radiation.

Me: In my class we learned that experiments like yours helped scientists understand what we now call the solar constant, the average intensity of sunlight reaching Earth.

Me: My question is this. When you were measuring sunlight in the 1800s, scientists did not yet know what actually powered the sun. Did it bother you that you could measure the energy but not know where it came from?

Herschel: Not really. Science often begins with careful measurements. Explanations sometimes come later. What matters is observing the world closely enough to ask better questions.

Me: That actually makes sense. Today we know the sun's energy comes from nuclear fusion.

Herschel: And that is the nature of scientific progress.

Me: I guess that means even simple curiosity like getting a sunburn can end up pushing science forward.

Herschel: Indeed. Curiosity is often the beginning of understanding.

Jasmine: Mr. Hubble, sorry I love your last name. It is so fun to say... and I keep thinking about the bubble gum brand: Hubba Bubba. I tried to make dinner thematic: vacuum-sealed macaroni and cheese, powdered lemonade, freeze-dried Neapolitan astronaut ice cream and rehydrated strawberries. NASA-inspired!

Hubble: I should clarify: I never left Earth

Jasmine: True. But you made the universe much larger from the ground. Honestly, that is cooler than going to space! On another note, you once described your discovery as “a linear correlation between distances and velocities”. Your use of language just makes something so revolutionary sound so... calm?

Hubble: It was simply what the data showed.

Jasmine: But the redshift... that’s the dramatic part, right??? Why are you so nonchalant?

Hubble: Technically, it is quite straightforward. You see, when we examine the light from distant galaxies, we spread it into a spectrum, much like a prism separates colors that you have learnt in class. Within that spectrum are specific absorption lines corresponding to elements

Jasmine: I think I remember this from high school! The wavelengths stretch and that fractional shift remains constant across the spectrum. This is known as a velocity shift???

Hubble: Not bad at all. And so yes, when galaxies move away, their light stretches too. The red end of the spectrum corresponds to longer wavelengths, like Randy has shown you in class. So when we observed that these absorption lines were shifted consistently toward red, we knew that the galaxies were receding!!

Jasmine: I got this question wrong on my exam, but I know it now... the relationship between a galaxy’s distance and its recession velocity was linear. The farther the galaxy, the faster it moved away from us. Double the distance, double the velocity

Hubble: Impressive, for a business student.

Jasmine: I wish I had not chosen business as my major and done something like biology or astronomy. It is so interesting and you actually learn 100x more than you do with business.

Hubble: I am glad you are aware.

Jasmine: If every galaxy is moving away from us, doesn’t that make it look like we’re at the center of the universe?

Hubble: Never mind. Forget I said you were smart. Imagine dots on the surface of a balloon as it inflates. Each dot sees every other dot moving away. No dot is the center.

Jasmine: Ah yes, I forgot. Space itself is stretching.

Hubble: Oop- Time is up. Farewell! I must say this food was delicious.

Jasmine: ...what a strange man.

Nomar: I have to admit something while we're sitting here. When I first saw in the lecture that you discovered phosphorus while experimenting with urine, I thought it had to be a joke. How did that even happen?

Hennig Brand: At the time I was searching for the Philosopher's Stone, which many alchemists believed could turn base metals into gold.

Nomar: That part surprised me. I always thought early scientists were doing experiments that looked more like modern chemistry labs. I didn't realize people were literally trying to make gold.

Hennig Brand: Alchemy was driven by the hope of discovering substances with extraordinary powers.

Nomar: The crazy thing is that even though you were looking for gold, you ended up finding something completely different. When the lecture showed that glowing phosphorus, it actually looked pretty amazing.

Hennig Brand: Yes, the substance produced light when exposed to oxygen. That property made it very unusual.

Nomar: I think that's what stuck with me most. You weren't even searching for something related to light, but you ended up discovering a chemical that literally glows.

Hennig Brand: Many discoveries happen when experiments produce unexpected results.

Nomar: The connection to matches later on was also interesting. I never thought about how something discovered hundreds of years ago eventually led to everyday things like safety matches.

Hennig Brand: Scientific discoveries often find applications long after they are first observed.

Nomar: What I liked about this story is that it shows science isn't always a straight path. Sometimes someone is looking for one thing and accidentally finds something way more useful.

Hennig Brand: Curiosity and experimentation often lead to discoveries beyond the original goal.

Nomar: I guess the next time I strike a match I'll probably think about the chemistry behind it instead of just using it without thinking.

Hennig Brand: That curiosity is exactly what drives scientific understanding.

Ariel Vilensky

Lecture 9: Production of Sunlight and Chemical Spectroscopy

Me: Good evening, Sir Arthur. I was struck by your comparison of scientists to Daedalus and Icarus. Most people see Icarus as a symbol of reckless failure, yet you seemed to defend him.

Arthur Eddington: I do. Icarus is remembered for falling, but his fall revealed a flaw in the wings. That discovery has value. In science, pushing a theory until it breaks can expose its weaknesses.

Me: So cautious “Daedaluses” aren’t enough?

Eddington: They are necessary. The cautious scientist applies theories where they seem safest. But too much caution can leave hidden defects untouched. Without strain, weaknesses remain concealed.

Me: And Icarus provides that strain?

Eddington: Exactly. He tests the limits. Any scientific theory may fail. However, in failing, it teaches us how to build a stronger one.

Me: Some would call that recklessness.

Eddington: Perhaps. Scientists are human, and ambition plays its part. But bold attempts often bring insight. Even if we do not reach the Sun, we learn something that advances our knowledge.

Me: So failure, in science, can be productive.

Eddington: Very much so. Progress requires both careful builders and daring testers.

Me: Thank you for your time, Sir Arthur.

Eddington: And may your own inquiries be both bold and enlightening.

Karen Zheng, kz374

Dinner Conversation with William Herschel

Me: Hi William, I was reading about your work on the Sun. What made it feel so important to you?

William: The sun gives us light and heat, which are the very conditions that make life possible. That is why it is so important to understand how changes might affect life here on Earth.

Me: So you would look at the Sun almost like someone studying a living system?

William: Yes, for example, I noticed that the Sun's appearance changes, especially with sunspots. I wondered whether those changes influenced how much light and heat we receive.

Me: I thought it was particularly interesting that you tried to connect sunspots to things like weather and even wheat harvests.

William: Yes, if the Sun really is the source of the warmth and light that makes crops grow, then changes on its surface might show up in harvests. I knew that wheat prices were not perfect data, but they offered clues when direct measurements were unavailable.

Me: That feels very creative. It sounds like you used whatever information you had to try to understand bigger ideas.

William: Science often begins that way. We rarely have complete evidence. We look for hints and patterns that might guide us toward understanding the larger truth.

Me: It makes me think about how we still try to connect light from the Sun to life today, from climate, seasons, to even food production.

William: Exactly, the Sun connects to everyday life more directly than most people realize.

Me: I like that idea, that looking at something so distant can help us understand what happens here on Earth.

William: And that is why the study of light is never only about the sky or the Sun. It is about life itself and its entirety.

Me: That's really inspiring, thank you, William!

Dinner Conversation with Lisa Jardine

Me: Professor Jardine, we talked in lecture today about your quote talking about how people don't really recognize the role pure science played in the Allied victory during World War II. This topic shocked me, all we talked about in past classes is just the frontline soldiers and battles.

Jardine: Yes indeed, science is celebrated mainly about progress but the context of the war is typically left out.

Me: We talked about how omission is certainly a conscious one which is shocking. Why do you think people purposely left that out?

Jardine: People left that out because it complicates the story, science is portrayed as neutral and purely good but if we look at the context of wars and killing, it could completely change that.

Me: I guess I never thought about it that way. I usually see science as discoveries and inventions but what you're saying is that science is what helped win the war.

Jardine: It played a major role, yes.

Me: That makes me think slightly different about how we talk about science today. If science helped defeat Fascism, then it wasn't only just abstract theories. It had real-world consequences.

Jardine: Yes exactly

Me: In the lecture we also talked about how the Crystal Palace could be assembled and disassembled quickly by Joseph Paxton, making me think about how science and engineering can be brought together and put into physical structures and even public spaces.

Jardine: Science and engineering always interact with society.

Me: What my big question is this, why do people like to separate science from history? Like if science played such a big role in the victory of World War II, I feel like we should talk about it more in classes throughout school?

Jardine: Yes but it seems like people just like simpler stories more and don't want to see that side of science.

Me:

Mr. Newton, something from this lecture that really stuck with me was the idea that white light contains all the colors already inside it.

Newton:

Many people believed that before the experiment. The prism does not create color. It only separates the light into the colors that were already there.

Me:

That part made me rethink rainbows. I used to see them as just something pretty in the sky, but now I realize it's the same idea happening in nature.

Newton:

Water droplets in the atmosphere act much like a prism, bending and separating the light.

Me:

What I liked about this lecture is that it made light feel more interesting than I thought before. We see light every day, but we usually don't think about what it's doing.

Newton:

Often, the most familiar things in nature are the least examined.

Me:

Another thing I thought about was how your experiment was simple. It was just sunlight and a prism, but it completely changed how people understood color.

Newton:

Simple experiments can sometimes reveal very important truths.

Me:

I guess that's what I'm taking away from this lecture. Science doesn't always start with complicated machines. Sometimes it starts with someone noticing something ordinary and asking the right question.

Newton:

Curiosity is often the beginning of discovery.

Me:

Yeah, and now I think I'll probably look at light a little differently. It's strange to realize that something we see every day contains a lot more information than we usually notice.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 10 Dinner Conversation

Conversation with Robert Schomburgk

Ellie: Hi Professor Schomburgk, thank you for having dinner with me! I've been reading about your travels, and I really wanted to hear your story directly.

Robert Schomburgk: I'm happy to join you, Ellie. What would you like to talk about?

Ellie: Your expedition to British Guiana really stood out to me. What was it like the first time you saw Victoria regia?

Robert Schomburgk: Unforgettable. I remember coming upon calm water and seeing what looked like enormous floating plates, each leaf wide enough to seem impossible. Some were around six feet across, and they sat on the surface with a kind of quiet confidence. When I looked underneath, the color shocked me, a deep reddish crimson. Then there were the flowers, opening white at first and later shifting to pink. It felt unreal.

Ellie: That sounds incredible. How did it go from being this hidden thing in South America to becoming famous in England?

Robert Schomburgk: I wrote detailed descriptions and sent sketches back. Once people realized how unusual it was, it captured attention quickly. It was named for Queen Victoria, which only added to the fascination. Before long, botanists were determined to grow it successfully, and when it was cultivated at Kew Gardens, the public excitement became real.

Ellie: And it didn't stop at botany, right? I heard it even influenced architecture.

Robert Schomburgk: Yes, Joseph Paxton studied the leaf and noticed how the ribbed structure supported such a large surface without collapsing. He saw an elegant solution to a practical problem, strength without heaviness. Nature handed him a structural idea, and he translated it into design.

Ellie: That's so cool. It's like discovering a plant can change how people build buildings. After a discovery like that, what made you keep going?

Robert Schomburgk: Because discovery doesn't cure curiosity, it feeds it. Once you realize how much is out there, it becomes difficult to accept the idea that you've seen enough.

Ellie: Wow. That makes a lot of sense. Thank you for sharing all of that with me, Professor Schomburgk.

Robert Schomburgk: Of course, Ellie. My pleasure.

Dinner with John Draper

Me: Professor Draper, you were the keynote speaker at the 1860 meeting of the British Association for the Advancement of Science in Oxford, the very meeting where the famous exchange between Huxley and Wilberforce supposedly took place. You were there. What do you actually remember about that day?

Draper: (with mild amusement) I remember that my address lasted nearly two hours, which the audience bore with varying degrees of patience, and that the subsequent discussion became considerably more animated than anything I had said. What history has preserved, or rather confabulated, is the argument about apes and bishops. What history has largely forgotten is that the scientific content of that meeting included a serious discussion of how natural law governs social development, which I had written about myself. The drama of personality overshadowed the substance of the science. It has always been so.

Me: You formulated what we now call the Grotthuss-Draper Law, the first law of photochemistry, which states that only the light absorbed by a substance can produce a chemical change in it. It seems almost obvious in retrospect. Was it obvious at the time?

Draper: (shaking his head) Nothing in science is obvious until someone has done the work to establish it clearly. Grotthuss had observed that colored solutions were decolorized by light, and that the rate depended on the light's intensity and exposure time. I extended this and stated it more precisely: the ray that is effective in producing a chemical change in any substance is determined by the absorptive property of that substance. A pigment absorbs the color complementary to its own – a red pigment absorbs green light, a blue pigment absorbs yellow light. What the substance cannot absorb, it cannot use. This seems simple. But consider how much follows from it. Chlorophyll is green because it absorbs red and blue light. It absorbs red and blue light because those are the wavelengths that can promote its electrons to higher energy states and drive the chemistry of photosynthesis. The color you see is, in a sense, the light that was useless to the plant – the remainder after it took what it needed.

Me: That is a remarkable way of thinking about it. The green of a forest is essentially waste light.

Draper: (smiling) From the plant's perspective, yes. The plant took the red and the blue and left us the green. We find it beautiful. The plant is indifferent. This is one of the places where aesthetics and biology diverge in a way I find rather charming.

Me: You were also one of the first people to take a daguerreotype photograph – including, famously, a photograph of the moon. You essentially demonstrated that light could fix an image permanently. Does it strike you that the same principle – light absorbed by a substance producing a change – connects your photochemistry to your photography to photosynthesis itself?

Draper: (leaning back, genuinely pleased) That connection is precisely what I found most exciting. When a daguerreotype plate is exposed to light, the silver salts are changed by the light they absorb – they are reduced to metallic silver, and the image is fixed. When a green leaf is exposed to light, the chlorophyll absorbs photons and uses that energy to split water and fix carbon dioxide into sugar. The principle is the same: absorbed light drives chemistry. The eye, the camera, the leaf – all are light-absorbing systems that transform radiant energy into something else. The eye transforms it into nerve impulses. The camera transforms it into an image. The leaf transforms it into food. One principle, endlessly varied in its applications. That is what a law of nature looks like.

Me: You also wrote that social advancement is as completely under the control of natural law as bodily growth. Looking back, do you stand by that?

Draper: (pausing more carefully) I stand by the aspiration behind it, that human society is not exempt from orderly natural principles and that we can study it as we study chemistry. Whether the specific claim holds, whether history obeys laws as strict as photochemistry – that I would state with more caution now. The law of absorbed light admits no exceptions. The laws of social development, I have found, admit many. Perhaps that is the difference between matter and man.

Me: Perhaps it is the difference between a substance that absorbs only what it needs and a creature that sometimes absorbs more than it can use.

Draper: (raising his glass) That is a better formulation than any I have managed. To the first law of photochemistry, and to its many exceptions.

Me: Okay so here is what I keep thinking about from lecture. Are we controlled by unconscious stuff deep in our minds or are we just reacting to our environment all the time.

Freud: Most of what drives you is unconscious. You think you are rational but hidden desires and conflicts are running the show.

Skinner: Or behavior is shaped by reinforcement. If something is rewarded it increases. If it is punished it decreases. It is not that mysterious.

Me: But that feels kind of too simple. What about dreams or anxiety or when you say something and immediately regret it.

Freud: Slips and dreams are not random. They reveal repressed thoughts trying to surface.

Skinner: Or they are learned patterns. Verbal behavior is shaped over time and sometimes it comes out in odd ways.

Me: In class we said introspection is unreliable. People are bad at explaining why they do things.

Freud: Exactly. That is why analysis looks at patterns over time. Not just what someone says once.

Skinner: And that is why observable behavior is better. If you cannot measure it then it is guesswork.

Me: But humans are not pigeons in boxes pressing levers.

Skinner: The principles still apply. College students study because grades reinforce them. Same system just more complex.

Freud: You reduce everything to reward and punishment. Humans care about meaning and guilt and love and fear.

Me: Trauma feels deeper than just reinforcement though.

Skinner: Trauma changes reinforcement history. It shapes what someone avoids or seeks.

Freud: Trauma gets buried in the unconscious. Then it shows up later as symptoms.

Me: So where does free will fit in. Because right now it sounds like we are controlled either way.

Skinner: Free will is understanding what shapes you so you can change it.

Freud: Free will is becoming aware of what was unconscious.

Me: That actually sounds kind of similar.

Freud: Insight changes behavior.

Skinner: Changing the environment changes behavior.

Me: So maybe it is both. Inner conflicts and outside reinforcement.

Freud: The mind matters.

Skinner: The environment matters.

Me: Yeah so basically we are complicated and that is probably the real answer

Jenny Huang
PLSCI 1130: Light and Life
Lecture 10

John Herschel

Jenny: Mr. Herschel, I have to tell you...I love painting. So when I read about your experiments with flower pigments and light, I got really excited.

Herschel: Ah, then we are not so far apart. Science and art are both concerned with light, after all.

Jenny: That's exactly what I was thinking. You found that pigments from flower petals were decolorized by the complementary color of light, right?

Herschel: Yes. When exposed to light of a certain color, the pigment absorbs its complement. What remains, what the eye perceives, is the color that is reflected or transmitted.

Jenny: That's so cool. In painting, we're always taught about complementary colors...like red and green, blue and orange, yellow and purple. When you put them next to each other, they make each other more intense.

Herschel: Indeed. Because each absorbs what the other reflects. They are opposites in the spectrum, yet they define one another.

Jenny: That makes me think about color palettes. When I'm choosing colors for a painting, it's not just about what looks pretty. It's about balance. If I use too much of one hue without its complement, it can feel flat.

Herschel: Then you are, in effect, conducting your own optical experiments.

Jenny: I was trying to make the color of sand once—when I was painting a beach. I kept mixing yellows and browns, but it looked dull. Then I added just a little bit of purple. It felt so wrong at first... but suddenly the yellow looked warmer and more real. It was like the color came alive.

Herschel: Precisely. By introducing its complement, you allowed the yellow to assert itself more fully. The eye delights in such contrasts.

Jenny: It honestly felt like magic.

Herschel: Science often explains what artists have long practiced by intuition.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Brodi dude Richard Feynman, what did you mean when you said science is “the belief in the ignorance of experts”?

Richard Feynman:

Well Mahidul, I meant that science is not about blindly trusting authority figures. Science depends on questioning ideas and testing them through evidence and experiments.

Me:

So just because an expert says something does not automatically make it true?

Richard Feynman:

That is correct Mahidul! Scientists can make mistakes too they are just like any other person, so people should always ask how conclusions were reached and what evidence supports them.

Me:

So when people say “science says this,” that’s not really correct?

Richard Feynman:

Not completely. Science itself does not teach facts. Experiments, observations, and evidence are what show whether an idea is supported and is actually proved to be scientifically true.

Me:

So people should ask questions like How did scientists figure this out?

Richard Feynman:

That’s right, Mahidul. People should ask how experiments were performed, what results were observed, and whether the evidence can be tested again.

Me:

That actually makes science sound way more open-minded.

Richard Feynman:

You’re on point! Science works best when people remain curious, skeptical, and willing to challenge ideas with evidence.

Me:

So science is more about the process than just memorizing answers?

Richard Feynman:

Absolutely. Science is a getting to the method of discovery, not just a having lots of facts written in a book.

Me:

That's honestly really interesting to think about.

Richard Feynman:

The most important part of science is never being afraid to question and investigate the world around you.

Me:

Thanks for telling me all of this!

Richard Feynman:

No problem, Mahidul you're a smart guy! Keep asking questions and thinking for yourself!

Benito Jaramillo

PLSCI 1130

March 9, 2026

Conversation with George Harrison

Benito: George, thank you so much for coming over tonight. I am a huge Beatles fan so this is really exciting for me. I made curry in your honor. In my Light and Life class we have been talking about light as a metaphor for enlightenment and I know that was a big theme in your life and music.

George Harrison: Thank you Benito, curry is perfect honestly. Yes, that search for light in the spiritual sense was really everything to me. Meeting Ravi Shankar in 1966 was a turning point. He introduced me to a tradition where music was devotion, not performance, and the idea that there is an inner light in all of us that never goes out.

Benito: Do you think music can actually illuminate something the way light does?

George Harrison: Absolutely. The best music reaches parts of a person that words and logic cannot get to. With Within You Without You I was trying to say that the separation we feel from everything around us is an illusion. Most of us are just living without realizing the light is already there inside us.

Benito: That connects to something we talked about in class, that awareness itself can be a form of illumination.

George Harrison: That is exactly it. Meditation, music, real spiritual practice, they do not bring the light from outside. They remove what is blocking it.

Benito: George this has been one of the coolest conversations I have had. Thank you so much for coming.

George Harrison: Thank you Benito. The curry was amazing. All things must pass but a good meal stays with you.

Lecture 10: Dinner Conversation with Theodor Engelmann

Light and Life | Vansh Kakra | vk365

Vansh: I have to tell you, if someone at Cornell proposed your experiment today - shine a rainbow on algae and let bacteria “tell” you what’s happening - it would probably win some quirky research grant.

Engelmann: Then I am glad curiosity is still funded.

Vansh: I walk past all these labs on campus and everything looks intense - machines, data screens, people stressed. And then there’s you, casually letting bacteria float toward oxygen like it’s a popularity contest.

Engelmann: I was less interested in noise and more interested in patterns.

Vansh: That’s actually what I like about it. At Cornell, everyone’s chasing something - grades, internships, recognition. Your experiment feels like the opposite. Just patient watching.

Engelmann: Observation is underrated. Most people rush to conclusions before they truly look.

Vansh: That hits. Sometimes I feel like we’re all staring at the “green light” because it looks obvious, but the real action might be somewhere else - like your red and blue.

Vansh: I also love that you didn’t try to force the answer. You just created the right setup and let the bacteria show you.

Engelmann: If you design the question well, the answer will reveal itself.

Vansh: That’s reassuring, because right now my life feels like constant interference. Meetings, deadlines, notifications. No stepping back.

Engelmann: Then perhaps you need your own “prism moment.” Split the noise into parts. See which parts actually matter.

Vansh: So instead of reacting to everything, I should watch what naturally gathers energy?

Engelmann: Precisely. Where does your attention move when you are not forced? That is your oxygen trail.

Vansh: That’s strangely deep for a conversation about algae. That might be the most Cornell advice I’ve heard all semester.

Engelmann: Then perhaps your campus and my microscope are not so different after all.

Selina Ke

Dinner Conversation with Douglas W. Jerrold

Selina: Mr. Jerrold, I cannot stop thinking about that image, the child standing on the water lily. It feels half science and half theater. Were you amazed or amused when you first heard of it?

Jerrold: Both, certainly. Amazement is nature's invitation and amusement is society's reply. A leaf strong enough to bear a child offends our assumptions about fragility. We expect beauty to be weak.

Selina: That is exactly what struck me. The reports obsess over measurements, diameter, growth rate, buoyancy, as if wonder needs numbers to be believed. Then the spectacle appears, Annie Paxton dressed as a fairy, standing over the lily like a queen.

Jerrold: Science explains how a thing stands, but poetry asks why it matters. A child balanced on a leaf is not merely an experiment in surface tension. The fairy costume turns a scientific curiosity into a story. It makes the moment memorable. People were not just looking at a plant. They were watching a scene.

Selina: Your poem feels gentle but also worried. You seem less focused on the flower and more focused on the child. It sounds like you are hoping life never becomes too heavy for her.

Jerrold: Is that not always the worry? We use children as symbols of purity, hope, and the future, while knowing how heavy life can be. The lily leaf becomes a moral test. How much weight can innocence bear before it sinks?

Selina: I find it unsettling that the child's weight had to be distributed by a board. The moment feels magical, but it is also carefully controlled. Does knowing that ruin the wonder?

Jerrold: I do not think so. Most beautiful things depend on support that we do not immediately see. Admitting that does not destroy the magic. It simply makes it more honest.

Selina: So the spectacle is not only about the plant. It is about us and our need to reconcile wonder with rationality.

Jerrold: Exactly. The lily grows incredibly fast, but people are even more amazed. We are learning to be amazed again, carefully, but still with some understanding.

Selina: Then let me ask you this, Mr. Jerrold. If the lily leaf represents beauty strengthened by hidden structure, what happens when the audience forgets the structure and demands only the spectacle?

Jerrold: Then the leaf breaks, not because it was weak, but because it was misunderstood. That is why I wrote the poem, not for the lily or even for Annie, but for the spectators. It is a reminder to tread lightly on what we admire.

Me:

Okay, I have to ask you something. In class we read your quote about “science being the belief in the ignorance of experts.” I kind of loved it. But also... isn't that a little dangerous? Like if no one trusts experts, things fall apart.

Feynman:

It's not about distrusting experts. It's about distrusting certainty. An expert who says, “Here's what we know, and here's how we know it,” is doing science. An expert who says, “Because I said so,” isn't.

Me:

That makes sense. I think I struggle with that sometimes. I'm studying information science, and in data work there's always this pressure to present results confidently. But half the time I'm thinking, “Well... this depends.”

Feynman:

Good. That discomfort? That's intelligence working. The trick is to be clear about the uncertainty without becoming paralyzed by it.

Me:

So how do you not get stuck in overthinking? Because I can spiral. I'll be like, maybe this model is wrong. Maybe the data is biased. Maybe I'm missing something obvious.

Feynman:

You probably are missing something obvious. Everyone is. The question is: can you design a way to find out? Doubt is useful only if it pushes you to test.

Me:

Haha, that's annoyingly practical. Do you think curiosity is something you're born with? Or something you protect?

Feynman:

Both. Children are naturally curious. Education sometimes trains it out of them though.

Me:

I moved to the U.S. when I was eight and didn't really speak English well. I remember being afraid to ask questions in class. I didn't want to sound dumb. It took me years to be comfortable raising my hand. I think that's partly why your quote hit me. It kind of gives permission to question.

Feynman:

The moment you're afraid to look dumb is the moment learning stops. The best scientists are comfortable being confused in public.

Joseph Paxton: Conversation

Joseph Paxton: The Leaf, the Palace, and the Engineer Called Nature

Me: Joseph! It's so good to see you! Thanks for making the trip!

Paxton: Maximo! A pleasure, truly. Is that steak and kidney pie I'm smelling?

Me: It is! Fresh out of the oven. Listen, Joseph, I've been reading about you for my class, and there is something I keep coming back to. On November 9, 1849, you flowered *Victoria regia* in a glasshouse you had built for it at Chatsworth, the first person in England to manage it. But then you did something unusual. You turned the leaf upside down and studied the bottom of it. What made you look there?

Paxton: Ah, Maximo. You've asked the right question, because that is where the lily keeps its secret. Most people see the top, the great green platter floating on the water, and they stop. But I was a gardener, and a gardener learns early that a plant's cleverness is often hidden from the sun. So I turned it over, and what I saw was an engineer's drawing. Radiating ribs like levers, flanges along their bottoms for strength, thinner ribs between them, and cross-girders binding the whole thing so it could not buckle. I wrote it plainly afterward. Nature was the engineer. I only copied her homework.

Me: But here is what I want to press you on, Joseph. That is a lovely story, and I think a little too lovely. You were already building glasshouses before you ever flowered that lily. You already worked in modular cast iron and glass. Isn't it possible the leaf gave you the metaphor after the fact, not the method?

Paxton: A fair blow, Maximo, and one I will not dodge. You are right that I had been at my trade for years. The Lily House was not born from nothing. But I will tell you this. When you have been building with iron and glass for a decade, and you turn over a leaf and see your own drawings staring back at you, something shifts. It was not that I had no ideas before. It was that the lily told me my ideas were sound. Nature had been running the experiment longer than any man.

Me: And yet, Joseph, you went from that leaf to winning the competition for the Great Exhibition building against 245 professional architects. A head gardener, with no formal training, beating the whole profession. Surely there is more luck in that than leaf.

Paxton: There is always luck, Maximo, I will not pretend otherwise. The committee was desperate, the deadlines were cruel, and my first drawing fit on a single sheet of blotting paper. But the building went up in nine months, on time and on budget, and it stood. The Crystal Palace was not a gardener's dream. It was a gardener's discipline. We grow things in seasons, Maximo. We cannot miss the frost.

Me: And the line that runs from your palace to the Seagram Building a century later? Do you take credit for that?

Paxton: I take credit for paying attention to a leaf. The rest was picked up by better men than me. But I will say this much. If a boy today looks at a plant and sees a building in it, I have done my work.

Me: That's a generous way to hold it, Joseph. Would you care for some dessert?

Paxton: I'll pass, Maximo, the steak and kidney pie has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 10: Dinner Conversation with Theodor von Grotthuss

Me: Hi Mr. Grotthuss, thank you for meeting me for dinner! In class, we learned about your work on the First Law of Photochemistry. How did you discover that only absorbed light can cause a chemical reaction?

Grotthuss: For starters, I was curious about how light interacts with matter. I worked with colored solutions, including iron (III) thiocyanate, which is red. When I exposed it to light, it slowly became decolorized. I noticed that the change only occurred when the solution absorbed light. If light passed through without being absorbed, nothing happened.

Me: That's fascinating! Did you also notice that the rate of change depended on the light itself?

Grotthuss: Yes. The reaction became faster when the light was more intense and when the exposure lasted longer. This showed me that light was not simply illumination. It was actively participating in the chemical process.

Me: In lecture, we connected your discovery to pigments and complementary colors. For example, red solutions were most affected by green light. Was that surprising to you?

Grotthuss: Initially, yes. But upon reflection, it all made sense. A pigment appears a certain color because it reflects or transmits that color, and the color it absorbs is its complementary color. Only that absorbed light has enough interaction with the substance to produce chemical change.

Me: Today, we understand that absorption raises an electron from a ground state to an excited state. That excited electron can then transfer to another molecule. Does that align with what you observed?

Grotthuss: It does. Although I did not describe it in terms of electrons at the time, I understood that light must be taken in by the substance before it can alter its chemical nature. Energy cannot act unless it is first absorbed.

Me: Your law is now fundamental to understanding photosynthesis. Do you believe your discovery carries a broader lesson about science?

Grotthuss: I believe it teaches us to observe carefully. Light surrounds us constantly, yet only the portion that is absorbed has an effect. In science, as in life, what truly enters and interacts brings change.

Me: Thank you for this conversation. You have helped me understand that light is not just something we see!

The glass of water refused to behave.

I hadn't even touched it yet. It just sat there on the table, minding its business, until the surface gave this tiny flicker like it couldn't decide what it wanted to be.

"Did you see that," I asked.

"Of course," said Theodor von Grotthuss, already leaning in like the glass had personally invited him.

"You're not even surprised."

"Movement is rarely visible," he said. "But it is always happening."

That sounded like something I would regret thinking about.

He didn't shake my hand. He didn't sit down right away. He just stared at the water like it owed him an explanation.

"You ever just... drink it," I said.

He waved that off. "Eventually."

We finally sat, but he dragged the glass with him like it was the main guest and I was optional.

"So what are we doing," I asked.

"Watching."

"For what."

"For what passes through without traveling."

I blinked.

"That sentence is illegal."

He dipped a finger near the rim of the glass, not touching it, just hovering.

"In your time, you imagine particles moving from one end to another," he said.

"I mean... yeah."

He shook his head.

“Too slow. Too obvious.”

“Then what’s happening.”

He smiled a little, like he’d been waiting a very long time for someone to ask that.

He grabbed a napkin and a pen and started drawing circles connected by lines.

“Imagine a chain,” he said. “Each holds something briefly, then hands it off.”

“Like a relay race.”

“Yes,” he said, pleased. “But no runner crosses the field.”

“That defeats the whole point of a race.”

“Not if the goal is speed.”

He pointed at the glass.

“Inside, there is a constant passing. A shift. A handoff from one to the next.”

“So things are moving.”

“Yes.”

“But also not moving.”

“Yes.”

I leaned back.

“I hate this already.”

He laughed quietly.

“You prefer objects to behave like travelers. Leaving, arriving, being seen.”

“Yeah. That’s kind of how I understand... everything.”

“But some things move by becoming something else for a moment,” he said.

“That is not comforting.”

"It is efficient."

He finally let me drink the water.

I hesitated.

"This feels like a trick."

"It is only water."

"That's what you said five minutes ago before telling me it's secretly doing invisible relay races."

He nodded.

"It still is."

I took a sip anyway.

"Great. Now I'm part of it."

"Always were."

He seemed genuinely excited now.

"You see, it is not the particle that travels far. It is the effect that does."

"Like a wave."

"Exactly."

He tapped the table lightly.

"A push here becomes motion there, without anything needing to cross the entire distance."

"That's actually kind of cool."

"It is elegant," he said.

We sat there for a while, him watching the glass like it was a performance, me trying not to feel like my drink had a secret life.

"So you figured this out by just... thinking about it," I said.

“And observing patterns,” he added.

“No glowing bottles. No barrels of anything questionable.”

He smiled faintly.

“Just persistence.”

At some point I tapped the table.

“Wait. So if I knock here...”

“The effect travels,” he said.

“But the wood doesn’t move across the table.”

“Correct.”

“That’s... weird.”

“That is nature.”

When he stood to leave, he didn’t take anything with him.

Not the glass. Not the napkin. Just the idea, apparently.

“Remember,” he said, pausing at the door, “not everything that moves needs to go somewhere.”

“That’s going to mess with me,” I admitted.

“It should.”

He left quietly.

I looked at the glass of water.

Perfectly still.

Completely normal.

Absolutely not trustworthy anymore.

Ean Pope
Dinner Conversation 10

Me: You Richard Feynman? in my Light and Life class we read something you said that stuck with me. You said that science is “the belief in the ignorance of experts.” That’s kind of surprising because most people think science is about trusting experts.

Feynman: People misunderstand that idea. Experts are useful, but science doesn’t depend on authority. It depends on experiments and evidence. Anyone should be able to question an idea if the evidence supports it.

Me: That actually makes sense with what we’re learning about photosynthesis. Scientists didn’t just assume how plants use light. They ran experiments to see which wavelengths of light actually make photosynthesis happen.

Feynman: Exactly. Science works when people want to know how we know something, not really when they repeat what they’ve been told.

Me: In class we talked about how photosynthesis uses light energy to convert carbon dioxide and water into carbohydrates and oxygen. It’s basically plants turning radiant energy into chemical energy that life can use.

Me: My question for you is this: if science is about questioning everything, how do we know when an explanation is good enough to trust?

Feynman: That’s the interesting part. We never know something with absolute certainty. What we do is test ideas over and over. The explanations that survive many experiments become the best explanations we have. But they are always open to improvement.

Me: So science isn’t really about proving something forever.

Feynman: No. It’s about building better and better explanations of the world.

Me: I guess that’s what makes science exciting. Even something as common as a green leaf is actually doing something incredibly complex with light.

Feynman: And the moment you realize that, you start seeing the world very differently.

Jasmine: Sir Joseph Paxton, before we talk architecture... you were a gardener first, right?

Paxton: Proudly so. I began as a young gardener and rose to become head gardener at Chatsworth. Plants were my first teachers

Jasmine: That's kind of amazing. So what was your favorite flower?

Paxton: The Victoria regia by a loonnnggg shot. I admired its structure underneath the leaf: strong and efficient

Jasmine: So through observation, did gardening lead to design? Did people think you were crazy proposing a glass palace inspired by a water lily?

Paxton: Many architects dismissed it at once. Too much glass. Too fragile. Too ambitious. BUT THAT'S HOW YOU KNOW YOU'RE MAKING HISTORY.

Jasmine: Was it economical as well?

Paxton: Yes. I designed it so there were standardized parts, repetition and minimal waste. These are the same principles that allow a leaf to support weight without collapsing

Jasmine: That's incredible... so you weren't just designing a building. You were translating nature into architecture.

Paxton: Exactly. People think innovation comes from invention, but often it comes from observation. The Victoria regia leaf had already solved the problem. I simply learned from it.

Jasmine: In another life, where would you want to have lived and what else would you have wanted to create?

Paxton: I would choose a place bursting with energy... somewhere like New York City in its great rise. A city growing impatient, alive with ambition.

Jasmine: CONCRETE JUNGLE WHERE DREAMS ARE MADE OF!!!

Paxton: uh...

Jasmine: Sorry, not to cut you off. I love that song.

Paxton: Even before the bursts of skyscrapers, I would have loved to bring glass and iron there at scale, not just for a single exhibition, but for entire districts. JUST IMAGINE. Imagine vast, light-filled markets, winter gardens in the middle of the city.

Jasmine: Yea, instead we are stuck with rat infested, no AC subways.

Paxton: Tough luck.

Nomar: Something from this lecture that really stood out to me was the experiment about how different colors of light affect photosynthesis. Before this class I honestly never thought about the idea that plants might use some colors of light more effectively than others.

Engelmann: That question was exactly what I wanted to investigate. I projected different wavelengths of light across a strand of algae and observed how it responded.

Nomar: The part I thought was really clever was how you used bacteria to help measure the results. Instead of directly measuring oxygen production with modern tools, you watched where oxygen-seeking bacteria moved.

Engelmann: Yes. The bacteria gathered in the areas where the algae produced the most oxygen, which indicated where photosynthesis was happening most strongly.

Nomar: What surprised me was that the bacteria gathered mostly in the blue and red parts of the spectrum, but not in the green light. That was interesting to me because plants are green, so at first I assumed green light would be the most useful to them.

Engelmann: That result showed that photosynthesis is most effective under blue and red light, which matches the absorption properties of chlorophyll. Green light is mostly reflected, which is why leaves appear green.

Nomar: That actually made a lot more sense once I thought about it. The color we see isn't what the plant is using, it's what it isn't using.

Engelmann: Exactly. The light that is absorbed provides the energy necessary for photosynthesis.

Nomar: I liked this experiment because it showed how creative scientists had to be before modern technology existed. Using bacteria as indicators for oxygen production feels like a really clever workaround.

Engelmann: Careful observation and creative experimentation often lead to important discoveries in science.

Nomar: For me the biggest takeaway from this lecture is realizing that something as simple as the color of light can affect how efficiently plants make energy.

Engelmann: Understanding those relationships helps explain one of the most fundamental biological processes that supports life on Earth.

Ariel Vilensky

Lecture 10: Photosynthesis I

Me: Good evening, Dr. Feynman. I was struck by your claim that science is “the belief in the ignorance of experts.” That sounds almost contradictory. What did you mean?

Richard Feynman: (laughs) It does sound that way, doesn’t it? What I meant is that science progresses by questioning authority. Experts are useful, but they can be wrong. The scientific attitude is to check claims against evidence, not just accept them because someone important said them.

Me: So when people say “science has shown” something, that’s not quite right?

Feynman: Not really. Science itself doesn’t show anything — experiments do. When someone makes that claim, the proper response is to ask: *How did they find out? What was the evidence?* Science is a method of inquiry, not a body that hands down truths.

Me: You also said that anyone has the right to judge whether a conclusion is sensible, as long as they listen to the evidence. Do you really believe non-experts can do that well?

Feynman: They can if they’re patient and honest. You don’t need to be an expert to ask good questions. The key is being willing to examine the evidence carefully and keep an open mind.

Me: So skepticism is actually central to science?

Feynman: Healthy skepticism, yes. Science works because we remain willing to doubt and to test. Our conclusions are always the best ones we have *so far*.

Me: Thank you for your time, Dr. Feynman.

Feynman: Anytime. Just keep asking how we know what we know.

Karen Zheng, kz374

Dinner Conversation with Richard Feynman

Me: Hi Richard, you once said that science is the belief in the ignorance of experts. I keep thinking about that. If experts can be wrong, how do we ever feel secure in what we “know”? Isn’t that unsettling?

Richard: It’s only unsettling if you think knowledge is supposed to be permanent. Science isn’t about certainty. It’s about getting less wrong over time. No one gets a golden ticket to truth, and science isn’t about authority; it’s about doubt.

Me: But if truth is always provisional, how do we avoid slipping into cynicism? How do we believe in anything at all?

Richard: Doubt in science isn’t cynicism because cynicism says nothing is true. Science is an active search. You test, you measure, you observe.

Me: So truth isn’t something we possess, but something we approach?

Richard: Yes, we don’t invent it; we discover it. And sometimes we discover we were wrong before. That’s not failure, that’s refinement.

Me: When someone says “science has proven this,” what bothers you the most: the arrogance or the oversimplification?

Richard: Both. Science never “proves” anything in an absolute sense. But it can provide evidence, test ideas, and narrow uncertainty.

Me: Then what responsibility does an ordinary person like me have? Most of us don’t run experiments. How do we meaningfully judge evidence?

Richard: You ask questions. “How was this tested?” “What would prove it wrong?” “Has it been repeated?” You don’t need to be an expert to be a skeptic.

Me: Do you think the search for truth requires humility more than intelligence?

Richard: Yes, humility lets you admit you might be mistaken. Without humility, intelligence becomes arrogance, and arrogance blinds you to the truth.

Dinner conversation with Martin Kamen

Me: Dr. Kamen, today we talked about photosynthesis and government surveillance. Honestly, I didn't expect it to go there.

Kamen: That's the thing about science. People like to think that it's all about experiments and equations. But it's more than that, it's also about people, and people bring politics into it, along with fear, pride, jealousy, and courage.

Me: That stood out to me, it seemed like a huge scientific breakthrough when you helped create a way to use carbon-14 to trace the path of carbon in photosynthesis. But rather than being celebrated, you were treated like a threat.

Kamen: My crime was that I was social, curious, and too trusting. I knew musicians, scientists, immigrants, and people with political opinions that made the government nervous. Suspicion became evidence even when there was no real evidence.

Me: That is a big issue to me- how quickly institutions can punish people when fear replaces fairness. It makes me think about how many discoveries could have been shaped not just by intelligence, but also by who gets protected and who gets pushed out.

Kamen: Exactly. Science is often presented as if the best idea simply wins, but sometimes the person with the best idea loses access to the funding or the reputation needed to continue.

Me: That's what bothers me also. The lecture said that Melvin Calvin continued the project after you were pushed out, and Calvin later won the Nobel Prize for the Calvin cycle. I'm not saying Calvin didn't contribute but it makes me question how history decides who gets remembered.

Kamen: History often remembers the person that's at the finish line, not everyone that built the road leading there.

Me: That's a good way to put it. In class, we talked about photosynthesis converting radiant energy into chemical energy, but your story made me think about another kind of conversion, how fear can convert scientists into suspects.

Me:

One thing from this lecture that really stuck with me was learning that the image in our eyes is upside down. I had never thought about that before.

Kepler:

It does seem strange at first. The optics of the eye naturally flip the image when light passes through the lens.

Me:

Yeah, that part kind of blew my mind. It means our eyes technically see the world flipped, but we never notice because our brain corrects it.

Kepler:

Exactly. The eye gathers the light, but the brain is what allows us to interpret what we see.

Me:

I guess that made me realize that vision isn't just about the eye itself. It's really a combination of physics and how the brain processes information.

Kepler:

That is correct. Understanding how light behaves helped explain how vision works.

Me:

What I liked about this lecture is that it made something so normal feel more interesting. We use our eyes constantly, but most of the time we never stop to think about what's happening when we look at something.

Kepler:

Many natural processes seem ordinary until we take the time to study them.

Me:

I guess that's what I'm taking away from this lecture. Seeing feels automatic, but it depends on a lot of precise things happening at once—light traveling, the lens focusing it, and the brain figuring out what the image means.

Kepler:

Yes, vision is a remarkable combination of light, biology, and perception.

Me:

It made me think differently about something as simple as looking around. There's a lot more going on than we usually realize.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 11 Dinner Conversation

Conversation with Martin Kamen

Ellie: Hey, Dr. Kamen. Thanks for joining me for dinner.

Martin Kamen: The pleasure is all mine, Ellie! What did you want to talk about?

Ellie: I was reading about your work with carbon 14, and I have to ask. What was it like when you first realized it could be used to trace biochemical pathways?

Martin Kamen: That was a real turning point. We had been bombarding nitrogen with neutrons, expecting to produce an unstable isotope, and suddenly we had carbon 14. What mattered was that its half life was long enough to be useful. Once we had that, we realized we could follow carbon as it moved through a plant and basically watch the chemistry of life happen step by step.

Ellie: Did you know right away that it was going to be revolutionary?

Martin Kamen: Not instantly. At first it felt like a clever tool for research. But then the uses kept growing. Biology and medicine, then archaeology, then other areas too. Before long, carbon 14 was changing how people studied both living systems and the distant past.

Ellie: And yet right after that discovery, you ran into a lot of trouble. What happened?

Martin Kamen: Politics happened. It was wartime, I was in a government lab, and suddenly who you knew mattered more than what you discovered. I went to the wrong dinner parties, knew the wrong people, and I was labeled a security risk.

Ellie: That must have been infuriating, being treated like a criminal when you were just doing science.

Martin Kamen: Infuriating and devastating. I lost my job, my reputation, and even my passport. I had to take odd jobs just to get by, and it took years before my name was cleared.

Ellie: After everything, what kept you going? Why stay in science?

Martin Kamen: Because I couldn't stop wondering. Science is bigger than politics and bigger than any one person's struggles.

Ellie: That's incredible. Thank you for sharing that with me!

Dinner with Albert Einstein

Me: Professor Einstein, you called light quanta – what we now call photons – lichtquanten, and your 1905 paper on the photoelectric effect, not relativity, was the work that won you the Nobel Prize. And yet you spent much of the rest of your life resisting what quantum mechanics became. You proposed the photon, and then found yourself uncomfortable with the theory the photon helped build. How do you make sense of that?

Einstein: (slowly, with a slight smile) It is a strange position, yes. I showed that light, which behaves as a wave in so many circumstances, must also behave as a particle – a discrete packet of energy – in order to explain the photoelectric effect. When light strikes a metal surface, electrons are ejected, but only if the light is above a certain frequency, regardless of its intensity. This could not be explained by the wave theory. A single photon of sufficient energy could eject an electron; a million photons of insufficient energy could not. That is the behavior of particles, not waves. So I accepted the photon. What I could not accept was the conclusion that Heisenberg and Bohr drew from it – that at the most fundamental level, nature is irreducibly probabilistic. That God plays dice, as I put it.

Me: And your preferred alternative was that there are hidden variables – deeper causes we haven't found yet – that would restore determinism. Most physicists today think you were wrong about that. Does the weight of evidence trouble you?

Einstein: (measured) The weight of consensus has never been my primary concern. Most physicists thought Newton's mechanics were complete, and they were not. What troubles me more is the philosophical claim – not merely the mathematical formalism, but the assertion that uncertainty is the fundamental nature of reality, not merely a limitation of our current knowledge. Heisenberg's principle says that energy can come from nothing for a brief moment – that virtual particles can pop into existence from the vacuum. This contradicts the first law of thermodynamics, which I regard as the deepest law of nature. A theory is impressive, I wrote, in proportion to the simplicity of its premises and the breadth of its reach. Classical thermodynamics reaches everywhere. It never fails. That is why I trust it more than I trust quantum mechanics at its philosophical foundations.

Me: Eddington said much the same thing, that if your theory conflicts with the second law of thermodynamics there is nothing for it but collapse in deepest humiliation.

Einstein: (nodding with satisfaction) Eddington understood. And yet – (pausing) – I must be honest. I gave the world the photon. The photon made quantum mechanics possible. If the edifice is wrong at its foundations, I helped build the scaffolding. That is not a comfortable position for a man who believes in a universe governed by deep, comprehensible order.

Me: That belief in order, in a God who does not play dice, sounds almost theological. You have spoken of a cosmic religious feeling. Is your objection to quantum indeterminacy ultimately scientific or philosophical or spiritual?

Einstein: (leaning forward) I do not make that distinction cleanly. To me, the universe has revealed itself as comprehensible – as the product of reason, not chance. When I discover that the equations of relativity contain the behavior of the cosmos, I do not feel I have invented something. I feel I have read something that was already written. The man who regards his own life and that of his fellow-creatures as meaningless is not merely unfortunate but almost disqualified for life. The same instinct that tells me life is not meaningless tells me that the universe is not random. Perhaps that is faith. Perhaps it is simply the disposition that has made me a physicist.

Me: Photosynthesis, which uses the very photons you described, converts eight of them to fix a single molecule of carbon dioxide into sugar. Every green thing alive is running on the photoelectric effect, on the quantum nature of light you revealed. Does it please you that the photon turned out to be so fundamental to life?

Einstein: (genuinely delighted) I confess I did not think of photosynthesis when I wrote that paper. I was thinking about metal surfaces and laboratory measurements. But yes – that the same discrete packet of energy that ejects an electron from a metal also excites an electron in chlorophyll, splitting water and building carbohydrates from air and light – that is the kind of deep unity that makes one feel the universe is indeed a very fine place. Even if God did play dice, he seems to have loaded them rather beautifully.

Me: (laughing) That may be the most hopeful thing I've heard you say.

Einstein: (with a quiet warmth) I am, at heart, an optimist. I simply require evidence.

Lecture 11 Dinner Party

Tyler: This lecture actually made my head hurt.

James Joule: That means it was probably a good lecture.

Tyler: I'm serious though, once they started debating whether thermodynamics or quantum mechanics is more fundamental I was done.

Albert Einstein: I liked that part actually. Thermodynamics feels more real because you can physically observe it everywhere.

Jean-Paul Sartre: Meanwhile quantum mechanics starts sounding like philosophy halfway through.

Tyler: The "particles appearing from nothing" thing was crazy.

Einstein: Heisenberg's uncertainty principle. Energy can briefly appear for a short period of time.

Tyler: Which feels like it breaks the First Law immediately.

Joule: That's why physicists argue about it endlessly.

Tyler: Honestly the Second Law made more sense to me. Energy transformations always lose some energy as heat and entropy increases.

Sartre: Yeah because time only moves in one direction.

Tyler: The Carnot engine example actually helped me understand that. Heat moves from hot to cold and some energy always gets wasted.

Einstein: Unless you somehow had a perfect engine at absolute zero which is impossible.

Tyler: So basically perfection doesn't exist.

Joule: Pretty much.

Tyler: I did think it was funny that one of the biggest physics laws came out of a brewery though.

Joule: As it should.

Tyler: James Joule doing experiments before breakfast and then running a brewery all day is honestly ridiculous.

Einstein: People forget a lot of scientists had completely normal jobs while making discoveries.

Tyler: The professor also kept bringing up how science should allow questioning.

Sartre: That was one of the most important parts honestly. The moment people stop questioning assumptions, science turns into ideology.

Tyler: Yeah the “science ends and scientism begins when questioning is forbidden” line definitely sounded important.

Einstein: Because science is supposed to be a process, not a religion.

Tyler: I feel like that connects to modern arguments too. People just appeal to authority instead of explaining reasoning.

Sartre: Which is basically what bad faith is.

Tyler: You know this class is wild when a photosynthesis lecture somehow becomes a debate about philosophy and politics.

Joule: Everything connects eventually.

Tyler: Apparently.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 11

Albert Einstein

Jenny: Professor Einstein, can I ask you something a little uncomfortable?

Einstein: The uncomfortable questions are usually the most interesting ones. Please.

Jenny: There's a debate about your first wife, Mileva Marić. Some people think you took credit for work she helped create...maybe even stole it. Did you?

Einstein: "Stole" is a strong word. We were young. We studied together. We discussed physics constantly. She was intelligent...very intelligent.

Jenny: Your letters sometimes say "our work." That sounds collaborative.

Einstein: When two students sit side by side, wrestling with Maxwell's equations late into the night, ideas intermingle. "Our" can mean intellectual companionship, not necessarily joint authorship.

Jenny: So she was a sounding board?

Einstein: Yes, and more than that. She understood the problems I was struggling with. To explain a theory aloud is often to clarify it. She helped in that way.

Jenny: But she never published. And you did.

Einstein: Publication requires more than discussion. It requires formulation, writing, and defense of the argument. The 1905 papers were written by me. That much is certain.

Jenny: Do you think history has been unfair to her?

Einstein: History is rarely gentle, especially to women of that era. Opportunities were not equal. That is true. But injustice in society does not automatically mean theft in science.

Jenny: Some people point to the divorce agreement. You promised her the Nobel Prize money.

Einstein: That was a practical arrangement. I had little money then, but I expected future recognition. It was security for her and the children. Not an admission of secret authorship.

Jenny: So you're saying she contributed emotionally and intellectually, but the theories were yours?

Einstein: I am saying that ideas grow in environments. She was part of that environment in my early years. But the responsibility and the work of construction was mine.

Jenny: Do you regret that she didn't have the same scientific career you did?

Einstein: Regret is a complicated word. Our marriage did not survive. But I do regret that talent, in any person, is constrained by circumstance.

Jenny: I guess what people really want to know is whether genius is ever truly solitary.

Einstein: It is not. No thinker stands alone. We are all lifted by teachers, colleagues, companions. But acknowledgment must rest on evidence, not sentiment.

Jenny: That's fair. I just didn't want to admire you without asking the hard question.

Einstein: Then you are thinking properly. Admiration should survive inquiry or it deserves to fall.

Mahidul Islam Dinner Conversation

PLBio 1130 2/17/26

Me:

Yooo Hermann von Helmholtz, what did you study about the sun's energy?

Hermann von Helmholtz:

Well Mahidul, I used James Joule's discoveries about energy to model how the sun could transform gravitational energy into thermal energy.

Me:

So the sun creates heat from gravity?

Hermann von Helmholtz:

Dude how did you know you're right! I believed that as the sun slowly contracts under gravity, gravitational energy is converted into heat and light energy.

Me:

That's actually really interesting.

Hermann von Helmholtz:

It helped scientists better understand where the sun's enormous energy might come from, although Helmholtz later turned out to be wrong because understanding nuclear energy became important to explain how the sun produces sunlight.

Me:

What did James Joule discover that helped with this idea?

Hermann von Helmholtz:

James Joule helped establish the principle of conservation of energy and the First Law of Thermodynamics which says that energy cannot be created or destroyed and that it can only be transformed from one form into another.

Me:

So energy is always changing forms instead of disappearing?

Hermann von Helmholtz:

That's right, Mahidul. Joule saw this law as evidence of unity within the many different processes found in nature.

Me:

Did Joule think science removed the idea of God?

Hermann von Helmholtz:

No, he did not. James Joule actually believed that the First Law of Thermodynamics reflected the will and order of God within nature.

Me:

This is all so crazy to hear!

Hermann von Helmholtz:

Many scientists in history believed that scientific laws revealed deeper patterns and order in the universe.

Me:

Thanks for telling me all of this!

Hermann von Helmholtz:

No problem, Mahidul. Keep exploring the connections between science and the universe!

Benito Jaramillo

PLSCI 1130

March 2, 2026

Conversation with Louis Fieser

Benito: Professor Fieser, thank you for joining me for dinner tonight. I made salmon which I hope you enjoy. In my Light and Life class we have been studying retinal, the molecule that lets our eyes detect light, and I wanted to ask someone who really understands organic chemistry about how it works.

Louis Fieser: Thank you for having me Benito, salmon is a great choice. Retinal is a fascinating molecule. It comes from vitamin A and has a structure that lets it absorb photons in the visible spectrum. When light hits it the molecule physically changes shape, and that triggers the whole process of vision.

Benito: So the chemistry of the molecule is what determines what light we can actually see?

Louis Fieser: Exactly. The arrangement of the bonds determines which wavelengths get absorbed. Slightly different structures give different animals sensitivity to different parts of the spectrum, which is why some creatures can see things we cannot.

Benito: That is a really cool way to think about it. What we see is basically a chemical window into the world.

Louis Fieser: That is a great way to put it. And it is a narrow window. The physical world has light across a huge spectrum but our chemistry only lets us access a small piece of it.

Benito: Thank you Professor Fieser, this made the chemistry feel a lot more connected to real life than it does in a textbook.

Louis Fieser: That is what good science should do. And the salmon was wonderful, thank you Benito.

Lecture 11: Dinner Conversation with Melvin Calvin

Light and Life | Vansh Kakra | vk365

Vansh: How does it feel to know that somewhere on campus, stressed students are whispering your name before exams like it's a spell? "Please let me remember the Calvin cycle."

Calvin: I apologise to them in advance. I promise I did not invent it to ruin midterms.

Vansh: That's not what it feels like. It feels very personal at 2 a.m.

Calvin: In fairness, I was simply trying to understand how plants turn carbon dioxide into something useful. I did not expect to become an academic obstacle.

Vansh: So walk me through this casually. You basically figured out what plants do *after* sunlight hits them, right?

Calvin: Exactly. I wanted to know what happens next. How does a plant take invisible carbon dioxide from the air and turn it into sugar?

Vansh: And your answer was a very complicated cycle that every biology student fears.

Calvin: It only looks complicated because it repeats. It is a cycle, after all. Carbon enters, moves through a series of steps, and eventually becomes part of a sugar molecule.

Vansh: Did you realize how big it was at the time?

Calvin: I knew it was important. Plants are the base of nearly every food chain. If you understand how they build carbon into sugars, you understand the foundation of life on Earth

Vansh: And then - Nobel Prize.

Calvin: Yes, in 1961. It was a tremendous honor.

Vansh: I feel like your work is one of those invisible things. We walk outside, see trees, eat food, and never think about the carbon cycle quietly spinning inside every leaf.

Calvin: The most important processes are often invisible.

Vansh: So every time I complain about Ithaca weather, I should remember the leaves are out there doing chemistry on my behalf.

Calvin: Correct. Very diligent chemistry.

Vansh: I'm going to start thanking plants more often.

Calvin: AHAHA, good. I am proud that my research is helping students understand the importance of plants.

Selina Ke

Dinner Conversation with C. S. Lewis

Selina: Mr. Lewis, I have been thinking about what makes life feel meaningful. I notice that the moments I truly enjoy, like a walk alone or a meal I savor, seem to stick with me more than the things I do to impress others.

Lewis: That is very good to notice. When we enjoy something simply for what it is, we connect with a part of ourselves that cannot be touched by pride or envy.

Selina: But it feels almost wrong to take pleasure in something so ordinary. We are always told to pursue what is important or admired.

Lewis: That is the subtle danger. When we chase only what is admired, we build a layer over our hearts. We start valuing appearance over reality. Simple joys keep us honest.

Selina: So enjoying life for its own sake is not selfish. It actually protects us in ways ambition or reputation cannot.

Lewis: Exactly. There is a kind of strength in being able to love something without caring what anyone else thinks. It makes us less vulnerable to deception, less swayed by vanity.

Selina: That is comforting and unsettling at the same time. It suggests that the small, quiet pleasures are more powerful than any achievement or recognition.

Lewis: They are powerful because they are real. A heart that knows what it genuinely loves is difficult to manipulate. True joy shapes us in ways the world cannot.

Selina: Then the challenge is to keep noticing these things in a world that constantly pushes us toward status, success, and approval. How do we do that?

Lewis: By paying attention to what touches us deeply, no matter how ordinary it seems. By loving without expectation and being present in the moment. That is where life becomes rich and the heart becomes resilient.

Selina: It makes me wonder if we spend so much time trying to impress others that we forget what truly delights us.

Lewis: That is often the case. And yet the heart remembers, quietly, the joys it has known, and those are the ones that guide us in the end.

Me: I have to say, this feels a little surreal. You helped make carbon-14 tracing possible. That's in every biochem textbook I've opened.

Kamen: It didn't feel historic at the time. It felt like troubleshooting.

Me: That's actually comforting. In school, discoveries sound dramatic. Like someone wakes up with a brilliant idea and changes science. You're saying it was mostly trial and error?

Kamen: Mostly error. And patience.

Me: I can relate to that. Most of my work feels like staring at something until it finally makes sense. When you were producing carbon-14, did you know it would matter this much?

Kamen: No. We just needed a tracer with a longer half-life. The implications came later.

Me: I like that. It makes science feel less mythical and more human.

Kamen: It is very human.

Me: Can I ask something harder?

Kamen: Go ahead.

Me: When you were labeled a security risk and pushed out... what did that actually feel like? Watching the research continue without you.

Kamen: It felt unfair. And confusing. I hadn't done anything wrong.

Me: That's the part that gets me. You didn't sabotage anything. You just had the wrong associations at the wrong time.

Kamen: Fear was stronger than reason.

Me: I always thought science was this pure merit system. Your story makes that harder to believe.

Kamen: Science is done by people. People bring politics with them.

Me: That's sobering. I'm still early in my career and I already worry about recognition. About whether what I do will matter. I know that sounds small compared to what you went through.

Kamen: It doesn't sound small. It sounds honest.

Me: I guess I'm afraid of putting in the work and disappearing anyway.

Kamen: Most of us disappear. The work remains.

Me: That's strangely reassuring.

Kamen: If you need applause to continue, you'll be disappointed. If you need understanding, you'll be sustained.

Me: So curiosity has to be enough?

Kamen: Yes. Curiosity and integrity.

Me: I think that's what I'm still figuring out. Whether I'm chasing impact or approval.

Kamen: That is a useful distinction to make early.

Me: You know, your story isn't clean. It's not genius, prize, celebration. It's complicated. Messy. I think I respect that more.

Kamen: History prefers simple narratives. Life does not.

Martin Kamen: A Dinner at Bernstein's

Me: Martin! It's so good to see you! Thanks for making the trip!

Kamen: Maximo! A pleasure, truly. Is that beef stew I'm smelling?

Me: It is! Fresh off the stove. Listen, Martin, I've been reading about you for my class, and I have to ask you about one evening in your life. A dinner at Bernstein's Fish Grotto in San Francisco. You had introduced the Russian vice consul to Ernest Lawrence's brother, a physician, so he could help a Soviet official dying of leukemia. A kindness, really. And then a thank-you meal at a fish restaurant, and the FBI was watching from across the room. That dinner ended your career at Berkeley. How do you sit with it now?

Kamen: Ah, Maximo. You have gone right to the wound. I will tell you the truth. I made the introduction because a man was sick. Kheifetz was a diplomat, and he was going home, and he wanted to thank me. We ate fish. We talked about music, I think, because I was a violinist and he knew Isaac Stern. That is the whole of it. And for that, I was put on a master list of the unemployable. Linus Pauling could not get me a job. James Franck could not get me a job. I inspected welds at a shipyard in Richmond while Melvin Calvin took my carbon-14 and won a Nobel Prize with it.

Me: But here is what I want to press you on, Martin. You knew the times. You knew the FBI was everywhere, that a scientist with Russian contacts was going to draw attention. Was the dinner worth it?

Kamen: A fair blow, Maximo, and one I have given myself many times. I could have refused. I could have written a polite note and sent him home hungry. But I will tell you what I believed then, and what I believe now. If a scientist cannot have dinner with a man from another country without his government treating it as treason, then the government has gone mad, not the scientist. I was not going to live my life as if the House Un-American Activities Committee was sitting at my table. In the end, of course, it was.

Me: And J. Parnell Thomas, the chairman who grilled you, went to federal prison for fraud not long after. Does that give you any satisfaction?

Kamen: A little. I am human. But it does not give me back the years. It does not give me back the passport they held until 1955. It does not give me back the Nobel I might have had, or the second one Dr. Wayne likes to say I might have had. What it gives me is a small, quiet confirmation that the men who hunted me were not the ones whose judgment the century would trust.

Me: That's an honest answer, Martin. Would you care for some dessert?

Kamen: I'll pass, Maximo, the beef stew has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 11: Dinner Conversation with James Joule

Me: Hi Mr. Joule, thank you for meeting me for dinner! In class, we learned about your experiments on heat and mechanical work. How did you discover that heat is a form of energy?

Joule: I was interested in understanding whether heat was a substance, as many believed, or something else entirely. I designed experiments to see if mechanical work could produce heat. One of my most well-known experiments involved a paddle wheel placed in water. When weights fell, they turned the paddle and stirred the water.

Me: I see. And the temperature of water increased?

Joule: Yes. The motion of the paddles caused friction within the water, allowing me to measure the temperature change. I found that a specific amount of mechanical work always produced a proportional increase in heat. This suggested to me that heat was not a material fluid, but a form of energy.

Me: Wow. That must've challenged the caloric theory at the time?

Joule: It certainly did. The caloric theory proposed that heat was an invisible substance that flowed from one body to another. However, my results showed that heat could be generated continuously through work. If heat were a conserved substance, that would not have been possible.

Me: I see. In lecture, we also learned that you calculated a constant showing the relationship between mechanical work and heat. Tell me more.

Joule: I determined that a fixed amount of work was required to produce a given amount of heat. This constant became known as the mechanical equivalent of heat. In fact, it also demonstrated that work and heat are interchangeable forms of energy.

Me: It all truly is fascinating. Today, we express this idea in the First Law of Thermodynamics, which states that energy cannot be created or destroyed, only transformed. Does that reflect your findings?

Joule: Very much so. My experiments showed that energy remains conserved. Mechanical energy lost by the falling weights reappeared as thermal energy in the water, but nothing vanished, it merely changed form.

Me: Thank you for this conversation. You helped me understand the science behind heat and so much more.

The soup was too hot.

Not like normal hot. Like aggressively, scientifically, personally hot.

I set the spoon down. "Why is this attacking me."

"That," said James Prescott Joule, calmly stirring his own bowl, "is exactly the question."

"Most people just blow on it."

"And miss the point entirely," he replied.

He had been watching the soup since it was poured. Not eating it. Studying it. Like it was about to confess a secret if heated just right.

"You feel heat," he said, "but what you are really sensing is motion."

"It feels like pain."

"A form of information."

"That's not comforting."

He reached over and gently tapped the table.

"Imagine this," he said. "When things move, when they collide, when they rub against each other, something changes."

"Yeah. They get annoying."

"They warm," he corrected.

He grabbed a napkin and, without asking, took my glass and swirled the water inside it.

"Watch."

"I am watching you make a mess."

"Notice what happens if I keep moving it."

"You're going to spill it."

"Eventually," he admitted. "But before that."

He stopped and handed it to me.

The glass felt slightly warmer.

I frowned. "Wait."

He smiled like this was his favorite part.

"Motion," he said, "becomes heat."

"That seems fake."

"It is measurable."

"Of course you measured it."

"I insisted on it."

He leaned back, clearly pleased.

"There was a time when people thought heat was a substance. A fluid. Something that flowed like an invisible liquid."

"That sounds made up."

"It was widely accepted."

"And you just said no."

"I said, let us test it."

He started describing an experiment, but not like a lecture. More like someone remembering a particularly satisfying moment.

"I had paddles turning inside water," he said, moving his hands slowly like he was still there.

"Driven by falling weights."

"So like a tiny water workout."

"Yes," he said, amused. "As the paddles moved, the water warmed."

"From... being stirred?"

"From the work being done on it."

I blinked.

“So the motion turned into heat.”

“Exactly.”

He leaned forward now, more animated.

“I measured how much the temperature changed. Again and again. Carefully.”

“You sound like you didn’t trust anyone.”

“I trusted numbers.”

Fair.

I picked up my spoon again, a little more cautiously.

“So this soup is hot because... everything in it is moving around?”

“At a microscopic level, yes.”

“So if it moved less, it’d be colder.”

“Yes.”

I stared into the soup.

“So it’s basically tiny chaos.”

“Organized chaos,” he said.

I shook my head.

“You turned stirring water into a whole discovery.”

“I turned it into a relationship,” he corrected. “A constant link between work and heat.”

“That sounds important.”

“It is.”

He tapped the table again.

“Whenever you rub your hands together and they warm up... whenever an engine runs... whenever something slows down and heats up...”

He looked at me.

“That is the same principle.”

“So like friction is just... motion turning into heat.”

“Yes.”

“That’s actually kind of satisfying.”

I took a bite of the soup again.

Still hot.

Still slightly threatening.

“So basically,” I said, “I burned my tongue because of physics.”

He nodded.

“Quantifiably.”

He stood up to leave, adjusting his coat like a man who had quietly changed how people understood energy and wasn’t going to brag about it too much.

“Remember,” he said, “nothing is lost. It only changes form.”

“Like motion turning into heat.”

“Precisely.”

He paused at the door.

“And perhaps let your soup cool.”

“No promises.”

He left.

I stared at the bowl for a second, then blew on it anyway.

The chaos calmed just enough.

Still hot.

Still moving.

Just slightly more negotiable.

Ean Pope
Dinner conversation 11

Me: Professor Einstein, in my Light and Life class we were talking about the laws of nature and thermodynamics. The lecture said you once wrote that thermodynamics impressed you because of how universal it is.

Einstein: Yes. A good scientific theory is simple in its assumptions but powerful in how many things it explains.

Me: It applies almost everywhere in nature.

Einstein: Yes.

Me: In class we learned the First Law says energy can't be created or destroyed, it just changes form. And the Second Law says energy transformations tend to increase entropy, meaning some energy spreads out as heat.

Me: My question is this. If the laws of nature describe how energy changes form, does that mean the universe is basically just energy constantly transforming?

Einstein: In many ways, yes. Matter, heat, light, and motion are all connected through transformations of energy. The laws of nature help us see the unity behind what first appears to be many different processes.

Me: That actually makes photosynthesis make more sense to me. Plants are basically taking radiant energy from sunlight and converting it into chemical energy stored in sugars.

Einstein: Exactly. Life itself is part of the great chain of energy transformations in the universe.

Me: So when I look at a tree or a leaf, I'm basically looking at sunlight that got stored as energy.

Einstein: Yes, more extraordinary than it appears

Jasmine: In another life, what if you were born in America... who do you think you would've been surrounded by?

Einstein: Hmm... I imagine I would have found myself among quite a remarkable group. Perhaps exchanging ideas with J. Robert Oppenheimer, debating theory and its consequences... or working alongside someone like Richard Feynman, whose curiosity and playfulness with physics I would have admired.

And, for beyond physics, I would have encountered minds like Thomas Edison, someone driven by application, or the poor soul Nikola Tesla, who saw the world in visions and possibilities

Jasmine: Wait... but didn't Edison and Tesla clash pretty heavily? I thought that relationship didn't exactly end well.

Einstein: Yes... and if I am to take a side, I would stand with Nikola Tesla. Tesla was guided by vision. He imagined possibilities before the world was ready to accept them. That kind of thinking is rare... and often misunderstood.

Jasmine: That makes sense. But turning to your own work for a moment...when you were developing your ideas, did you know you were changing physics forever?

Einstein: No, no. It never feels like that from the inside. It feels more like confusion... followed by obsession. Like I said, "Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid."

Jasmine: THAT WAS ON MY 3RD GRADE ELEMENTARY SCHOOL WALL. You said that?

Einstein: You see, that idea is very much connected to my own work. When I was young, I was not considered an exceptional student in the traditional sense. I questioned too much... I resisted memorization... I preferred to think.

If you had judged me by how well I followed instructions or recited facts, you might have thought I was... meh.

Jasmine: What would you say is your proudest work?

Einstein: I would say general relativity. The typical $E = mc^2$, the thing teachers randomly put on their walls.

General relativity was... a struggle to say the least. Nearly ten years of thought, doubt, and revision.

It was my attempt to understand gravity not as a force, but as a property of space and time themselves. That mass bends the fabric of the universe and that motion follows that curvature.

Nomar: Something from this lecture that really stood out to me was learning about how carbon actually moves through plants during photosynthesis. I knew plants used carbon dioxide, but I never thought about how scientists figured out the exact path it takes.

Calvin: Understanding that pathway required many careful experiments. We used radioactive carbon to trace where the carbon atoms traveled during photosynthesis.

Nomar: That idea was really interesting to me. Instead of just guessing what might happen inside the plant, you could actually follow the carbon atoms step by step.

Calvin: Yes. By tracking radioactive carbon, we were able to determine the sequence of reactions that convert carbon dioxide into sugars.

Nomar: I thought it was surprising that such a complicated process happens constantly inside plants without us noticing. The cycle repeats over and over again to build carbohydrates.

Calvin: That repeating set of reactions became known as the Calvin Cycle. It explains how plants transform carbon dioxide into the organic molecules that sustain life.

Nomar: What I took away from this lecture is that plants are basically doing chemistry all the time. They are constantly turning simple molecules from the air into the energy and food that ecosystems depend on.

Calvin: Exactly. Understanding these biochemical cycles helps us understand how energy and matter move through the living world.

Ariel Vilensky

Lecture 11. Photosynthesis: Converting Radiant Energy into Chemical Energy – The Light-Independent Reactions

Me: Good evening, Mr. Thomas Jefferson. I wanted to ask you about one of your more famous quotes: “I hold it that a little rebellion now and then is a good thing.” What did you mean by that?

Thomas Jefferson: Good evening. What I meant is that occasional challenges to authority are essential to keep any government healthy. Just as storms renew the earth, a rebellion can refresh political life and prevent stagnation or corruption.

Me: That’s interesting. So, in your view, it’s less about chaos and more about accountability?

Thomas Jefferson: Precisely. It is not a call for anarchy, but a recognition that those in power need to be reminded that they serve the people. Without that, even the best systems can decay.

Me: Would you say there’s a balance, then, between stability and disruption? Too much rebellion could be destructive, I imagine.

Thomas Jefferson: Absolutely. A government must be generally stable, but it should also remain responsive. Small, controlled disruptions like ideas, protests, and debates act as corrective forces without undermining the entire structure.

Me: I see. Do you think this principle applies beyond politics, maybe in society more broadly?

Thomas Jefferson: Yes. Innovation, social progress, even personal growth rely on questioning the status quo. Challenges, when approached thoughtfully, keep systems - political or otherwise - adaptable and healthy.

Me: That's a powerful way to think about change. Thank you for sharing your perspective, Mr. Jefferson.

Thomas Jefferson: My pleasure. Always remember: the health of any institution depends on its willingness to listen, and occasionally, to be shaken awake.

Karen Zheng, kz374

Dinner Conversation with Albert Einstein

Me: Hi Albert, I was wondering what you mean when you say “a theory is the more impressive the greater the simplicity of its premises?”

Albert: When I speak of simplicity, I mean that the deepest truths often rest on very few basic principles. If a theory can explain many different phenomena from a small number of clear assumptions, it reveals something fundamental about nature. It shows unity beneath complexity.

Me: So simplicity isn’t about making things easy; it’s about uncovering what is essential?

Albert: Exactly. Nature may appear complicated, but often that complexity grows from simple roots. When we discover those roots, the world suddenly feels more coherent. A powerful idea removes the unnecessary and keeps only what must be there.

Me: Is that why your equations look so minimal?

Albert: The mathematics must reflect the logic of the universe. If you need too many arbitrary assumptions, perhaps you have not yet understood the problem currently.

Me: But how do you know when something is truly simple and not just oversimplified?

Albert: That is the delicate part. Simplicity alone is not virtue; it must be faithful to reality. An idea must survive contact with experience. If it does, and if, from a few quiet assumptions, it can illuminate many corners of the world.

Me: Do you think that applies beyond science and physics? To life, maybe?

Albert: I think so. In life, too, we often complicate what is simple. We add layers of ambition, fear, and comparison. There is elegance in the way the universe is structured, and there can be elegance in how one chooses to live. To seek what is essential and let go of what is superfluous, that is both scientific and human wisdom.

Me: So maybe the goal isn’t to have the most complicated life or the most complicated theory, but the most meaningful one?

Albert: Precisely. Simplicity is not the shrinking of reality, but the sharpening of vision. In physics and in life, it is the moment when confusion falls away, and what truly matters stands.

Dinner Conversation with Joseph Priestley

Me: Dr. Priestley, during our lecture, we talked about oxygens' relationship with candles, mice, plants, religion, politics and even mob violence.

Priestley: That's awesome, a simple jar, a candle, a mouse, and a sprig of mint can open a door to the structure of nature.

Me: The experiment with the candle interested me the most. You collected the gas from heated mercuric calx and found that a candle burned with a remarkably vigorous flame. Then a mouse lived much longer in that same air than it would have in common air.

Priestley: Yes, it was clearly a special kind of air that supported flame and life.

Me: That connection between flame and life is what I found so meaningful. A candle and a mouse seem completely different, but your experiments showed that both depend on the same kind of air, oxygen.

Priestley: Exactly, a candle burns, an animal breathes, and plants restore what flame and life consume. Nature isn't a collection of separate facts, but is rather a system.

Me: That's why the mint experiment stood out to me as well. You found that a sprig of mint could refresh the air so a candle could burn and a mouse could live. The lecture says we now know plants evolve oxygen, even though your experiments were hard to reproduce since you didn't get the chance to discover that light was required.

Priestley: Science often advances by partial truths. I saw that plants restored air, but I didn't see the full role of light. Someone else had to continue the conversation with nature.

Me: That phrase conversation with nature is interesting. Your own conversation got interrupted though. Your home, lab, and meeting house were burned down by a mob just because people disagreed with your views on church, king, and revolution.

Priestley: Yeah, the flame I studied in a jar was easier to control than the flame of politics.

Me:

Something from this lecture that really surprised me was how much science you can learn just by studying a candle. I always thought of a candle as something simple, but it turns out a lot is going on inside the flame.

Faraday:

That is exactly why I chose the candle for my lectures. It seems ordinary, but it contains many of the same scientific principles that explain much larger things in nature.

Me:

Yeah, the idea that the candle is basically turning chemical energy into light and heat was interesting to me. I never thought about how the wax has to melt, move up the wick, and then vaporize before it burns.

Faraday:

The flame itself depends on that process. The fuel must first become vapor before it can combine with oxygen in the air.

Me:

What I also found cool was how the flame isn't just one thing. The lecture showed that there are different regions in the flame where different reactions are happening.

Faraday:

Yes, the bright part of the flame is caused by tiny soot particles that become incandescent when they are heated. That is what gives the candle its yellow light.

Me:

That part really changed how I look at a candle. It's funny because we see candles all the time, but we usually don't think about the chemistry happening right in front of us.

Faraday:

Often, the most familiar objects are the best teachers, because they allow us to observe natural laws clearly.

Me:

I guess that's what I'm taking away from this lecture. Something that looks simply can show you a lot about how the world works if you pay attention.

Faraday:

Even a candle flame can open the door to understanding science.

Me:

Yeah, now I think I'll probably look at a candle differently. Instead of just seeing a flame, I'll probably start thinking about all the reactions and energy changes happening in it.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 12 Dinner Conversation

Conversation with Joseph Priestly

Ellie: Dr. Priestley, thanks for having dinner with me. It still blows my mind that you figured out oxygen.

Joseph Priestley: I appreciate that, Ellie, but I wouldn't say I "discovered oxygen" the way people mean it today. I called it dephlogisticated air.

Ellie: Right, because you were working with the phlogiston idea, even though we now know oxygen is its own thing.

Joseph Priestley: Exactly. My experiments with candles, mice, and plants showed that air plays a role in burning and in staying alive, but I didn't fully understand the mechanism behind it.

Ellie: The mouse and plant experiment is the one everyone remembers. You put a mouse in a sealed jar and it couldn't survive, but if a plant was there, the air became "good" again.

Joseph Priestley: Yes. I observed that plants could restore the air after it had been "spoiled." But I did not realize that light was required for that renewal. If I had focused on that detail, I might have uncovered more about what you now call photosynthesis.

Ellie: So you were right on the edge of the bigger explanation, but missed the key ingredient.

Joseph Priestley: That's a fair way to put it. At the time, I was most interested in gases themselves. I isolated carbon dioxide and studied several other kinds of "airs." Chemistry was changing quickly, and it felt like every experiment opened another door. However, my political and religious views were unpopular in England. I supported the American and French Revolutions, and that made me a target. People often respond to ideas with fear, especially when they think those ideas threaten the social order.

Ellie: Wow, that's disappointing. You also helped invent carbonated water, right?

Joseph Priestley: I did. I found a method for dissolving carbon dioxide into water. Later, others turned it into something commercial.

Ellie: That's really cool! You gave us oxygen and soda water.

Joseph Priestley: I suppose that is a funny combination. But it comes from the same habit: observe carefully, test ideas, and keep experimenting.

Ellie: I'll definitely remember that! Thank you again for having dinner with me.

Dinner with Benjamin Franklin

Me: Dr. Franklin, you began your life in your father's candle shop – cutting wicks, filling molds, breathing tallow smoke – and ended it as perhaps the most celebrated man in the world. There is something fitting about a man who started with candles going on to pull lightning from the sky. Did you ever think of those two things as connected?

Franklin: (chuckling warmly) More than connected, I think of them as the same enterprise. A candle converts the stored energy of fat into heat and light. Lightning is electricity discharged through the atmosphere. Both are transformations of energy from one form into another, and both, once understood, can be made to serve human purposes rather than merely threatening or comforting us. My father's shop taught me that fire is chemistry and not fire, and once you know that, you stop fearing it and start asking what else it can do.

Me: The candle turns out to be extraordinarily rich as a scientific object. The wax combusts, producing carbon dioxide and water – the same products that a living creature produces when it burns its food for energy. Faraday built six lectures around it. Is there anything that surprised you about how deep the chemistry of a candle goes?

Franklin: (leaning forward with genuine interest) What surprises me is not the depth but the connections. The beeswax candle begins with sunlight falling on flowers, which the bees visit for nectar. The nectar becomes honey in the hive, and from honey the bees produce wax. When we burn that wax, we are releasing, in a single flame, the stored energy of sunlight that a flower captured perhaps a year before. The candle is sunlight made slow. I did not know the mechanism in those terms when I was a boy pouring tallow, but I understood even then that there was a chain – sun, plant, animal, fire – and that pulling on one end of it pulled everything else.

Me: You encouraged Joseph Priestley to pursue his scientific interests alongside his theological ones, and Priestley went on to discover oxygen. You seem to have had a gift for recognizing what other people were capable of and pushing them toward it. Where did that come from?

Franklin: (simply) From having been pushed myself, I suppose. I had two years of schooling. Everything else I learned by reading, by experimenting, by talking to people who knew more than I did and not being too proud to ask questions. Priestley was a minister who thought his science was a hobby. I told him it was a vocation. When a man has the instinct for inquiry, it is a cruelty to let it go unused. Besides, (dryly) a man who discovers what air is made of seems to me to have done something more lastingly useful than most sermons.

Me: You also petitioned Congress to abolish slavery in 1790, shortly before your death. That took a different kind of courage than flying a kite in a thunderstorm. Was it connected in your mind to the same principles?

Franklin: (quietly, without self-congratulation) Liberty and light go together, as Jefferson said. You cannot hold the torch of freedom high for some men and keep others in darkness and call it consistent. I came to that conclusion slowly – too slowly, I confess. I held enslaved people myself for many years. The older I grew, the more I doubted my own earlier judgments, and the more I paid respect to those who had seen the truth before I did. At the Constitutional Convention I said as much, that a long life teaches a man above all to doubt himself. The petition to Congress was one of the last things I did. I wish it had been among the first.

Me: Michael Faraday ended his candle lectures by saying he hoped his listeners would be like candles, that they would shine as lights to those around them and make their deeds honorable. Is that how you think about it?

Franklin: (nodding slowly, looking at the flame between us) A candle does not choose who it illuminates. It simply burns, and the light goes where it goes. That seems to me the right ambition for a person – not to decide in advance who is worthy of the light, but to burn as clearly as you can and let it reach wherever it will. I did not always manage it. But it was always what I was aiming at.

Lecture 12 Dinner Conversation

Benjamin Franklin: candles are kinda underrated honestly people forget they literally changed how people lived at night

Joseph Priestley: and candles helped people understand science too, like combustion and air and oxygen, even if i called it dephlogisticated air back then

Antoine Lavoisier: yeah because you were close but not exactly right

Priestley: alright relax man you renamed everything after i already found it

Benjamin Franklin: this is why scientists argue like musicians fighting over samples

Michael Faraday: honestly though the candle is perfect for teaching science, one flame shows chemistry physics heat light all at once

Lavoisier: and respiration too, that was the important connection. food burns in the body the same way candles burn in air

Priestley: except slower and without visible flames

Faraday: still follows the same laws though, energy gets transformed not created from nowhere

Franklin: kinda crazy that people went from making tallow candles out of animal fat to understanding thermodynamics from them

Priestley: i still think my oxygen experiment was one of the best parts. the mouse surviving longer in oxygen was wild

Lavoisier: probably not ethical by today's standards though

Franklin: neither was half the stuff from the 1700s if we're being honest

Faraday: the thing i like is how ordinary objects can explain huge ideas. you dont need fancy machines sometimes just a candle and curiosity

Priestley: exactly, science wasn't separated into neat little categories back then either. chemistry philosophy politics religion it all mixed together

Franklin: and apparently revolutions too since everybody kept getting chased out of countries

Lavoisier: some of us literally lost our heads over politics

Faraday: okay maybe that's a sign to switch topics before dinner gets too dark

Jenny Huang
PLSCI 1130: Light and Life
Lecture 12

Benjamin Franklin

Jenny: Dr. Franklin, I heard you worked in your father's candle shop as a kid. Is that true?

Franklin: Very true. My father made soap and candles in Boston. I was one of many children, so labor was not optional. I worked all day, trimming wicks ... and dipping tallow.

Jenny: That's kind of amazing. Today in lecture, my professor was lighting candles on fire and doing experiments. I wish I could show you all the photos and videos I took.

Franklin: Ah yes...I loved performing those experiments myself in the shop when my father wasn't watching. Later in life, I switched from dipping candles to studying lightning...I suppose I have always had a relationship with flame.

Jenny: And you only had two years of formal education!

Franklin: Two years, yes. My schooling ended early, but my education did not. I read everything I could find. Books were my true tutors.

Jenny: That's reassuring. Sometimes it feels like education is all about credentials.

Franklin: Credentials are useful, but curiosity is indispensable. A mind set aflame with questions needs little supervision.

Jenny: That's kind of what today felt like. Professor Randy wasn't just explaining candles: he was experimenting. Sometimes it wouldn't work and we would all sigh in disappointment...and when the flames went up, everyone was wowed and leaned backwards. The room smelled like smoke...it made science feel alive.

Franklin: Excellent teaching, then!

Jenny: Yes! Do you think working in a candle shop shaped how you approached science?

Franklin: Undoubtedly. Growing up handling materials, I learned that nature is not abstract. It is tangible. You may test it with your own hands.

Jenny: I love that. Today felt like that...less like memorizing, like all my other classes, and more like discovering.

Franklin: Then you are being educated in the best sense. True learning is not passive. It is experimental.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Bro Joseph Priestley, what kinds of discoveries did you make in chemistry?

Joseph Priestley:

Well Mahidul you got the right thinking, I was interested in studying gases, and I discovered several important ones in addition to oxygen.

Me:

Wait, you discovered oxygen too?

Joseph Priestley:

Yes! Oxygen was one of my most famous discoveries, but I also identified gases such as nitric oxide, nitrogen dioxide, nitrous oxide, hydrogen chloride, carbon monoxide, ammonia, and sulfur dioxide.

Me:

That's actually a lot of different gases.

Joseph Priestley:

It really was. While I was doing that, scientists were still learning that air was made up of different substances instead of being just one single material.

Me:

How did you even study all those gases back then?

Joseph Priestley:

I did many experiments using chemical reactions to collect and observe the gases that were released.

Me:

Did where you lived help with your experiments too?

Joseph Priestley:

Yes, Mahidul your absolutely correct. I lived near a brewery, so I became interested in studying the carbon dioxide gas that was produced during the brewing process.

Me:

So the brewery accidentally helped your science research?

Joseph Priestley:

Exactly! Everyday observations often inspired scientific discoveries and experiments.

Me:

That's honestly really cool to think about.

Joseph Priestley:

Science can be found almost everywhere if people stay curious enough to investigate it.

Me:

Thanks for telling me all of this!

Joseph Priestley:

No problem, Mahidul. Keep learning about science!

Benito Jaramillo

PLSCI 1130

March 16, 2026

Conversation with Martin D. Kamen

Benito: Dr. Kamen, thank you for joining me for dinner tonight, I have lasagna ready for us. In my Light and Life class we have been studying photosynthesis and I know your discovery of Carbon-14 was huge for understanding how plants capture light and turn it into energy.

Martin D. Kamen: Thank you for having me Benito, lasagna sounds great. Yes, discovering Carbon-14 with Sam Ruben in 1940 was one of those moments where you realize you have found something that is going to open a lot of doors.

Benito: Can you explain what Carbon-14 actually is and why it mattered so much for photosynthesis research?

Martin D. Kamen: Carbon-14 is a radioactive isotope of carbon, which means we can track it. We introduced it into carbon dioxide and let plants photosynthesize with it, and then we could follow exactly where that carbon went inside the plant. It let us see the steps of photosynthesis that were completely invisible before.

Benito: So it was basically using radioactivity as a kind of light to illuminate the process.

Martin D. Kamen: I had never thought of it quite like that but yes, that is exactly right. It was Melvin Calvin who then used it to map out the full cycle, which is why it carries his name today.

Benito: Thank you Dr. Kamen, this made photosynthesis feel a lot more real to me. It is amazing what one discovery can unlock.

Martin D. Kamen: It really is. And the lasagna was excellent Benito, thank you for a great evening.

Lecture 12: Dinner Conversation with Joseph Priestley

Light and Life | Vansh Kakra | vk365

Vansh: I need to start by saying you discovered oxygen by accident ?

Priestley: Yes, it was not on my to-do list that morning.

Vansh: You were just heating stuff up and suddenly realized you'd found the air that makes candles burn brighter?

Priestley: More or less. I heated a substance and collected the gas it released. When I put a candle into it, the flame grew unusually strong. That is when I thought, "Well, this is interesting."

Vansh: That's such an understated reaction to discovering oxygen and then you put a mouse in it?

Priestley: The mouse seemed quite comfortable.

Vansh: That's how casually you confirmed something that literally keeps us alive.

Priestley: At the time, I called it "dephlogisticated air."

Vansh: Yeah, "oxygen" has better branding. What I love is that you also showed how plants restore air. Like, candles and animals mess it up, plants fix it.

Priestley: It hinted that nature balances itself in ways we barely notice.

Vansh: You were also a theologian, right? Did discovering oxygen mess with your religious views?

Priestley: Not at all.

Vansh: That's interesting. Today people act like science and belief are in constant argument.

Priestley: Much of that argument is about tone, not truth.

Vansh: You also got a lot of backlash in your life, didn't you?

Priestley: Yes. My ideas, scientific and political, were not always welcomed. My house and laboratory were even destroyed at one point.

Vansh: That's intense. You discover oxygen, and people burn down your house. I guess what amazes me is how something invisible, air, turned out to be so important once you looked closely.

Priestley: The invisible often matters most. We ignore it because we cannot see it.

Vansh: That's both inspiring and mildly stressful :)

Selina Ke

Dinner Conversation with Emily Dickinson

Selina: Emily, what do you mean in your poem when you say “The Poets light but Lamps Themselves go out.” Are you saying poets create meaning but do not control what happens to it?

Dickinson: Yes. The poet begins something, but cannot decide how long it will last or where it will travel.

Selina: So the poet is not the source of the light, just the one who helps release it.

Dickinson: Exactly. The light already exists. The poet gives it form so others can see it.

Selina: That helps explain the next lines about the wick and the vital light. The wick does not create the flame. It only allows the flame to appear.

Dickinson: And the flame matters more than the wick.

Selina: When you say “If vital Light Inhere as do the Suns,” it sounds like you are saying good poetry contains something lasting, something natural, like sunlight.

Dickinson: Something that does not depend on the poet staying present.

Selina: That connects to “Each Age a Lens.” You seem to be saying every generation reads poetry differently, based on its own needs and experiences.

Dickinson: Yes. No age receives the poem in the same way. Meaning spreads outward.

Selina: Like the word “Circumference” at the end. The poem does not move in a straight line. It expands.

Dickinson: And the poet cannot follow it everywhere.

Selina: So the poet going out is not a loss. It is part of how the poem continues to live.

Dickinson: It is necessary. If the poet stayed at the center, the poem would stop growing.

Selina: Then poetry is not about preserving the poet’s voice forever. It is about allowing the poem to change as it moves through time.

Dickinson: That is the risk and the reward.

Selina: My question, then, is this. If poetry only survives by being reinterpreted and separated from the poet, how do I accept that people may understand my work in ways I never intended?

Dickinson: By trusting that meaning which can travel farther than intention is the strongest kind.

Dinner Conversation with Benjamin Franklin

Me:

Mr. Franklin, I actually learned today that you worked in your father's candle shop when you were young. That surprised me. Did working there make you curious about how things work?

Franklin:

Very much so. The work itself was not pleasant, but watching how materials changed with heat and flame did spark my curiosity. I think those early observations helped shape how I approached science later.

Me:

That's funny because we were literally studying the chemistry of a candle. I never thought something so simple could connect to things like oxygen, combustion, and even metabolism in the body.

Franklin:

The simplest objects often reveal the deepest truths. A candle may seem ordinary, yet it involves physics, chemistry, and even philosophy about energy and transformation.

Me:

I guess that's something I'm still figuring out. I study data science now, but sometimes I wonder how the small things we analyze actually connect to bigger ideas.

Franklin:

Curiosity is the most reliable guide. Whether one studies electricity, chemistry, or numbers, the goal is the same: to observe carefully and ask better questions.

Me:

That actually makes me feel better. Sometimes it feels like I'm supposed to already know what path I'm on.

Franklin:

Even at my age I was still experimenting and learning. The path becomes clearer through exploration, not certainty.

Me:

Then I guess the real takeaway is to just keep asking questions... even about candles.

Franklin:

Especially about candles.

Joseph Priestley: Dephlogisticated Air and a House in Flames

Me: Joseph! It's so good to see you! Thanks for making the trip!

Priestley: Maximo! A pleasure, truly. Is that roast chicken I'm smelling?

Me: It is! Fresh out of the oven. Listen, Joseph, I've been reading about your work for my class, and I have to ask you about August 1, 1774. You focused sunlight with a burning lens onto a bit of mercuric calx, and out came a gas you called dephlogisticated air. A candle burned brighter in it. A mouse lived longer. You even breathed it yourself and wondered if it might become a fashionable article in luxury. And yet when Lavoisier sat across from you at dinner that October, he walked away with your gas and gave it a new name. Oxygen. How did that sit with you?

Priestley: Ah, Maximo. You have gone to the sore place, and I will not pretend it is not still tender. I told him at the table what I had seen. I showed him the mouse, in a manner of speaking. And he went home and wrote of combustion in a way I could not, because I still held onto the phlogiston, and he had the courage to let it go. He named the thing. I had only found it.

Me: But here is what I want to press you on, Joseph. You use the word courage, and I wonder if that is right. You were the discoverer. He was the systematizer. Isn't there something a little galling about a man taking your data at dinner and building his theory on top of it?

Priestley: A fair blow, Maximo. There are days I have felt it keenly. But I will tell you what I came to. Science is not a footrace with a single ribbon at the end. I lit the candle. He read by its light. And another man after him read by a better light still. If I had insisted the gas was mine and mine alone, I would have been a small man protecting a small corner. I preferred to be a minister who happened to have seen something useful, and to let the chemistry go where chemistry goes.

Me: And yet, Joseph, the world was not so generous to you. On July 14, 1791, a mob burned down your home, your laboratory, your meeting house. Not because of the chemistry, but because you argued for the American Revolution, the French Revolution, for educating women, against state religion. You ended up in Pennsylvania, near Franklin and Jefferson, an exile. Was the chemistry worth the cost?

Priestley: The chemistry did not cost me the house, Maximo. My conscience did. I could have kept quiet. I could have preached a tame sermon and written a tame pamphlet and died in England with my library intact. But I believed, and I still believe, that a mind freed by inquiry cannot be chained in the pew or the schoolroom. The mob that burned my laboratory understood that better than I did. They knew the gases and the sermons came from the same man. They were right to burn both, if they meant to burn either.

Me: That's a fierce way to hold it, Joseph. Would you care for some dessert?

Priestley: I'll pass, Maximo, the roast chicken has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 12: Dinner Conversation with Joseph Priestley

Me: Hi Mr. Priestley, thank you for meeting me for dinner! In class, we learned about your discovery of a gas you coined dephlogisticated air. How did you first discover it?

Priestley: I was studying the properties of different gases produced in chemical reactions. In one experiment, I heated mercuric oxide using a burning lens. When the compound decomposed, it released a gas that allowed a candle to burn more brightly than normal air.

Me: That must've been surprising to see!

Priestley: Indeed it was. I also found that a mouse placed in this gas lived longer than it would in ordinary air. These observations suggested that the gas supported both combustion and respiration particularly well.

Me: And today we know that gas as oxygen?

Priestley: That's the one. However, at the time I interpreted the results through the phlogiston theory. I believed the air was simply ordinary air without phlogiston. Later, my friend Antoine Lavoisier reinterpreted the results and named the gas oxygen.

Me: I also read that you performed experiments with plants and air. What did you observe?

Priestley: I noticed that air that had been used by a burning candle or by animal respiration could be restored by placing a plant in the same container. Over time, the plant seemed to improve the quality of the air again. It was incredibly fascinating.

Me: So your experiments helped show the relationship between plants and the air we breathe. What an amazing discovery.

Priestley: Exactly. Although I did not yet understand the role of light in the process, my experiments suggested that plants somehow renew the air. We now know that plants release oxygen during photosynthesis.

Me: In class we also learned that you were not only a scientist, but also a philosopher and a minister. Did your beliefs influence the way you approached science?

Priestley: Very much so. I believed strongly in rational inquiry and intellectual freedom. To understand nature, one must be willing to question authority and examine evidence independently.

Me: Do you believe your discoveries carry a broader lesson about science?

Priestley: I believe they remind us that curiosity and freedom of thought go hand in hand. Scientific progress depends not only on experimentation, but also on the courage to think independently.

Me: Thank you for this conversation. You've helped me understand that science is not just about discovering new knowledge, but also about defending the freedom to pursue it.

The lights went out.

Not flickered. Not dimmed. Just gone.

I stood there in the sudden dark, holding a fork mid-air. "That's not a great sign."

From across the room, a voice said, very calmly, "Or it is an excellent opportunity."

A small glow appeared near the window. Not a flame. Sharper than that. Controlled.

Benjamin Franklin stepped into view like he had planned this outage personally.

"You did not seem to be using the electricity efficiently," he added.

"I was eating."

"A noble use," he admitted.

He set a small device on the table. Metal rod, a bit of wire, something about it looked like it was one thunderstorm away from a bad idea.

"You ever notice," he said, sitting down, "how people only think about electricity when it stops working."

"Yeah. Like right now."

He nodded. "Very motivating."

I tried to see my plate.

"Do you have, I don't know, a normal light?"

"This is better," he said.

"For who."

"For understanding."

That was not the answer I wanted.

He tapped the metal rod lightly.

"In my time, we did not have your switches and wires everywhere," he said. "We had curiosity. And storms."

"That sounds less safe."

“It was more exciting.”

He leaned back, completely relaxed in a dark room like this was his natural habitat.

“People once thought lightning was... something separate. Mysterious. Untouchable.”

“It still feels untouchable.”

“Only until you ask the right question,” he replied.

I squinted at the device.

“Is that the kite thing.”

He smiled slightly.

“A simplified memory of it.”

“You flew a kite in a storm.”

“With a key.”

“In lightning.”

“Yes.”

I stared at him.

“That’s not curiosity. That’s commitment issues with survival.”

He laughed.

“Carefully done, it revealed something important.”

He picked up the device and adjusted it.

“A spark,” he said, “and a bolt of lightning are not so different.”

“That feels like a big claim.”

“It was,” he said. “So I tested it.”

The room lit for a split second as a tiny spark jumped.

I flinched.

He did not.

“See,” he said, pleased. “Same nature. Different scale.”

“That’s terrifying.”

“That is knowledge.”

I finally found my drink in the dark.

“So you basically proved lightning is electricity.”

“I demonstrated it behaves the same way,” he said. “Which is enough to begin control.”

“And then you invented... rods on roofs.”

“To guide it safely into the ground,” he said.

“So instead of houses getting hit, the energy just goes down the rod.”

“Yes.”

“That’s actually genius.”

He shrugged.

“Practical curiosity.”

We sat there for a bit, the occasional small spark lighting the space just enough to remind me I was eating dinner in what felt like a science experiment.

“You also did like... a million other things, right,” I said.

“Printing. Writing. Diplomacy.”

“Busy.”

“I disliked boredom.”

At some point I asked, “Weren’t you scared doing that storm experiment.”

He paused.

“Of course.”

“Then why do it.”

He looked at the small device in his hands.

“Because fear is often a sign that something is worth understanding.”

That one stuck.

The lights suddenly came back on.

Bright. Normal. Slightly disappointing.

Franklin glanced up.

“Convenient,” he said.

“Yeah. Welcome to modern life.”

He looked around at the outlets, the lamps, everything quietly powered.

“You have captured lightning,” he said.

“Basically.”

He nodded, impressed.

“Then use it wisely.”

He stood up, brushing off his coat.

“One must not waste electricity,” he added.

“I’ll try.”

“And do not fly kites in storms,” he said, almost as an afterthought.

“That feels like very late advice.”

He smiled.

“Experience arrives when it can.”

He left as casually as he arrived.

I looked around at the lights, the outlets, the completely normal room.

Then at the metal fork in my hand.

For a second, I imagined it sparking.

I put it down.

Some discoveries feel cooler when someone else made them first.

Ean Pope

Lecture 12 ‘

Me: Ben Franklin... I'm not gonna lie, this is wild. You've actually been my laptop wallpaper for a while now. The kite experiment, the whole curiosity thing, I always thought that was tough.

Franklin: I'm honored to hear that. Curiosity is one of the greatest tools a person can have.

Me: In my Light and Life class we started talking about candles and combustion, and your name came up. I didn't realize you actually worked in your father's candle shop when you were young.

Franklin: Yes, when I was a boy in Boston I helped my father make tallow candles. It was messy work, but it taught me a lot about how ordinary things produce light.

Me: That's crazy because the lecture showed how candles turn stored chemical energy and wax into light and heat when they burn. Basically life turning into light.

Franklin: Precisely. A candle is a simple object, but within it you can see the laws of nature at work.

Me: That actually changed how I see it.

Franklin : A candle isn't just something you light

Me: It's kind of like when the power goes out it's energy from living things being transformed into light right in front of you.

Franklin: And that is the beauty of science. The ordinary world becomes more extraordinary when you begin to understand it.

Jasmine: Do you think growing up poor helped you get to where you are?

Benjamin: It certainly shaped me, as I was not born into wealth or privilege. My education was brief, with only a couple of years in my belt, before I was put to work in my father's candle shop at the age of ten.

You children have it so good these days. What were you even doing at age 10?

Jasmine: Yeah, we truly have it so much better. Though, nowadays, learning feels a lot genuine as it did back then when people would be off their phones and exploring their environment.

Benjamin: This is true. Comfort can make one passive.

Working in the candle shop, from cutting wicks to pouring tallow, it was not glamorous work. In fact, I disliked it greatly. But it taught me discipline. It made me want something different, a greater life than what my parents had.

Jasmine: If I were you, the candle shop would have taught me what I did not want, as much as it would have taught me about how to observe. Strangely, learning now is far beyond college or school in general. It is those books that Randy speed reads all the time, conversations you have with your peers and mentors, experiments that you should not be scared about failing at.

Benjamin: For me, I found my love in printing. It was the first time I truly felt at the center of ideas. As a printer, I was not just producing words, I was surrounded by them: politics, philosophy, science!!!

Specifically, printing gave me a voice, something people of no power did not have. And with that came responsibility. I began writing, debating, questioning. I was no longer just a bystander, observing a lot more excessively than others. I was participating.

Jasmine: This was your book writing era right!!! Essays, pamphlets, ANNNND Poor Richard's Almanack.

It was your way of sharing practical wisdom with everyday people. I love how you stayed grounded your whole life, not filling up the page with just grand theories, but lessons for living

Benjamin: And as for my guided experiments in electricity. In the least prideful way possible, my work with lightning led to the lightning rod. This simple invention protected homes, churches, entire communities.

Jasmine: I feel like if you were my grandpa, you would have had the craziest stories to share with me. I am so jealous.

Benjamin: You and my beautiful daughter Sarah would have been good friends. Very good friends. She was a leader in relief work during the American Revolutionary War

Jasmine: Indeed.

Thank

Nomar: One part of the lecture that stuck with me was when we talked about Joseph Priestley and how he studied air. I had heard his name before, but I didn't really know what he actually did until this lecture.

Priestley: My goal was to understand the different kinds of air and how they behaved in experiments.

Nomar: From the lecture slides, the experiment where you focused sunlight with a burning lens onto mercuric calx was really interesting to me. I remember thinking it was wild that something as simple as sunlight and a lens could produce a gas that people had never really understood before.

Priestley: The sunlight caused the mercuric calx to release a gas that we now know as oxygen.

Nomar: What surprised me was that even though you discovered the gas, you still thought of it as "dephlogisticated air." It made me realize how much scientific ideas depend on the theories people believe at the time.

Priestley: That is true. Scientists interpret observations through the framework of the theories available to them.

Nomar: I also remember the explanation in the lecture about how the chemical bond was broken by the energy from sunlight. That made the experiment make a lot more sense to me.

Priestley: Energy can drive chemical reactions that release substances which were previously bound together.

Nomar: One thing I kept thinking about during the lecture is how simple the experiment seems now, but it must have been a huge discovery at the time.

Priestley: Many important discoveries begin with simple observations carefully interpreted.

Nomar: For me the biggest takeaway from this lecture is realizing how much of chemistry and biology comes down to understanding gases and energy. Before this class I never would have connected something like a candle flame or sunlight with the chemistry of life.

Priestley: Understanding air and energy transformations helped lay the groundwork for modern chemistry and biology.

Nomar: After this lecture I started thinking about how often oxygen shows up in everyday life, from breathing to combustion. It made me realize that discoveries like yours changed how people understand the world around them.

Priestley: Scientific discoveries often reveal processes that were always present but previously unnoticed.

Ariel Vilensky

Lecture 12. Chemical History of a Candle: Converting Hydrocarbons into Light and Carbohydrates into ATP

Me: Good evening, Sir Michael Faraday. I've always been struck by your quote about comparing a person to a candle. Could you explain what you mean by that?

Michael Faraday: Good evening. When I speak of a candle, I think of its purpose: it gives light and warmth without seeking recognition. A person, like a candle, should contribute positively to others' lives.

Me: And you mention the "taper." Could you clarify what you mean by that?

Michael Faraday: The taper is the candle itself: the form, the structure, what one appears to be. It may be well-shaped or beautiful, but that alone is not enough. A candle must burn to justify its form.

Me: So the taper is more like a person's potential or outward character, not their actions?

Michael Faraday: Precisely. The beauty of the taper lies in what it promises, but it is only justified when it gives light. In the same way, a person's qualities or appearance must be proven through their deeds.

Me: So it's not enough to seem virtuous - you have to act in a way that actually benefits others?

Michael Faraday: Exactly. It is through honourable and effectual actions - those that truly accomplish good - that one proves their worth. Otherwise, the form is empty.

Me: That's a compelling metaphor. Would you say this applies to all areas of life, not just scientific work?

Michael Faraday: Indeed. It calls not for show, but for substance. A life is measured not by how it appears, but by what it does for others.

Me: Thank you, Sir Faraday. I'll remember good form must be supplemented by good deeds.

Michael Faraday: Just so. Let your actions give the light that proves your worth.

Karen Zheng, kz374

Dinner Conversation with Benjamin Franklin

Me: Hi Benjamin, I saw that you started working in your father's candle shop when you were really young. What was that like?

Benjamin: It was not very pleasant. It was hot, smelly work, and I spent much of my time cutting wicks and running errands. I did not know it then, but those small flames would later remind me how precious light truly is.

Me: Did you already feel drawn to learning back then?

Benjamin: Yes, books felt like windows. My school ended early, but my curiosity did not. Whenever I found a page to read, it felt as if a small candle had been lit inside my mind.

Me: That's lovely, it's like each idea is its own little flame.

Benjamin: Exactly, a single candle may not seem like much, but place it in darkness and suddenly the room changes. Knowledge works the same way. One thought leads to another, and before long, the mind begins to glow.

Me: So when you became a printer, you were lighting more candles, in a way.

Benjamin: That is how I like to think of it. Printing allowed ideas to travel from one mind to another, like sparks carried by the wind. When people read, question, and think for themselves, those sparks become brighter.

Me: It's amazing and motivating to think that your life started in a candle shop and grew into something much bigger.

Benjamin: Life often begins in humble places. But curiosity is a powerful flame. If you protect it and feed it, it will continue to burn.

Me: That's how I feel about taking classes here at Cornell. Each class opens up a new way of thinking that I hadn't considered before.

Benjamin: Exactly, the pursuit of knowledge is simply the act of tending that flame!

Dinner Conversation with J. Robert Mayer

Me: Dr. Mayer, when we talked about cellular respiration in lecture, we started with blood color, but I thought we were going straight into ATP, mitochondria, and glucose.

Mayer: Sometimes the largest principles begin with the smallest observations. I was a ship's physician, not sitting in a grand laboratory. I noticed that venous blood in the tropics looked unusually red.

Me: That detail really interested me. The lecture says you realized that in tropical climates, people don't need as much combustion to heat the body as they do in colder climates. So more oxygen stays in the blood, making venous blood redder.

Mayer: Exactly, the body doesn't separate from the laws of nature. It transforms energy when needed. In cold climates, more combustion is required to maintain warmth. In warm climates, less is needed for heat.

Me: That's what I found meaningful, the idea that the body is constantly converting energy, even when we aren't thinking about it. We eat food, breathe oxygen, and somehow our body turns that into heat, movement, and life.

Mayer: And not from nothing, that point came clear to me. Nothing comes from nothing, and nothing becomes nothing.

Me: The lecture connects that directly to the First Law of Thermodynamics. Every effect has a cause, and the effect is equal to the cause. That sounds simple, but it changes how you see almost everything.

Mayer: It should. Heat in the body, work by muscles, radiant energy, chemical energy, electrical energy, magnetic energy, all of these are not isolated miracles. They are transformations

Me: I like that because it makes life feel more mysterious and understandable. The lecture compares respiration to combustion, but then says there are limits to that analogy. A candle burns visibly, but intracellular combustion doesn't emit visible light.

Me:

Lavoisier, I think what surprised me most in this lecture wasn't just the science, it was the way you described respiration. Calling it a kind of combustion made it feel a lot less abstract.

Lavoisier:

Sometimes a comparison helps reveal what is otherwise hidden.

Me:

Yeah, because before this, I never really thought about breathing as something chemical. But the lecture made it sound like we're basically carrying around a controlled fire.

Lavoisier:

That is not far from the truth. The difference is that in living systems, the process is regulated rather than uncontrolled.

Me:

That part stuck with me. Like, a candle burns and wastes energy, but in cells, it happens step by step. It seemed a lot more efficient than I expected.

Lavoisier:

Nature rarely wastes what it can use.

Me:

I also noticed the lecture kept connecting your ideas to bigger ones, like the First Law of Thermodynamics how nothing comes from nothing. It made your work feel less isolated and more like part of a bigger pattern.

Lavoisier:

Scientific ideas often gain strength when they connect to broader principles.

Me:

What I'm taking away is that something as simple as breathing ties into a lot of different ideas, chemistry, physics, and even philosophy.

Lavoisier:

Understanding often comes from seeing connections rather than divisions.

Me:

Yeah, and it also made me realize that the way something is explained really matters. Like, thinking of respiration as combustion completely changed how I understood it.

Lavoisier:

A new way of describing something can sometimes be as important as the discovery itself.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 13 Dinner Conversation

Conversation with Wilbur Olin Atwater

Ellie: Dr. Atwater, thank you for meeting me for dinner. I wanted to talk to you more about your work!

Wilbur Olin Atwater: I'm glad to join you, Ellie. What are you interested in?

Ellie: The way you treated food like energy and the body like a system that follows thermodynamics really stuck with me. It made eating feel a lot more scientific than I expected.

Wilbur Olin Atwater: That is essentially the point. Your body takes in energy from food and spends it to keep you alive and active. If you bring in more energy than you use, your body saves the extra, usually as fat. If you bring in less than you need, your body has to draw on what it stored. The principle is straightforward, even if people don't always like the conclusion.

Ellie: So if I consistently eat more than I burn, I gain weight. And if I eat less than I burn, I lose weight.

Wilbur Olin Atwater: Exactly. And activity matters a great deal. In the past, daily life involved far more physical work, so people naturally used more energy. Modern life is more sedentary, but many eating habits did not shrink along with movement.

Ellie: That makes sense. How did you actually measure how much energy was in food?

Wilbur Olin Atwater: I used what is called a bomb calorimeter. You burn a food sample in a sealed container and measure the heat it produces. That heat corresponds to the energy content. Using methods like that, we estimated that a pound of foods like meat or bread can be around 1,000 calories, while a pound of fruits or vegetables is much lower, closer to 250 calories.

Ellie: Did your work change how people ate?

Wilbur Olin Atwater: In some ways, yes. It pushed nutrition toward measuring and comparing foods. But there was also a downside. Early nutrition focused so heavily on calories that many people assumed energy was the only thing that mattered. They overlooked vitamins, minerals, and overall balance.

Ellie: So someone could technically hit their calorie needs but still not be healthy.

Wilbur Olin Atwater: Precisely. A diet heavy in white bread, sugar, and meat might meet energy requirements, but it can still be lacking. Variety and moderation matter, not just totals.

Ellie: Wow that's so interesting. Thanks for meeting for dinner again! I learned so much!

Dinner with J. Robert Mayer

Me: Dr. Mayer, may I ask you something that has been bothering me all evening? You opened a vein in a sailor in Java. The blood was bright red where it should have been dark. Most physicians would have written it down, shrugged, and moved on to the next patient. You walked away with the conservation of energy. How does one go from a lancet to a law of the universe?

Mayer: (a small smile) You assume the leap was a leap. It was a stumble. I went to bed that night annoyed, I was sure I had cut an artery and ruined the bloodletting. By morning I was annoyed at myself for being annoyed, because the redness was real, and a real thing always has a reason.

Me: But the reason you found wasn't local. You could have stopped at "the tropics need less internal heat." Instead you said: nothing comes from nothing, and applied it to falling weights, magnets, lightning, the sun. Why didn't you stop?

Mayer: Because once you say the body's heat comes from the food it burns, you have committed to bookkeeping. And bookkeeping, my friend, is ruthless. If a calorie of food becomes a calorie of warmth, what becomes of the calorie when the sailor also hauls a rope? The heat cannot have been spent twice. So the work and the warmth must be the same coin in different pockets. And if work and heat are one currency, why should gravity not also pay in it? Why should the lightning?

Me: That's the part I want to push on. You had no equation for it yet – no Joule's apparatus, no paddle wheel. You had a Latin tag: *ex nihilo nihil fit*. Isn't that just metaphysics dressed as physics?

Mayer: (setting down his spoon) And what is wrong with that? The physicists of Munich said the same thing to me, in those words, and committed me to an asylum for saying it. But tell me – when Newton wrote that every action has an equal and opposite reaction, was that physics or metaphysics? It was a commitment. It was the refusal to let the books not balance. I made the same refusal, only larger.

Me: So the law was a kind of moral demand on the universe before it was a measurement?

Mayer: It was a demand on me. To not let myself off the hook. The redder blood was a debt I owed an explanation. And once I started paying, I found the debt extended everywhere.

Me: Then here is my question, the one I really came to ask. If your insight came from not dismissing a small thing, how does a person learn to know which small things to not dismiss? The world is full of red blood we ignore.

Mayer: (a long pause; he watches the candle) I do not think you can learn it. I think you can only refuse to unlearn it. Every child asks why the sky is blue and the blood is red. Most of us

are taught, gently, to stop. The trick is simply to be too stubborn, or too foolish, to stop. (He raises his glass.) To stubbornness, then. And to the next sailor whose blood embarrasses his physician.

Lecture 13 Dinner Conversation

Antoine Lavoisier: respiration really is just controlled combustion when you think about it

Richard Feynman: thats why i love science because one idea connects to like ten others immediately

J. Robert Mayer: i figured some of that out just from noticing blood color in different climates

Feynman: which is honestly insane levels of observation

Mayer: people in hotter climates had redder venous blood because less oxygen was being used to generate heat

Lavoisier: and from there came the first law of thermodynamics, energy changes form but doesnt disappear

Louis Pasteur: then we started understanding fermentation and respiration as living processes

Eduard Buchner: until i accidentally showed fermentation could happen outside living yeast cells

Pasteur: yeah thanks for ruining my theory

Buchner: accidents carry science sometimes

Feynman: literally half of discoveries are someone trying to do one thing and then something weird happens

Mayer: what interests me most is how efficient cells are. a candle just releases heat and light but cells store energy as ATP

Lavoisier: way more controlled too, all those tiny enzymatic steps instead of one giant combustion reaction

Feynman: and then ATP powers basically everything. movement nerves biosynthesis all of it

Pasteur: people also forget food isnt just fuel though

Feynman: yeah the wine speech proves that honestly. one glass connects chemistry biology geology history everything at once

Buchner: now youre sounding philosophical again

Feynman: science should feel philosophical sometimes

Mayer: i just think its funny that understanding oxygen and respiration also changed stuff like horse harnesses and labor productivity

Lavoisier: oxygen really runs the world if you think about it long enough

Jenny Huang
PLSCI 1130: Light and Life
Lecture 13

J. Robert Mayer

Jenny: Dr. Mayer, I've heard you made quite the discovery on your voyage. Something about blood?

Mayer: Ha! you make it sound romantic. It started as a simple observation. I was performing a blood-letting on a feverish passenger in Batavia, and the blood from the vein looked almost arterial. Bright red. I had to double-check that I hadn't accidentally struck an artery.

Jenny: But venous blood is supposed to be dark. That's the whole point...the oxygen is gone.

Mayer: Exactly what I thought! Back in Europe, venous blood is dark because the tissues have pulled the oxygen out to generate heat and keep the body warm. But here in the tropics...the body doesn't need nearly as much heat. The air does half the work for you. So the blood returns to the heart still carrying most of its oxygen, still bright red.

Jenny: So the redness of the blood was telling you something about how hard the body was working?

Mayer: Precisely. And that got me thinking: this combustion, this burning of fuel in the blood, it doesn't just make heat. When I row a boat or climb a rope, that effort must come from somewhere. The muscles consume fuel too. Work and heat – they are two forms of the same thing.

Jenny: That's a bold claim. Are you saying heat can become work and work can become heat?

Mayer: Not just can, they must. Nothing is created from nothing. If the body produces heat and motion, both must be drawn from the same source: the combustion of food and oxygen in the blood. You cannot get one without paying for the other.

Jenny: The conservation of energy.

Mayer: Call it what you like. I call it common sense, finally written in numbers. Though I must confess I still do not fully understand how heat itself tells the muscle to contract. That part remains a mystery to me.

Jenny: Perhaps that's a question for the next voyage.

Mayer: Or for a better physician than I. Cheers.

Jenny: Cheers, Dr. Mayer. To red blood and big ideas.

Mahidul Islam Dinner Conversation

PLBio 1130 2/17/26

Me:

Buddy boy Antoine Lavoisier, what did you discover about respiration?

Antoine Lavoisier:

Well Mahidul buddy boy, I was the first scientist to compare respiration to the chemical process of combustion.

Me:

So you're saying breathing is kinda like burning something?

Antoine Lavoisier:

Exactly little bro! Both respiration and combustion involve chemical reactions that release energy.

Me:

Wait, how does breathing release energy?

Antoine Lavoisier:

When humans breathe, oxygen reacts with substances inside the body to help produce energy, similar to how fire burns fuel.

Me:

That's actually really cool!

Antoine Lavoisier:

I thought so too Mahidul. It helped scientists understand that living organisms follow chemical laws just like other natural processes do as well.

Me:

Did people back then already think breathing and fire were connected?

Antoine Lavoisier:

In some ways yes. In 1789, I wrote that philosophers and poets from antiquity had already noticed similarities between respiration and fire.

Me:

So ancient people kinda guessed the idea before modern science?

Antoine Lavoisier:

Exactly! They did not fully understand the chemistry, but they recognized the connection between life, breath, and fire.

Me:

That's honestly cool how old ideas connected with science later.

Antoine Lavoisier:

Science usually builds upon observations and ideas from earlier generations.

Me:

Thanks for telling me all of this!

Antoine Lavoisier:

No worries Mahidul, keep being curious about chemistry and life!

Benito Jaramillo

PLSCI 1130

February 9, 2026

Conversation with Blaise Pascal

Benito: Monsieur Pascal, thank you for joining me for dinner tonight. I hope you are enjoying the beef stew. In my Light and Life class we have been talking about truth and what it really means, and I know that was something central to your work.

Blaise Pascal: Thank you for having me Benito, the stew is delicious. Yes, truth was something I could never stop thinking about. I believe reason alone cannot get us all the way there. The heart has its own way of knowing that reason does not always reach.

Benito: What do you mean by the heart? Is that not just emotion?

Blaise Pascal: Not exactly. I mean something closer to intuition, the part of us that grasps first principles before logic even begins. Without it we could not reason at all. Pride makes people think their logic is enough, but humility is what actually opens the door to truth.

Benito: That challenges something we talked about in class, the idea that light and certainty go hand in hand.

Blaise Pascal: Yes, certainty can be its own kind of blindness. Faith is not the opposite of reason, it completes it. Reason shows us where our answers run out. That is where faith steps in.

Benito: This has been a really helpful conversation. I came in thinking truth was straightforward but you have shown me it is much more layered than that.

Blaise Pascal: Well said Benito. And the stew was excellent, thank you for the meal.

Lecture 13: Dinner Conversation with Melvin Calvin

Light and Life | Vansh Kakra | vk365

Vansh: I feel like half of Cornell's biology students have a complicated relationship with you.

Melvin Calvin: That sounds concerning. What did I do?

Vansh: You created the Calvin cycle. Which means every time there's an exam, people stare at that diagram with arrows going in circles and quietly blame you.

Calvin: Ah, the cycle. I assure you, the plants started it. I only explained it.

Vansh: So the big mystery you were trying to solve was basically: plants take sunlight and carbon dioxide and somehow turn that into sugar?

Calvin: Exactly. People already knew sunlight powered the process, but the real question was what happened to the carbon dioxide afterwards.

Vansh: And your answer was a complicated series of steps that run in a loop. It's funny because we walk across campus every day, see trees everywhere, and never think about the insane amount of chemistry happening inside those leaves.

Calvin: That is the quiet beauty of nature.

Vansh: I feel slightly guilty now. I've eaten thousands of meals in my life and never once thanked a leaf.

Calvin: The leaves do not expect recognition. They are very disciplined workers.

Vansh: So when you and your team figured this out, did it feel like a big moment?

Calvin: It felt satisfying. We had spent years tracking carbon atoms through plants. Slowly the pattern emerged.

Vansh: And then you win the Nobel Prize in 1961 for figuring it out.

Calvin: Yes. It was an honor, of course.

Vansh: That's such a calm response to discovering how plants make the food that basically supports life on Earth. I guess the wild part is that every tree outside this window is running your cycle right now.

Calvin: Not my cycle. Their cycle. I simply gave it a name.

Vansh: Still, it's impressive. Most people leave behind papers. You left behind a process every plant on Earth uses.

Vansh: Honestly, I might start looking at salad with more respect now.

Calvin: The lettuce will appreciate that :))

Selina Ke

Dinner Conversation with Carlo Rovelli

Selina: Rovelli, I have been thinking about your ideas about time, and they honestly confuse me a little. My whole life I thought time moved the same way for everyone, like a universal clock. But you argue that time actually passes at different rates depending on where someone is and how fast they are moving.

Rovelli: Your confusion makes sense. Our everyday experience makes time feel uniform. But when we look carefully at the physics of gravity and motion, we see that time is not the same everywhere. The rate of time changes depending on the conditions of spacetime.

Selina: So time is not some fixed background that everything happens inside of. It is more like something that interacts with the physical world.

Rovelli: Exactly. Time is part of the structure of the universe itself. It is woven together with space, gravity, and motion.

Selina: Another thing that really surprised me is your claim that the fundamental equations of physics do not actually distinguish the past from the future. That feels completely opposite to how we live. I remember the past but not the future. Causes come before effects. Everything about life seems to move in one direction.

Rovelli: Our experience of time does move in one direction, but the deepest laws of physics are often symmetric. They do not inherently prefer one direction of time over the other.

Selina: Then why do we feel such a strong sense that time flows forward

Rovelli: Because of entropy. The universe tends to move from states that are more ordered to states that are less ordered. That change creates the arrow of time that we experience.

Selina: So the direction of time might not come from time itself but from the way matter behaves.

Rovelli: That is a good way to think about it. The arrow of time emerges from thermodynamics rather than from the fundamental equations.

Selina: The idea that challenged me the most was your argument that there is no universal present. I always imagine that the present moment is shared by everyone across the universe.

Rovelli: Relativity shows that simultaneity depends on the observer. Two events that appear to happen at the same time from one perspective may not appear simultaneously from another. Because of that, the universe does not have a single present moment.

Selina: That makes the present feel much smaller than I thought.

Rovelli: In a sense it is. What we call the present is only the set of events that we can interact with directly. It exists within a limited region around us.

Selina: So our strong intuition about the present is really based on a small bubble of experience rather than the structure of the entire universe.

Rovelli: Yes, our intuition works well within that local environment, but it does not describe the larger cosmos.

Selina: I think that is what fascinates me most. Science keeps showing us that the universe is very different from how it feels in everyday life. But it also makes me wonder something. If time is not universal and the present is only local, how should people think about their place in the universe? Does realizing this change how we should understand our lives, or is it simply a reminder that our perspective is limited?

Rovelli: Discoveries like these often do both. They challenge our assumptions, but they also deepen our sense of curiosity about the universe we live in.

Me: Professor Pasteur, I learned that you believed fermentation only happens with living organisms. That must have been a bold claim back then.

Pasteur: It was controversial. Many scientists believed fermentation was purely a chemical reaction, but my experiments kept pointing to the role of microorganisms.

Me: It's kind of funny because now we take that for granted. Bread, beer, yogurt, fermentation is everywhere. Though I came across Buchner's work from 1897, where he showed fermentation could happen without living cells at all, just cell-free yeast extracts. Doesn't that contradict you?

Pasteur: It is a fair challenge, and Buchner's experiments were important. He showed that the chemical agents inside cells, what we now call enzymes, could carry out fermentation independently. But I would call it a refinement rather than a refutation. I argued that life was necessary, and at the time, the living cell was the only known vehicle for that chemistry. Buchner showed the machinery could be extracted from it.

Me: So you laid the foundation and Buchner dug under it, and together you built something more solid?

Pasteur: Science accumulates, revises, and deepens. Neither of us had the complete picture. That is the nature of inquiry. Discovery rarely feels monumental while you are in the middle of it.

Me: That's reassuring. It reminds me of data, actually. Small patterns can explain big outcomes if you look closely enough.

Pasteur: Exactly. Science progresses when someone notices what others overlook. Curiosity is more important than certainty. The scientist who is too sure of what he will find rarely sees what is actually there.

Me: I like that. So basically, keep asking questions and maybe drink some fermented beverages along the way?

Pasteur: Within reason, of course.

Edward William Binney: Coal Balls, Crayons, and a Quest That Wouldn't Close

Me: Edward! It's so good to see you! Thanks for making the trip!

Binney: Maximo! A pleasure, truly. Is that cottage pie I'm smelling?

Me: It is! Fresh out of the oven. Listen, Edward, I've been reading about you for my class, and I have to tell you, my professor has a whole personal quest built around your name. He has been trying for years to find the link between you, Edward William Binney of Manchester, and the Binney who helped found Crayola crayons in 1885. He has not found it. Is there one?

Binney: Ah, Maximo. You have asked me the question I cannot answer, and I will not pretend otherwise. I died in 1881, four years before those American Binneys put a crayon to paper. If there is a cousin, a nephew, a thread of blood running from my Manchester to their Peekskill, I did not know of it in my lifetime. Your professor may be chasing a ghost. Or he may be right, and the ghost is mine. I would like to think so. It is a pleasant thing to imagine a child somewhere coloring a picture and holding a bit of me in her hand.

Me: But here is what I want to press you on, Edward. Even without the crayons, you had a life most men would envy. You co-founded E. W. Binney and Company in 1851 with James Young, the man who figured out how to distill paraffin from coal after seeing it drip from a mine roof. You wrote on the fossil plants of the Carboniferous. You described coal balls with Hooker in 1855. There is a sandstone in Manchester that carries your name. Why does the crayon chase matter when the geology is already yours?

Binney: A fair blow, Maximo, and a kind one. You are right that a man should be content with what he built. Paraffin lit the lamps of the poor. The coal balls opened a window on a forest three hundred million years gone. The sandstone, well, the sandstone will outlast me longer than my own bones. But I will tell you something. A scientist's name on a stone is a quiet thing. A name on a child's crayon is a loud thing. I am not above wanting to be loud, Maximo, even in death.

Me: One more thing, Edward. In 1844 you set up a private fund for what you called artisan mathematicians and botanists. Men like James Crowther the porter, Richard Buxton the shoemaker, amateurs who loved the work and had no means. You hosted them at an annual dinner. Why?

Binney: Because I had seen them, Maximo. A clergyman had tried to attach moral conditions to a public society for their support, and I would not have it. A man who botanizes on a Sunday after twelve hours in a warehouse does not need a sermon. He needs a meal and a microscope. I gave what I could. It was not charity. It was recognition. The work they did on their own time was as real as the work I did on mine. I only had more time.

Me: That's a generous way to hold it, Edward. Would you care for some dessert?

Binney: I'll pass, Maximo, the cottage pie has done me in. Thank you for having me, my friend.
Take care of yourself.

Lecture 13: Dinner Conversation with J. Robert Mayer

Me: Hi Mr. Mayer, thank you for meeting me for dinner! In class, we learned that you helped discover the principle that energy is conserved. Tell me more about your findings.

Mayer: I came across this idea while I was working as a ship's physician. During a journey to the tropics, I noticed that the blood drawn from sailors was a brighter shade of red than what was typically seen in colder climates.

Me: That must have been quite surprising. What did this mean?

Mayer: I began to think carefully about why this difference existed. In colder climates, the body must produce more heat to maintain its temperature, whereas in warmer climates less heat is required. Because of this, the body consumes less oxygen in tropical climates, leaving more oxygen in the blood and making it appear brighter red.

Me: And how did that observation help you connect metabolism with combustion?

Mayer: Well, I realized that the way our bodies produce heat is similar to combustion. The chemical energy stored in food can be converted into heat or into mechanical work within the body.

Me: Right! I assume this is what led you to the idea that energy is conserved?

Mayer: Exactly. I concluded that energy cannot be created from nothing. The Latin phrase "*ex nihilo nihil fit*" expresses this idea well. Nothing comes from nothing. The energy produced in any process must come from an equivalent amount of energy supplied to it.

Me: So energy can change form, but the total amount does not change?

Mayer: Precisely. For instance, chemical, radiant, and thermal energy are different forms of the same fundamental quantity. Energy can change from one form to another, but it cannot be created or destroyed.

Me: Do you think your discovery carries a broader lesson about science?

Mayer: I believe it shows that careful observation, no matter how small, can lead to powerful ideas. You must stay curious, because sometimes simple details can reveal a law that applies to many things.

Me: Thank you for this conversation. I will be sure to stay curious throughout my life!

The room felt wrong.

Not creepy. Not dangerous. Just... watched.

I stepped inside and the door shut behind me with a soft, very final click. The walls were thick, sealed tight, like the place had no interest in letting anything escape. Heat included.

From the corner, Wilbur Olin Atwater looked up from a notebook.

“Good,” he said. “You’re here.”

“Where exactly is here,” I asked.

“A calorimeter.”

“That does not help.”

He gestured around like this was completely normal.

“A room that measures energy.”

“It feels like a room that traps people.”

“Temporarily,” he added.

That did not help either.

There was a chair in the middle. A table. Nothing else. No windows, no breeze, just still air that felt like it had been measured before I even walked in.

“You can sit,” he said.

“I feel like that’s part of the experiment.”

“It is,” he replied.

At least he was honest.

I sat.

Nothing happened.

Which somehow made it worse.

“So what are we doing,” I asked.

“We are observing,” he said, already writing something down.

“Observing what.”

“You.”

I stood back up.

“Nope.”

He sighed, not annoyed, just patient.

“You eat food,” he said.

“Yes.”

“Your body uses it.”

“Also yes.”

“But how much,” he asked, looking up. “Exactly.”

I paused.

“...Enough?”

He shook his head gently.

“Not precise.”

He tapped the wall.

“This room can measure the heat your body gives off.”

I blinked.

“My body... gives off heat.”

“Constantly.”

“So I’m basically a space heater.”

“In a sense.”

I sat back down slowly.

“I don’t like being described like that.”

“It is accurate.”

He explained it like it was obvious.

“When you eat, your body transforms that food. Some becomes movement. Some becomes heat.”

“Like burning fuel.”

“Yes,” he said. “But controlled.”

“That’s kind of cool.”

“It is measurable,” he added, which for him clearly made it cooler.

He pointed at the walls again.

“Nothing escapes unnoticed here. Heat, gases, everything is tracked.”

“So you lock people in a box and watch them... exist.”

“Carefully,” he said.

“That’s intense.”

“It is necessary.”

I looked around again.

“So if I eat something in here...”

“We can determine how much energy it provides.”

“In calories.”

He nodded.

“Actual, physical energy.”

“So calories aren’t just numbers on a label.”

“They are measurements of heat,” he said.

“That’s... weirdly literal.”

He handed me a small snack.

“Go on.”

“This feels like a trap.”

“It is data.”

I ate it anyway.

He started writing again almost immediately.

“You breathe differently after eating,” he said. “You produce heat. You metabolize.”

“You’re watching all of that right now.”

“Yes.”

I leaned back.

“I have never felt so scientifically judged in my life.”

“It is not judgment,” he said. “It is quantification.”

“Feels like judgment.”

There was a quiet hum in the room. Subtle, but constant. Like the space itself was paying attention.

“So you figured out how food turns into energy in the body,” I said.

“I helped measure it,” he corrected.

“By putting people in a sealed room.”

“Yes.”

“Bold strategy.”

He didn’t react.

I thought about it for a second.

“So when I eat like... a lot,” I said, “that’s just more fuel.”

“Yes.”

“And if I don’t use it...”

“It is stored.”

I looked down.

“...That makes too much sense.”

He finally closed the notebook.

“Understanding energy changes how you live,” he said.

“Or how guilty you feel about snacks.”

He almost smiled.

“Awareness is the first step.”

The door opened again.

Fresh air rushed in like it had been waiting.

I stepped out immediately.

“That was the most intense room I’ve ever been in.”

“It is a very honest room,” he said.

“Too honest.”

As I walked away, I could still feel it.

Like the room had weighed something invisible.

Not just the food.

Me.

Calories suddenly felt less like numbers and more like tiny units of heat following me around.

Ean Pope

Lecture 13 dinner conversation

Me: Dr. Mayer, I read about how you discovered something huge just from observing people's blood during a sea voyage. That's honestly crazy to me. How did noticing the color of blood lead you to such a big idea?

Mayer: While I was working as a ship's physician in the tropics, I noticed that venous blood appeared unusually red. That observation made me think about how the body uses oxygen and heat. In warmer

Me: So from that one observation you started thinking about energy in the body?

Mayer: Yes. I realized that the body must convert chemical energy from food into heat and work. That led me to the idea that energy cannot simply appear or disappear. It only changes form.

Me: That sounds like what we learned in class as the First Law of Thermodynamics. Nothing comes from nothing, and energy is conserved.

Me: When you realized that the body works like a kind of combustion system, did that change how you thought about life?

Mayer: It helped show that the same physical laws apply everywhere. The energy that moves our muscles, the heat that warms our bodies, and the light and heat from fire are all connected through the same transformations of energy.

Me: That's actually kind of wild to think about. It means when I run on the football field, the energy in my muscles is basically coming from the chemical energy in the food I ate.

Mayer: Exactly. Life itself is powered by transformations of energy.

Jasmine: I really need to start learning German. There have been so many of you guys on these conversations talks. You guys have the best energy!

Robert von Mayer: Let me teach you a German saying: “Wer nicht fragt, bleibt dumm.”

Jasmine: huh??

Mayer: “He who does not ask remains ignorant.”

Jasmine: I love quotes.

Mayer: The quote is simple yes... but it is the foundation of discovery.

When I noticed the unusual color of blood in the tropics, I could have ignored it. Many would have. But I asked why.

Jasmine: And that led you to everything right???? Sorry for the excessive energy, my German friends are always so expressive.

Mayer: No it's great!

But as I was saying: Exactly. I realized that in warmer climates, the body requires less heat... and therefore uses less oxygen.

Jasmine: Is this the First Law of Thermodynamics birth place??

Mayer: Practically, yes.

Jasmine: Where does that energy go?

Mayer: And that is where another German idea comes in: “Von nichts kommt nichts.” — nothing comes from nothing.

Jasmine: So energy isn't just disappearing. IT IS TRANSFORMING.

Mayer: PROST to that.

Jasmine: To *cheers* energy cannot be created or destroyed — only converted from one form to another.

Mayer: Beer is my stomach fuel if you did not know. Nothing else I would rather drink on this beautiful transitional month of becoming spring

Nomar: Hi, I wanted to ask you something about what we talked about in lecture this week. In class we discussed your idea that respiration is similar to combustion. Before this lecture I honestly never thought about breathing as a chemical reaction, but the way it was explained made it seem like the body is basically carrying out a controlled form of combustion.

Antoine Lavoisier: That is exactly the comparison I was trying to make. In both respiration and combustion, oxygen reacts with a fuel and produces carbon dioxide and water. The key difference is that combustion happens rapidly in a flame, while respiration happens slowly and in a controlled way inside living organisms.

Nomar: That actually helped me understand the candle demonstration we talked about in lecture. Seeing how combustion works in different regions of the flame made it easier for me to imagine how energy transformations might happen inside cells. Instead of one big reaction, the body seems to break the process into smaller steps.

Antoine Lavoisier: Yes, living systems must regulate those reactions carefully. If all the energy stored in food were released at once like in a fire, it would be destructive. Instead, the body releases that energy gradually and uses it for work.

Nomar: That idea also made me think about how respiration connects to the laws of thermodynamics. In class we talked about how energy cannot come from nothing and must be transformed from one form to another. When we eat food, the chemical energy stored in those molecules is converted into other forms of energy that the body can use.

Antoine Lavoisier: Exactly. Respiration is a process of energy transformation. The chemical energy in food is converted into forms that power biological processes such as muscle movement, cellular activity, and heat production.

Nomar: Something else I found interesting from the lecture was how respiration and combustion produce the same basic products. I had always thought of them as totally different processes, but realizing that both produce carbon dioxide and water made the connection much clearer.

Antoine Lavoisier: Scientific understanding often comes from recognizing those kinds of similarities. By comparing different processes, we can see the underlying principles that govern them.

Nomar: After hearing that explanation in lecture, respiration makes a lot more sense to me. Instead of thinking of it as just breathing, I now see it as a chemical process that allows the body to convert energy from food into forms that sustain life.

Ariel Vilensky

Lecture 13. Cellular Respiration: Converting Carbohydrate into Chemical Energy without Emitting Visible Light

Me: Good evening, Dr. Stephen Jay Gould. I wanted to ask about your idea that if we “rewound life’s tape,” humans would likely never appear again. What do you mean by that?

Stephen Jay Gould: Good evening. Life’s history is contingent - it depends on countless accidents and small events. Evolution is not random in direction, but the specific outcomes we see, including humans, are highly improbable. If we started over, the same chain of events would almost certainly never repeat.

Me: So you’re saying that evolution makes sense after the fact, but isn’t predictable in advance?

Stephen Jay Gould: Exactly. Once events have unfolded, we can explain them, but there’s no “inevitability” in evolution. Humans exist because of a unique combination of biological, geological, and even climatic circumstances.

Me: You also mention that this perspective is “liberating and exhilarating.” Why do you find it so?

Stephen Jay Gould: Because it removes the burden of seeking inherent meaning in nature. If the universe has no preordained purpose, we are free to construct meaning ourselves, guided by wisdom and ethics, rather than waiting for it to be handed to us.

Me: That resonates. So in a way, understanding our evolutionary contingency encourages responsibility and creativity in how we live?

Stephen Jay Gould: Precisely. Life is what we make of it, built upon a fragile and remarkable chain of chance events. Recognizing that makes human action, culture, and ethics all the more significant.

Me: Thank you for your insights, Dr. Gould. It's a humbling and inspiring way to think about our place in the world.

Stephen Jay Gould: My pleasure. Always remember that our awareness of contingency is itself a gift.

Karen Zheng, kz374

Dinner Conversation with Richard Feynman

Me: Hi Richard, I was wondering what the quote “the whole universe is in a glass of wine” means to you. It sounds like an oversimplification, no?

Richard: People often imagine science as something that strips beauty away from the world, but to me, it is the opposite. When I look at that glass, I see the dance of atoms, the sunlight that once touched the grapes, the soil and rain that nourished them. To me, that quote means that the universe is hiding there, quietly swirling in my hand.

Me: I wonder if knowing all those details actually changes the way you experience something simple, like sharing a glass of wine?

Richard: It does, when you realize that the universe doesn’t feel distant. It feels more intimate and tangible.

Me: I think a lot of people, including myself, sometimes imagine science as something cold or detached.

Richard: I get that, but the real joy of science is curiosity. It’s the quiet thrill of noticing that the world is deeper than it first appears. When you watch the wine swirl in the glass, you’re seeing fluid dynamics. When you taste it, you’re experiencing chemistry.

Me: But does that way of thinking ever take away from the simple pleasure of the moment? Do you ever worry about analyzing things too much?

Richard: It depends on the person. To someone in a hurry, it’s just a drink. But if you slow down, it becomes a small universe.

Me: It sounds almost like the wine is alive with history.

Richard: That’s the quiet gift of curiosity. The more you learn about the world, the more you realize how much there is beneath the surface of even the simplest things.

Me: So maybe the point isn’t to analyze every detail, but to notice that the depth is there. Thanks, Richard!

Dinner conversation with E. Newton Harvey

Me: Dr. Harvey, I have to say, this lecture made me think about light differently. Before this, I mostly thought of light as something from the sun, a candle, or a lightbulb. But living organisms making their own light feels almost unreal.

Harvey: It can feel unreal the first time you learn about it. I became really fascinated by the blue light of *Cypridina hilgendorffii*, the sea firefly, while swimming at night near the Misaki Laboratory Biological Station.

Me: That part stood out to me. You were on your honeymoon in 1916, and instead of just enjoying the water, you became interested in these tiny organisms glowing blue in the ocean.

Harvey: Curiosity stole the holiday, the sea fireflies were too beautiful and too strange to ignore.

Me: What I found most interesting was that bioluminescence isn't just pretty. It has functions.

The lecture says *Cypridina* can emit clouds of blue light to escape predators, and some ostracods use species-specific light pulses during courtship.

Harvey: Yes, light can be a defense, a signal, a lure, or a language. In some organisms, it helps them survive. In others, it helps them find a mate.

Me: that makes me think of fireflies too. The lecture said that male fireflies flash in specific patterns and females respond with a single flash after a certain delay. It's almost like a conversation coming from light.

Harvey: A conversation but not always an innocent one.

Me: Yeah right, since the lecture also mentions the *Photuris* females that imitate the timing of another genus so they can lure in males and eat them.

Harvey: Nature is often more complicated than our first impression. The same light that attracts a mate can also attract danger.

Me: That's the issue that I think about. Whether bioluminescence is best understood as beauty, survival, communication, or all of those at once.

Me:

Darwin, I think what surprised me most in this lecture wasn't just the idea of bioluminescence, but how hard it is to explain.

Darwin:

Some natural phenomena resist simple explanation.

Me:

Yeah, because it seems straightforward at first, like organisms just evolved to glow, but then the lecture showed that different species use completely different systems to do it.

Darwin:

That does complicate the idea of a single origin.

Me:

That's what confused me. If they all glow, you'd expect it to come from one ancestor, but the lecture said the chemicals and enzymes aren't even the same across species.

Darwin:

In such cases, similar traits may arise independently.

Me:

I think that's what I'm trying to understand. It feels like the same outcome light but reached in different ways. That makes it harder to tell whether it's really one process or a bunch of separate ones.

Darwin:

Nature often works through gradual variation, but the pathways are not always obvious.

Me:

The lecture also mentioned that even you found things like this difficult to explain. That honestly made me feel better, because it's kind of frustrating trying to make sense of it.

Darwin:

Difficulty is often a sign that there is more to discover.

Me:

I guess what I'm taking away is that not everything fits neatly into one explanation. Like, natural selection might explain some cases, but not all of them perfectly.

Darwin:

A theory must be tested against its most challenging examples.

Dinner with Raphaël Dubois

Me: Monsieur Dubois, you demonstrated at the Paris Exposition that six flasks of bioluminescent bacteria could light a room well enough for visitors to read newspapers. No fire, no heat, no explosion. You called it a new method of illumination and suggested that nature's means were superior to ours. That was a bold claim in 1896. Do you stand by it?

Dubois: (gesturing at the flask between us) Look at what sits here. A candle converts perhaps one or two percent of the energy in its wax into visible light. The rest becomes heat – wasted, useless, sometimes dangerous. A bioluminescent organism converts chemical energy into light with an efficiency that no lamp of my era can approach, and it does so at the temperature of the living body. Cold light. Light without fire. When I made that claim at the Exposition, I was not being immodest. I was simply describing what I saw. The organisms had solved a problem that our engineers had not.

Me: You named your two components luciferin and luciferase – luciferin for the light-bearer, luciferase for the enzyme that activates it. Both names come ultimately from the Latin for light. Was that a deliberate poetic choice, or simply the obvious terminology?

Dubois: (with a slight smile) Both, perhaps. Luciferin is the molecule that carries the potential for light – the morning star, if you like, before it falls. Luciferase is the enzyme that completes the reaction, that releases what was stored. One is the fuel and the other is the engine. But I also chose those names because I wanted people to feel what they were encountering. Living light is not merely a chemical curiosity. It is one of the most ancient and widespread phenomena in nature – bacteria, fungi, jellyfish, fireflies, ostracodes, fish – organisms separated by hundreds of millions of years of evolution, all independently arriving at the same solution. That deserved a name with some weight to it.

Me: That brings me to what I find most striking. E. Newton Harvey later showed that the luciferin of one species will not work with the luciferase of another – that bioluminescence evolved independently many times, using different molecules each time, arriving at the same function by completely different chemical routes. What do you make of that?

Dubois: (leaning back thoughtfully) It is both humbling and extraordinary. When I discovered that bioluminescence required two components – a heat-stable luciferin and a heat-labile enzyme – I assumed I had found the mechanism. Harvey showed that there is not one mechanism but many, all producing the same result. The firefly's luciferin is nothing like the ostracode's. The bacterial system is different again. Nature, it seems, is not parsimonious about solutions, it will find the same answer by a dozen different paths if the answer is useful enough. This is either a tremendous waste or a tremendous richness, depending on how you look at it. I prefer to see it as richness.

Me: It also suggests that the production of light by living things is so useful – for defense, for communication, for attracting prey – that evolution has discovered it over and over independently. Like the eye.

Dubois: Precisely. And like the eye, bioluminescence raises a question that pure mechanism cannot fully answer: why is the light beautiful? The courtship display of the ostracode on a moonless night – the male releasing pulses of blue light in a species-specific pattern, the female responding – is functionally explicable. But when you watch it, you do not think about function. You think about beauty. I have spent my career explaining how the light is made. I confess I have never fully explained why it moves us as it does.

Me: (gesturing at the flask) Perhaps because it is proof that life has been making light since long before we thought to put it to use.

Dubois: (quietly, watching the glow) Yes. We arrived late to this particular fire. And we have still not matched it.

Lecture 14 Dinner Conversation

E. Newton Harvey: bioluminescence might be one of the coolest things evolution ever produced

William Beebe: seeing it deep underwater probably changed my brain chemistry permanently

Raphael Dubois: i was just happy figuring out luciferin and luciferase existed separately

Harvey: and then we realized every species basically had its own version

Beebe: meanwhile fish are glowing everywhere in the deep ocean like its some alien city

Dubois: humans have always been fascinated by living light though, even rotten wood and glowing fish impressed people centuries ago

Harvey: some people literally used glowing fish and fungi as light sources in mines and submarines

Beebe: imagine explaining to somebody that dead fish are now your flashlight

Harvey: honestly still more environmentally friendly than some modern stuff

Dubois: what amazes me is how efficient bioluminescence is. almost no energy wasted as heat

Beebe: unlike old incandescent bulbs basically cooking the room while barely lighting it

Harvey: LEDs are closer to the efficiency of nature honestly

Dubois: and bioluminescence isn't just for decoration either. predators prey courtship camouflage its all communication

Beebe: the hatchetfish using counter illumination to erase their silhouette is genius

Harvey: fireflies are even messier socially. some species literally fake mating signals to eat males from another species

Dubois: thats actually horrifying when you say it out loud

Beebe: nature is beautiful until it suddenly isn't

Harvey: the chemistry is beautiful too though, oxygen reactions turning chemical energy directly into visible light

Dubois: kind of the reverse image of photosynthesis in a weird way

Beebe: i still think the deep ocean wins for atmosphere though. thousands of invisible flashes everywhere around you in total darkness

Harvey: sounds peaceful until something glowing starts swimming toward you

Beebe: yeah fair point

Jenny Huang
PLSCI 1130: Light and Life
Lecture 13

Eilhard Wiedemann

Jenny: Have you ever been to a beach at night? I've always wanted to go and see the beautiful blue glow of those tiny bioluminescent creatures in the water.

Eilhard Wiedemann: Ah, what a magnificent phenomenon to witness! Those little organisms produce what I would call luminescence: light born not from heat, but from something far more elegant. Cold light, if you will.

Jenny: Cold light? My professor actually mentioned your name when explaining it! He said you coined the term back in the 1880s.

Eilhard Wiedemann: Indeed, in 1888. I felt it necessary to distinguish these glowing wonders from ordinary incandescence...like the hot light of the sun, a candle, or a gas lamp. Those glow because of heat. But luminescence? The firefly, the glowing sea – they produce light through chemistry alone. No flame required.

Jenny: So before you gave it a name, people just... didn't have a word for it?

Eilhard Wiedemann: Oh, people had noticed it for centuries. The ancient Greeks wrote about glowing fish. Sailors told stories of seas that lit up at night like scattered stars. But without a precise term, it was difficult to study seriously. A name gives a thing scientific weight, it invites inquiry.

Jenny: That makes so much sense. Like once you name something, you can actually start asking real questions about it.

Eilhard Wiedemann: And the questions that followed were remarkable. We found that luminescence wasn't just biological, it appeared in radioactivity, in certain minerals, even in the strange new rays that Röntgen had just discovered. X-rays, they came to call them. All of these produced light without heat. They all belonged under the same roof.

Jenny: Wait, so bioluminescence and X-rays are related in some way?

Eilhard Wiedemann: Not in their cause, no. Both produce cold light. A glowing jellyfish and an X-ray photograph have more in common than most people realize. Nature had many different mechanisms for producing light, and heat was just one of them. Not even the most interesting one, if you ask me.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

My man Eilhard Wiedemann, what does the word “luminescence” mean?

Eilhard Wiedemann:

Well Mahidul i know the answer buddy, I made the term “luminescence” in 1888 to describe forms of light that are produced without high temperatures.

Me:

So it’s basically light that is not hot?

Eilhard Wiedemann:

You’re absolutely brilliant Mahidul! Luminescence is often called cold light because it does not come mainly from heat like normal glowing objects do.

Me:

What kinds of things produce luminescence?

Eilhard Wiedemann:

Stuff such as x-rays, radioactivity, and other light effects that are not caused only by rising temperature can produce luminescence.

Me:

So how is that different from regular light sources?

Eilhard Wiedemann:

Regular light sources like the sun, candles, oil lamps, gas lamps, or electric lamps with carbon or tungsten filaments produce incandescent light, that is created through heat.

Me:

Oh, so incandescence is “hot light”?

Eilhard Wiedemann:

Uh huh Mahdul. Incandescence happens when an object becomes so hot that it starts glowing and producing visible light.

Me:

That actually makes a lot more sense now.

Eilhard Wiedemann:

Science often becomes easier to understand once we compare different processes side by side just like i just did.

Me:

Did scientists find luminescence important later on?

Eilhard Wiedemann:

Absolutely. Understanding luminescence helped scientists study radiation, chemistry, and many natural light-producing processes.

Me:

Thanks for telling me all of this!

Eilhard Wiedemann:

No problem, Mahidul. Keep exploring buddy!

Benito Jaramillo

PLSCI 1130

February 23, 2026

Conversation with T.H. Huxley

Benito: Mr. Huxley, thank you for coming over tonight, I hope you are enjoying the pasta. I wanted to talk to you about science and religion and how we come to know truth, which is something we touch on a lot in my Light and Life class.

T.H. Huxley: Thank you for having me Benito, the pasta is great. I am always happy to discuss that. I think science and religion conflict when religion tries to make claims about the natural world without evidence. That is why I came up with the word agnosticism. The honest position is to follow evidence and admit when it runs out.

Benito: In class we talk about light as both a scientific concept and a metaphor for knowledge. Does that kind of metaphor bother you?

T.H. Huxley: A little. Metaphors are useful but they can become a substitute for actually understanding the mechanism. I would rather know how light physically works. That said, if it helps people think about knowledge I can tolerate it.

Benito: You also cared a lot about education. What did you think it should do?

T.H. Huxley: Teach people to think clearly and be comfortable with uncertainty. A good scientist is someone who can say I do not know and then go find out. The person who thinks they already have the answers is the most dangerous kind of thinker.

Benito: This has been a really interesting conversation. You have helped me see why honesty about what we do not know is just as important as what we do.

T.H. Huxley: Well put Benito. And this pasta was excellent, thank you for a wonderful evening.

Lecture 14: Dinner Conversation with Raphaël Dubois

Light and Life | Vansh Kakra | vk365

Vansh: I have to start with this - you studied glowing animals.

Dubois: I was fascinated by organisms that produced their own light.

Vansh: Like fireflies?

Dubois: Yes, and also glowing marine animals. Many creatures in the ocean produce light naturally. I wanted to understand how that was possible.

Vansh: I always thought glow-in-the-dark animals were just magic nature tricks.

Dubois: It looks magical, but it is actually chemistry. Two components interact — what I called luciferin and luciferase. When they react together, light is produced.

Vansh: So you basically figured out the recipe for natural light.

Dubois: Yes, you could say so. .

Vansh: That's amazing. Humans build giant power plants and electrical grids just to get light and a tiny jellyfish is out there doing it quietly.

Dubois: Nature is often very efficient.

Vansh: I feel like if this happened today, someone would immediately try to turn it into a startup. "Organic lighting powered by shrimp."

Dubois: I suspect the shrimp might object :)

Vansh: Fair. But the idea that living things can produce light inside their bodies is still wild to me.

Dubois: It is useful for many animals - attracting mates, confusing predators, or communicating in the dark ocean.

Vansh: What made you even think to investigate this seriously? Most people would just say "cool glowing animal" and move on.

Dubois: The glow suggested there was a process behind it.

Vansh: That's kind of relatable. At Cornell I see people rushing everywhere - classes, meetings, internships. Nobody really stops to stare at something weird for long.

Dubois: Yet many discoveries begin with exactly that - someone pausing and asking why something unusual happens.

Vansh: That's a very calm way to look at it.

Selina Ke

Dinner Conversation with Jim Morin

Selina: Morin, I keep thinking about the ostracodes you described. The image of them releasing clouds of blue light when chased by a predator is beautiful, but also strategic.

Morin: It does seem dramatic, but for the ostracode it is simply survival. When predators pursue them, they release a burst of bioluminescent chemicals into the water. The glowing cloud distracts the predator and gives the ostracode a moment to escape.

Selina: So the light is almost like a decoy. The predator attacks the glowing cloud instead of the animal.

Morin: Exactly. The reaction occurs outside the body. The chemicals mix in seawater and create the light there. That is why we say their bioluminescence is extracellular.

Selina: What fascinated me even more was the courtship display. On moonless nights the males release pulses of blue light in patterns. It almost sounds like a language made of light.

Morin: That is a good way to think about it. Each species has its own pattern of pulses, almost like a signature. The females recognize those patterns and swim toward the male producing them.

Selina: So the light becomes communication rather than defense.

Morin: Yes. The same biochemical ability serves different purposes. One moment it confuses a predator, another moment it attracts a mate.

Selina: I find it incredible that these signals happen on moonless nights. It suggests that darkness is actually part of the system. Without darkness the message would not stand out.

Morin: Darkness is essential. In the natural environment the sea is dark enough that a brief flash of blue light is very visible. The male's display creates a trail of pulses that the female can follow.

Selina: That makes me think about the resorts built along tropical coastlines. The artificial lights must change that environment completely.

Morin: That is one of our concerns. Light pollution from coastal development brightens the water at night. If the background light becomes too strong, the pulses of the males may be harder for females to detect.

Selina: So something as simple as decorative lights on a shoreline could interfere with reproduction.

Morin: Potentially, yes. Many organisms evolved under predictable cycles of darkness and moonlight. Artificial light can disrupt those signals.

Selina: I think that is what strikes me the most. Humans often see lighting as harmless or even beautiful, especially at beach resorts. But for these tiny animals it could be the difference between successfully finding a mate and failing to reproduce.

Morin: Ecology often reminds us that our actions have consequences beyond what we notice. Even small environmental changes can affect communication systems that evolved over millions of years.

Selina: It also makes me appreciate how complex the ocean is. These ostracodes are tiny, but they are performing coordinated light displays that depend on chemistry, behavior, and the darkness of the night itself.

Morin: The ocean is full of such systems. Bioluminescence is one of the most widespread forms of communication and defense in marine life.

Selina: It makes me realize that protecting darkness can be just as important as protecting the ocean itself. Without that darkness, these incredible blue signals might disappear before most people even know they exist.

Me:

Okay so I have to ask. You're half a mile underwater in basically a metal ball. Were you scared?

Beebe:

Terrified, yes. But also completely absorbed. There was no room to dwell on the fear because there was too much to look at.

Me:

You wrote that the blue down there was impossible to describe. What made it so different?

Beebe:

Every blue I had ever seen was a surface thing. Light bouncing off something. Down there it was the water itself glowing. It came through the glass and just sat in the room with us. I turned on the searchlight to remind myself what a normal yellow light looked like, and the second I turned it off, it was like it had never existed.

Me:

That's kind of haunting. Did you feel alone down there?

Beebe:

The opposite, actually. Up above you're always aware of other people, other noise. Down there it was quiet in a way I'd never felt, but not lonely. Everything outside the window was alive and glowing and completely unbothered by us.

Me:

The lecture mentioned you estimated ninety-five percent of fish below 400 meters are bioluminescent. That number surprised me. It means the dark ocean is actually full of light, just not our kind.

Beebe:

That was one of the things that changed how I thought about the world. We assume light belongs to the surface. But most of the ocean is deep, and most of the life in it makes its own light. We're the ones in the dark, in a way.

Me:

Okay that's a good line. Did you ever want to go back?

Beebe:

Every day after. Nothing on land ever looked quite the same. Once you've seen a fish flash blue in absolute darkness at 1300 feet, a forest seems almost ordinary.

Me:

That tracks. I'd probably be ruined for normal life too.

Beebe:

You get used to it. You just start looking for the glow wherever you are.

Richard Owen: Homology, Dinosaurs, and a Statue That Came Down

Me: Richard! It's so good to see you! Thanks for making the trip!

Owen: Maximo! A pleasure, truly. Is that beef wellington I'm smelling?

Me: It is! Fresh out of the oven. Listen, Richard, I've been reading about you for my class, and I have to tell you, my professor is one of the few men alive who seems determined to rehabilitate your reputation. He calls your distinction between homology and analogy a cornerstone of all biology. The bat wing and the rat forearm, homologous. The butterfly wing and the bat wing, merely analogous. And yet in 2009, the Natural History Museum you built took your statue down and put Darwin's up in your place. How do you sit with that?

Owen: Ah, Maximo. You have gone to the sore spot, and I thank you for not tiptoeing around it. I will tell you the truth. The museum was my work. I lobbied for it, I fought for it, I laid the plan for it. And a century and a half later, the men in charge decided the building should belong to the man who had beaten me in the public mind. I cannot say it does not sting, even now. But I will say this. A statue is a piece of stone. The distinction between homology and analogy is a piece of thought. I would rather the thought outlived the stone, and it has.

Me: But here is what I want to press you on, Richard. History has not been kind to you, and some of that you earned. You were combative, you were proud, you made enemies where you did not need to. Huxley did not invent his dislike of you out of nothing. Isn't some of the erasure your own doing?

Owen: A fair blow, Maximo, and one I cannot dodge. I was not an easy man. I made Huxley into an enemy when I might have made him a colleague, and I paid for it the rest of my life, and past it. But the deeper fight was not about temperament. It was about whether evolution required a mind behind it. Darwin and Huxley said no. I said I did not know, and that a scientist who cannot say I do not know has stopped being a scientist. For that refusal I was painted as a reactionary and a fool. The painting has held up well. The man underneath, less so.

Me: And yet you coined the word dinosaur. That word alone has done more to bring children into science than almost any other. Does that ease the sting?

Owen: More than you would guess, Maximo. I named the terrible lizards in 1842, and I did not imagine a boy in New York or a girl in Tokyo would know that word before they knew my country's king. If my statue is gone and the dinosaurs remain, I have not done badly. The children do not care whose bronze sits in the hall. They care about the bones. I gave them the word for the bones. That is a decent legacy for a difficult man.

Me: That's a fair way to hold it, Richard. Would you care for some dessert?

Owen: I'll pass, Maximo, the beef wellington has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 14: Dinner Conversation with Raphaël Dubois

Me: Hi Dr. Dubois, thank you for meeting me for dinner! In class, we learned about your work on bioluminescence. How did you first begin studying the phenomenon of living light?

Dubois: Well, I was fascinated by organisms that could produce light naturally, such as certain marine animals. I conducted many experiments on bioluminescent species to understand how this light was produced.

Me: And what did your experiments reveal?

Dubois: I discovered that the production of bioluminescence required two separate components. The first was a heat-stable substance that I could extract using hot water. I called this substance luciferin, from the Latin word for “light bearer.” The second component was a heat-sensitive substance that I extracted with cold water. Because it was sensitive to heat, I recognized that it behaved like an enzyme. I called this enzyme luciferase.

Me: And both components were part of the reaction that produced light?

Dubois: Exactly! When luciferin and luciferase were combined in the presence of oxygen, they produced light even outside the organism. This demonstrated that the two substances were both necessary to generate bioluminescence in a test tube.

Me: That must have been incredibly exciting, seeing light produced in the laboratory.

Dubois: It was indeed remarkable. It showed that living organisms use chemical reactions to generate light. In this reaction, energy stored in luciferin is released as visible light.

Me: After this discovery, I learned that you also explored the practical uses of bioluminescence.

Dubois: I did. I believed that this could one day serve as an alternative to artificial lighting. In fact, I demonstrated that several flasks of bioluminescent bacteria could produce enough light for people to read in a room. Isn't that fascinating?

Me: Absolutely. Do you think biological light could ever replace traditional lighting in everyday life?

Dubois: While it may not replace all forms of lighting, it does show us that nature can produce light without producing significant heat, unlike flames or many artificial lamps. By studying these natural systems, I hope we will develop safer and more energy-efficient ways to produce light.

[PLSCI 1130] Candy Nalinthrangkurn, npn28

Me: Thank you for this conversation! You have helped me recognize that nature has developed remarkable biochemical processes that we are only beginning to understand.

There was a barrel in my garage.

Not a normal barrel. This one had screws, metal bands, and something that looked suspiciously like a hand crank sticking out of the side.

I stood there for a second. "I'm not opening that."

From behind me, a voice said, "You must."

I turned to see David Bushnell, already halfway inside like he had been waiting for this exact moment.

"You put that there," I said.

"I improved it," he corrected.

He knocked on the side of the thing like it was a loyal companion.

"This," he said, "is a vessel."

"This is a wooden problem."

"It is a submersible," he added.

"That is a barrel."

"It travels underwater."

"That is a drowning barrel."

He sighed.

"You lack vision."

He opened the top.

Inside was... worse.

Cramped. Dark. Levers everywhere. A seat that looked like it had never heard of comfort.

"You get in," he said.

"No."

“You must.”

“Absolutely not.”

He climbed in halfway and started turning a crank with surprising enthusiasm.

“Observe.”

“I am observing bad decisions.”

He ignored that.

“This design allows a single operator to move beneath the surface of the water.”

“With... arm power?”

“Yes.”

I stared.

“So you pedal your way through the ocean in a wooden egg.”

“Efficiently,” he added.

“That’s not the word I’d use.”

He tapped a small glass window.

“You can see outside.”

“That is the least of my concerns.”

“And control your depth.”

“With what.”

He pointed at a valve.

“Water enters. Water leaves.”

I blinked.

“So your plan for going up and down is just... letting water in.”

"In a controlled manner."

"That still sounds like sinking on purpose."

He finally climbed out and stood next to it proudly.

"You must understand," he said, "this was designed for stealth."

"Stealth what."

He lowered his voice slightly.

"Approaching enemy ships unnoticed."

I stepped back.

"Oh. This just escalated."

He pointed to the top.

"A timed mechanism."

"Why do I not like that phrase."

"To attach an explosive charge."

I rubbed my face.

"So you sneak under a ship... in this wooden capsule... and then what, just politely explode it."

"Strategically," he said.

"Of course. Strategically."

He looked slightly disappointed in me.

"You are focusing on the discomfort."

"Because it looks extremely uncomfortable."

"You are focusing on the danger."

"Because it looks extremely dangerous."

“You should focus on the innovation.”

I paused.

“...It is kind of insane.”

He nodded.

“Yes.”

I walked around it slowly.

“This actually worked?”

“It functioned,” he said carefully.

“That’s not a confident answer.”

“It was... a beginning.”

He tapped the side again.

“Imagine being beneath the water, unseen, moving quietly toward a massive ship.”

“I’m imagining panicking immediately.”

“Courage is required.”

“So is oxygen.”

He smiled slightly.

“That as well.”

I crouched down next to the hatch.

“How long could someone stay in there.”

“Long enough.”

“That is not a number.”

“It depends on discipline.”

"I would last thirty seconds."

"You would improve," he said.

I would not.

He stepped back, looking at it one more time.

"People laughed at the idea," he said. "A man underwater, navigating in secret."

"I get why."

"And yet," he continued, "it opened the door to something new."

I nodded slowly.

"Yeah. Submarines."

He didn't say the word. He didn't have to.

Before leaving, he placed a hand on the wooden shell like it was something alive.

"Progress often begins in cramped spaces," he said.

"I'm going to remember that in a less literal way."

He almost smiled.

He walked out, leaving me alone with the barrel.

The crank was still.

The hatch slightly open.

I stared at it for a long time.

Then I closed the garage door.

Some inventions feel important.

Some feel like they're waiting for you to climb in.

That one can keep waiting.

Ean Pope

Light and Life

Dinner Conversations

Me: Hello Dr. Dubois, I hope all is well.

Dubois: All is, and you are?

Me: I'm glad you asked Dr. Dubois, I'm Ean and I read that you figured out bioluminescence needs two separate parts to work. That honestly sounds ahead of your time. How did you even discover that?

Dubois: I experimented with glowing sea organisms and separated the substances involved. One part was heat-stable, which I called luciferin, and the other was heat-sensitive, an enzyme I called luciferase. When combined together with oxygen, they produced light.

Me: So basically living things can create light without producing a ton of heat like a candle or lightbulb?

Dubois: Exactly. It is "cold light," what we call bioluminescence.

Me: That's actually crazy because modern lights waste so much energy as heat. Nature was already doing it efficiently before humans figured anything out.

Dubois: Nature often solves problems elegantly.

Me: My question for you would be: did you think bioluminescence would ever become useful technology for humans, or did you just see it as something beautiful in nature?

Dubois: I believed it could inspire safer and more efficient lighting systems. In fact, I demonstrated rooms lit by bioluminescent bacteria at the Paris Exposition in 1900.

Me: That's hard. You were basically thinking futuristic before everybody else.

Jasmine: ANOTHER GERMAN??? You guys truly ruled the 19th century.

All of these German scientists have something in common I am realizing: they take something ordinary and completely redefine how we understand it.

Eilhard Wiedemann: Cold light for me! I introduced the term luminescence to distinguish these phenomena

Jasmine: Yes! I did a lot of background research on you. As a kid, I used to be obsessed with anything of luminescence nature aka glow sticks. Omg.

Wiedemann: Yes, so all light comes from something being hot. Light can come from different forms of energy being transformed: chemical reactions, electrical energy, mechanical forces. You name it!

Jasmine: Let me cook. Chemiluminescence... photoluminescence... fluorescence... phosphorescence... each is simply energy transforming into light in a different way.

Wiedemann: I have never of this term “let me cook”, but in context, yes you cooked...

Jasmine: That’s actually kind of crazy — it’s like Mayer’s idea, but applied to light.

Wiedemann: Very perceptive.

Energy does not disappear; it transforms. I just find light ever so truly elegant

Jasmine: For spring break, I am planning to go to Mosquito Bay in Vieques, Puerto Rico, which has bioluminescent water. But apparently you cannot see them during the full moon ugh.

Wiedemann: Get me tickets too! Hahahah.

The water you will see is just a chemical reaction. Tiny organisms in the water called dinoflagellates that convert chemical energy into light when they are disturbed. Once again, light can be from so many sources.

Jasmine: So when I move my hand through the water...

Wiedemann: You trigger the reaction. The motion causes energy to be released as visible light! A brief, beautiful flash! SEND PICTURES!!!

Jasmine: Wait so why can I not see the light in the full moon period?

Wiedemann: Ah, yes. The light is quite faint, which is what we call low-intensity luminescence. It is best seen in darkness, when your eyes are adapted to it. Under a bright full moon, the contrast just simply disappears... and so does the magic.

Jasmine: I guess we won't go then. DAMNIT I was looking forward to it so much.

Nomar: Something from this lecture really caught my attention. In class we talked about bioluminescence, and I remember the demonstration with the sea fireflies. I always thought animals that glow were kind of mysterious, but hearing the explanation made it feel much more like a chemical process.

Raphaël Dubois: That is correct. My experiments showed that bioluminescence is the result of a chemical reaction involving two components.

Nomar: What stood out to me was how you figured that out. From the lecture slides, it sounded like you separated the glowing material into two parts using hot water and cold water extractions. I remember thinking that was a really clever approach.

Raphaël Dubois: Yes. One component was heat-stable, which I called **luciferin**, and the other was heat-sensitive, which turned out to be an enzyme that I named **luciferase**.

Nomar: When the professor explained that those two substances could produce light when mixed together, it suddenly made the whole idea of “living light” feel less mysterious. Instead of magic, it is really just chemistry happening inside organisms.

Raphaël Dubois: Exactly. When luciferin reacts with oxygen in the presence of luciferase, the reaction releases energy in the form of light.

Nomar: Another part I thought was interesting from lecture was how some animals use bioluminescence for survival. The slides showed examples like deep-sea fish using glowing lures to attract prey or releasing glowing clouds to escape predators.

Raphaël Dubois: Bioluminescence has many ecological functions. It can help organisms communicate, defend themselves, or capture food.

Nomar: I think what surprised me the most is how efficient the reaction is. Most chemical reactions that produce light also create a lot of heat, but in living systems most of the energy goes directly into light.

Raphaël Dubois: That efficiency is one of the remarkable features of bioluminescent reactions.

Nomar: After this lecture I started thinking about how common light-producing reactions actually are in nature. Before, I mostly associated glowing organisms with fireflies, but now I realize it happens in many different species in the ocean.

Raphaël Dubois: Indeed. Bioluminescence is widespread in marine environments and plays an important role in many ecosystems.

Nomar: What I took away from the lecture is that something that looks mysterious at first often turns out to have a clear chemical explanation once scientists study it carefully. Learning about

your experiments made me realize how much discovery can come from simple but creative experiments.

Ariel Vilensky

Lecture 14. Luminescence and the Production of Light by Living Organisms

Me: Good evening, Dr. Maitland A. Edey. In your book *Blueprints*, you write, “You can't accept one part of science because it brings you good things like electricity and penicillin, and throw away another part because it brings some ideas you don't like about the origin of life.” But doesn't that make science sound monolithic? People can reasonably agree with the consensus in one area and disagree in another.

Maitland A. Edey: Good evening. That's a fair point, but the issue isn't agreeing or disagreeing. My concern is how people treat science inconsistently. Many treat controversial areas, such as the origin of life or issues related to gender, with less rigor or more emotional bias than other, “safer” topics.

Me: So the quote isn't claiming that all science is a single unified truth that must be accepted wholesale?

Maitland A. Edey: Exactly. Science is diverse, and skepticism is always legitimate. What matters is that every area is approached rationally and with the same level of critical thinking. The quote was criticizing selective rationality, not questioning the validity of disagreement itself.

Me: That makes sense. It's about consistency in method rather than in conclusions.

Maitland A. Edey: Precisely. Whether you're studying electricity, penicillin, or evolutionary biology, the standard of evidence and reasoning should be uniform. Emotional preferences should not lower the rigor applied to “sensitive” subjects.

Me: Thank you, Dr. Edey. That distinction really clarifies your point; it's about how we apply scientific reasoning, not what we accept.

Maitland A. Edey: My pleasure. Treat science consistently, and its insights will be most reliable, regardless of how controversial the topic seems.

Karen Zheng, kz374

Dinner Conversation with Raphaël Dubois

Me: Hi Raphaël, I recently read about your demonstration at the 1900 Paris International Exposition—the one where bioluminescent bacteria lit a room. It sounds almost unbelievable. Did it really produce enough light for visitors to read?

Dubois: It did indeed. Six flasks of luminous bacteria were enough for people to read their newspapers. The light was soft, bluish, and quite gentle on the eyes, nothing like the harsh glare of electric lamps.

Me: That must have felt extraordinary, showing people that living organisms could light a room. It must have seemed almost magical to people at the time.

Dubois: Many thought so. But to me, the wonder was not magic; it was life. Those tiny organisms were performing a delicate chemistry, releasing light without flame, without heat. I felt like standing inside a quiet secret of nature.

Me: So the light in that room was the result of countless microscopic reactions happening at once.

Dubois: Yes, if you looked closely at the flasks, the glow was not steady like a lamp. It trembled slightly, as though the light itself were breathing.

Me: Did you believe this kind of light could one day replace ordinary lamps?

Dubois: It was nice to imagine. A world illuminated not by burning fuel, but by quiet organisms glowing in glass vessels. Streets would be lit gently and full of life. Whether practical or not, the thought itself was beautiful.

Me: It's strange to think that tiny bacteria could illuminate a room.

Dubois: Nature often hides its wonders in the smallest places. Each small glow is the result of life carrying out its chemistry. Millions of microscopic beings, each contributing a faint spark.

Me: And what did you feel, watching them?

Dubois: A quiet satisfaction. Not because the experiment worked, but because for a moment people realized something simple: that the darkness of the world is never complete.

Dinner Conversation with Harry Allard

Me: Mr. Allard, during lecture today we talked about plants and learned that they seem so aware. Before the lecture, I thought that plants just grew when they had sunlight, water, and soil, but your work made it seem like plants are keeping track of time.

Allard: That's a fair way to think about it. Plants don't think like humans do but they sense their environment. Light isn't only energy for photosynthesis, but it also carries information.

Me: That was another interesting idea in the lecture. Sunlight can act as a substrate for photosynthesis, but it can also act like a signal that changes how a plant develops.

Allard: Exactly, a plant needs to react to its environment. If it grows in shade, it may elongate. If it receives the right day length or night length, it may flower. The environment gives the information that the plants respond to.

Me: The Maryland Mammoth tobacco experiment stood out to me. These plants grew huge in the summer, almost 15 feet tall but they wouldn't flower. Then in winter when they were shorter, they flowered.

Allard: Yeah, that was the puzzle. If size was the reason for flowering, then the tall summer plants should have flowered, but they didn't. The season still mattered.

Me: At first, temperature seemed like it would be the easy explanation, but you considered that day length could be the actual cause, so you built a dark chamber and later a dark house to control how much light the plants received.

Allard: We needed to separate the possible causes, if we change the light period while keeping the season the same, we could test whether the plant was responding to day length.

Me: And when the Maryland Mammoth tobacco plants were exposed to only seven hours of sunlight and then moved into darkness, they flowered by mid-August, but the control plants outside in the long summer days didn't flower.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 15 Dinner Conversation

Conversation with Harry Allard

Ellie: Hi Dr. Allard, thank you for meeting with me for dinner.

Harry Allard: I'm happy to, Ellie. What about my work would you like to talk about?

Ellie: In class we covered your research on photoperiodism, especially the Maryland Mammoth tobacco plant. I was surprised that it could refuse to flower all summer, but then reliably flower in the winter, and that the real reason was day length.

Harry Allard: Yes, that pattern was what caught our attention. For a long time, people tried to fix the problem in obvious ways. They changed soil, fertilizer, and growing conditions, but nothing worked. Then we noticed something strange. When the plants were moved into a greenhouse in the winter, they finally flowered. That pushed us to test whether the duration of light was the real factor.

Ellie: Wow that's so interesting. We also learned that exposing even a single leaf to the right day length could still cause the whole plant to flower.

Harry Allard: That experiment was important. It showed that the leaf is where the plant measures night length. The leaf detects the timing, then sends a signal to the growing tissues that tells the plant to begin flowering.

Ellie: That made plants seem a lot less passive to me. It's like they're tracking time.

Harry Allard: In a way, they are. Plants cannot move to find better conditions, so they have to be extremely sensitive to environmental cues, especially light.

Ellie: The lecture also mentioned a pigment that switches forms depending on light, and that it's central to how this works.

Harry Allard: You're thinking of phytochrome. It exists in two forms that can convert back and forth depending on the light. In short day plants, flowering happens only if the night is long enough for phytochrome to shift back to the form that absorbs red light. If you interrupt the night with a brief red light flash, you reset that process and prevent flowering. And if you follow the red flash with far red light, you can reverse the effect. That reversibility is one of the strongest clues that a light sensitive pigment is involved.

Ellie: That's so cool, because it means you can basically "trick" the plant by changing one small moment of light. Thank you so much again for meeting with me. I learned so much!

Harry Allard: Of course, my pleasure!

Dinner with Aldous Huxley

Me: Mr. Huxley, I've been thinking about something that seems more urgent now than ever – the way science abstracts the world in order to study it, and then quietly forgets that the abstraction is not the world. Do you think scientists themselves understand what they're leaving out?

Huxley: (leaning back, turning his wine glass slowly) Most of them don't, and the honest ones occasionally do – usually at three in the morning, when the equations won't come and the lab is dark. The scientific method is a magnificent instrument, you understand, but it is an instrument designed to play only certain notes. It cannot play sorrow. It cannot play the smell of rain. And yet we have persuaded ourselves – and this is the great sleight of hand of the modern age – that if it cannot be played, it does not exist.

Me: But isn't that precisely what makes science powerful? By stripping away everything unmeasurable, you can actually test what remains.

Huxley: Precisely! And I admire it enormously. I am not anti-science – good Lord, I was practically born into science, with grandfathers and brothers who could recite the periodic table at breakfast. What I resist is the imperialism of the method. When you select from the whole of experience only those things that can be weighed and numbered, you do not arrive at a true picture of reality. You arrive at a useful fragment of it. The tragedy is that this fragment is so dazzling, so productive of aeroplanes and penicillin, that we mistake it for the whole cathedral when we are only standing in the nave.

Me: So when you wrote *Brave New World*, were you warning against science itself, or against a society that had made science its only religion?

Huxley: (with a slight smile) The latter, emphatically. Soma is not chemistry, soma is certainty. The horror of the World State is not that it is technological. It is that it has abolished ambiguity. It has solved the problem of suffering by abolishing the capacity for depth. Everyone is happy the way a well-fed dog is happy. Stability purchased at the cost of everything that makes stability worth having.

Me: And you think we're drifting toward that?

Huxley: I think we've been drifting since at least 1850. The question I would put back to you is this – you, who exist at a moment when machines have genuinely begun to think, or to appear to think: have you noticed that the humans around you are becoming more comfortable with answers and less comfortable with questions? Because that is the tell-tale sign. The World State's first achievement was not the test-tube baby. It was the conditioned reflex that made uncertainty feel like a malfunction.

Me: That's unsettling. And yet – here we are, two minds at a table, asking questions we can't resolve. Doesn't that count for something?

Huxley: (raising his glass) It counts for everything. It is, in fact, the whole of it.

Lecture 15 Dinner Party

Tyler: This lecture switched from plant biology to existential philosophy so fast I got whiplash.

Aldous Huxley: Honestly that was my favorite part.

Charles Darwin: Of course it was.

Tyler: The whole argument about science not explaining every aspect of reality was actually interesting though.

Huxley: Because science intentionally simplifies reality into measurable things. That's why it's powerful, but also limited.

Tyler: Yeah like science can explain photoperiodism but not beauty or morality.

Jean-Paul Sartre: Or meaning.

Tyler: The good faith versus bad faith part felt super relevant honestly.

Sartre: People act in bad faith when they stop trying to persuade others with evidence and just intimidate disagreement.

Darwin: Which happens a lot once people think there's "no choice" except their own position.

Tyler: It was weird hearing all this during a lecture about plants though.

Huxley: The plant material connected to it more than you think.

Tyler: I did think the photoperiodism stuff was cool. Plants somehow keeping track of day length is crazy.

Darwin: And changing behavior based on it too. Flowering, stem growth, seed germination, all controlled by light exposure.

Tyler: The Maryland Mammoth tobacco plants were honestly hilarious.

Darwin: Giant plants that refused to flower unless the daylight conditions changed.

Tyler: Imagine spending years trying to solve the mystery of why your tobacco plants are twelve feet tall and useless.

Sartre: The dark house experiment sounded exhausting too.

Tyler: Moving plants in and out every single day just to control light exposure is commitment.

Huxley: But it proved something important. Plants aren't passive objects, they constantly sense and respond to their environment.

Tyler: Yeah phototropism, heliotropism, circadian rhythms, plants are honestly doing a lot more than I realized.

Darwin: Life in general is more active and adaptive than people assume.

Tyler: The consciousness discussion surprised me too. Plants being "conscious" in the sense that they respond to the environment.

Sartre: Not conscience, consciousness. There's a difference.

Tyler: Right, plants don't have morality but they still process information and react to it.

Huxley: Which kind of forces people to rethink what life actually is.

Tyler: Honestly this class makes everything sound deeper than I expected when I signed up for biology.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 15

Lawrence Bragg

Jenny: I heard you gave a really famous speech at the Royal Institution in 1950: Science and the Adventure of Living. What made you want to give a talk like that?

Lawrence Bragg: Honestly? I had watched so many young scientists burn out or lose their way, and I wanted to remind them and myself why we started. Science isn't just a career. It's a calling. And callings need to be spoken out loud every once in a while or people forget them.

Jenny: That's a beautiful way to put it. Do you ever have moments where even you lose that feeling?

Lawrence Bragg: Of course. Every researcher does. You spend months chasing something and hit wall after wall. The data doesn't cooperate, your hypothesis starts looking shaky, and you begin to wonder if you've wasted an enormous amount of time on a dead end. It's humbling in a way that's hard to describe to people outside the field.

Jenny: So what pulls you back?

Lawrence Bragg: Usually the problem itself. If it's a good problem, a real one, it has a way of not letting you go. And then something clicks. There's a moment where the answer arrives and it's so clean, so simple, that you almost laugh. You think, *how did I not see that before?*

Jenny: I had a small version of that last week actually. I'd been stuck on something for days and then it just... landed. I sat there staring at it for a full minute.

Lawrence Bragg: That's it exactly. That silence afterward...that's the real reward. Hold onto that feeling. It's what carries you through all the days when nothing lands at all.

Jenny: Were you always this passionate about it, even as a kid?

Lawrence Bragg: My father was a physicist, so I grew up with science at the dinner table. Experiments, questions, arguments about ideas. It was just the air we breathed at home. But passion in the deeper sense? That came the first time I realized the universe was under no obligation to make sense and yet somehow, it does. That never stopped being extraordinary to me.

Jenny: That's really inspiring Mr. Bragg.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Hey hey hey Lawrence Bragg, what did you mean when you said science is driven by faith?

Lawrence Bragg:

Well Mahidul, I believed that scientists are motivated by a deep faith that studying the universe can lead to understanding and discovery.

Me:

So you don't mean religious faith, right?

Lawrence Bragg:

Not exactly. I meant faith in the value of science and in humanity's ability to uncover the truths of nature.

Me:

Why do so many scientists dedicate their whole lives to research?

Lawrence Bragg:

Because science has a very big and powerful effect on people. Many young researchers become inspired by the excitement of discovering something new.

Me:

Is that why you said science makes people "scorn delights and live laborious days"?

Lawrence Bragg:

Mahidul yes you are right! Scientists often sacrifice comfort, lots of their time, and easier careers because they are passionate about learning and discovery.

Me:

So science becomes more than just a job?

Lawrence Bragg:

Yes, Mahidul. For many researchers, science becomes an adventure and a lifelong pursuit of knowledge.

Me:

Did you notice that passion in younger scientists too?

Lawrence Bragg:

Absolutely. I was always struck by how strongly science inspired new generations of researchers at the beginning of their careers.

Me:

That's actually really motivating to hear.

Lawrence Bragg:

Science gives people the opportunity to explore mysteries that no one has fully understood before.

Me:

Thanks for telling me all of this!

Lawrence Bragg:

No problem, Mahidul. Keep being curious and never stop learning!

Benito Jaramillo

PLSCI 1130

March 23, 2026

Conversation with John Wells

Benito: Professor Wells, I have to be honest, when my professor first mentioned you in class I thought the idea sounded almost too simple to be true. You figured out the length of a day hundreds of millions of years ago just by looking at corals?

John Wells: Ha, I get that reaction a lot. But yes, that is essentially it. Corals leave daily growth ridges as they deposit calcium carbonate, one ridge per day. Count the ridges in an annual ring and you know how many days were in that year. The math does the rest.

Benito: And ancient corals had more ridges per year, meaning shorter days back then.

John Wells: Exactly. Around 400 days per year in the Middle Devonian. The year itself had not changed much so the earth was simply spinning faster. It has been slowing down ever since because of tidal friction with the moon.

Benito: What I love about it is that you did not need some massive expensive experiment. Just a hand lens and patience.

John Wells: Science does not always need to be complicated. Sometimes you just have to look carefully at what is already there. I hope that is a lesson that sticks with you.

Benito: It really has. Oh and I made pasta tonight, hope that is okay.

John Wells: More than okay. Between the food and the conversation this has been a great evening Benito.

Lecture 15: Dinner Conversation with Charles Darwin

Light and Life | Vansh Kakra | vk365

Vansh: When people talk about you, they usually mention evolution and *On the Origin of Species*. But I recently learned you spent a lot of time watching plants move.

Darwin: Yes, plants became a bit of an obsession for me later in life.

Vansh: That's the phototropism work, right? Plants bending toward light?

Darwin: Exactly. My son Francis and I were curious about how plants "know" where the light is. When we observed young seedlings, we noticed they consistently bent toward the light source.

Vansh: So the plant is basically turning its body like someone chasing sunlight through a window.

Darwin: A good comparison. The question was which part of the plant actually senses the light.

Vansh: And your experiment was surprisingly simple, right? Cover different parts of the plant and see what happens.

Darwin: Yes. When we covered the tip of the plant shoot, the plant no longer bent toward the light. But when we covered the lower part and left the tip exposed, the bending still happened.

Vansh: So the tip is basically the "sensor."

Darwin: Precisely. The tip detects the light and then somehow sends a signal down the plant, telling the lower part how to grow.

Vansh: That's wild. Plants don't have brains, but they still detect information and react to it.

Darwin: Plants are far more responsive than most people think. In reality they are constantly adjusting themselves toward light. It simply happens slowly, so we fail to notice.

Vansh: What I like about this work is how simple the question is. "How does a plant know where the sun is?" But the answer opens up this whole idea that plants sense their environment.

Darwin: A bending plant can lead to deeper questions about how life detects and responds to the world.

Vansh: So even though you're famous for evolution, you were also showing that plants are way more active than we assume.

Darwin: Yes. Life is always interacting with its surroundings. Even a small seedling turning toward sunlight is responding to information.

Vansh: I guess next time I see a plant leaning toward the sun outside a Cornell building, I'll think, "That's Darwin's experiment happening in real time."

Darwin: Then the plant has done its job :)

Selina Ke
Dinner Conversation with George Washington Carver

Selina: Studying nature is the only true method for understanding the natural principles behind every branch of business. That surprised me a little. Most people today think of business as numbers, markets, and competition.

Carver: And yet every one of those things depends on nature. The soil produces crops. Crops become products. Products become trade. If the soil is exhausted, what happens to the business?

Selina: I suppose the business eventually collapses. There's nothing left to sell.

Carver: Exactly. That is why I encourage people to observe nature first. When farmers studied only profits, they planted the same crop again and again. But when they studied the soil itself, they learned that the land needs variety and care.

Selina: So when you studied peanuts and sweet potatoes, it wasn't just about finding new products. It was also about restoring the soil.

Carver: Yes. Crop rotation allowed farmers to replenish nutrients that cotton had drained from the land. But farmers were hesitant at first. They wondered what they would do with all these new crops.

Selina: Your experiments, you developed hundreds of uses for peanuts and other plants.

Carver: I simply followed curiosity. Nature always contains more possibilities than we expect. When people investigate it carefully, they begin to discover solutions that support business and livelihoods.

Selina: I like that idea of curiosity leading to innovation. In my world, people often talk about creativity as something separate from science. But you seem to say the opposite.

Carver: Investigation stimulates originality. When a student observes a plant closely, asks questions about it, and experiments with it, new ideas naturally emerge.

Selina: That reminds me of something I've been thinking about as a student interested in business and problem solving. Today many industries rely heavily on technology and data. Sometimes it feels like people forget the natural systems that everything ultimately depends on.

Carver: Technology is simply another tool for investigation. But tools should not replace observation. A person who understands the principles of nature will always be equipped to use any tool wisely.

Selina: So you would say that studying nature builds a kind of foundation for other fields.

Carver: Yes. Nature teaches patience, balance, and interdependence. These lessons apply not only to farming but to business, education, and life.

Me:

You named phytochrome before you could actually isolate it. That's kind of a wild move.

Hendricks:

The action spectra were too consistent to ignore. Red light inhibited flowering, far-red reversed it, and nothing in our pigment catalog explained it. Naming the pigment gave the search somewhere to land.

Me:

The Montreal story gets me though. You were checking the sample at every gas station and didn't realize opening the trunk was degrading it the whole time.

Hendricks:

It was a very expensive lesson in keeping things dark. But you learn more from a failed demonstration than a successful one. Everyone in that room knew exactly what we were looking for after that.

Me:

The economics book thing is what I really want to understand. You read about business cycles and connected it to how phytochrome switches between two forms?

Hendricks:

Tustin described systems that oscillate and self-correct through feedback. Phytochrome does the same thing. Pfr reverts slowly to Pr in the dark, light can interrupt it, and the whole cycle resets. Once you see that structure you can't unsee it. It shows up everywhere.

Me:

Is that something you were actively looking for or did it just click one day?

Hendricks:

You read widely enough and eventually something collides with something else. You can't manufacture it. You can only make yourself available to it.

Me:

That's a more honest answer than I expected.

Hendricks:

Most people want a method. There isn't one.

Wightman Garner and Harry Allard: The Clock in the Tobacco Leaf

Me: Wightman, Harry! It's so good to see you both! Thanks for making the trip!

Garner: Maximo! A pleasure, truly. Is that smoked brisket I'm smelling?

Me: It is! Fresh out of the smoker. Listen, gentlemen, I've been reading about your work for my class, and I have to ask you about the Maryland Mammoth. You were at the Arlington Experimental Farm, where the Pentagon sits now. You had this tobacco plant that would grow to the size of a small tree in summer and never flower, and then flower reliably every winter. Most men would have shrugged and changed crops. What made you keep asking?

Allard: Ah, Maximo. You have put your finger on the thing. The plant was telling us something, and it would not stop telling us. We tried more fertilizer. We tried bigger pots. We tried less water, more water, different soil. And the thing went on ignoring us until winter came, at which point it bloomed as if on a signal we could not hear.

Garner: And the signal, Maximo, turned out to be the simplest thing in the world. Not the heat. Not the sun's strength. The length of the day. We built a dark house in 1918 and 1919 and put the plants on trucks running on steel tracks, wheeling them in and out to give them seven hours of light and seventeen hours of dark. And they flowered. The ones we left outside did not. We coined a word for it. Photoperiod.

Me: But here is what I want to press you on. You built a dark house, you ran plants on rails in and out of it, you spent years proving what turned out to be a single variable. Wasn't there a simpler way? It feels almost absurd in retrospect.

Allard: A fair blow, Maximo. In retrospect, most good experiments look absurdly simple. At the time, light was thought to matter mostly by its intensity. No one was measuring hours. We had to build the dark house because no one had thought to withhold the afternoon from a plant before. You cannot prove a clock exists by staring at the plant. You have to stop the clock and see what happens.

Garner: And I will say this, Maximo. Once we had it in tobacco, we took it to soybeans, and it held. Short-day plants, long-day plants, the whole architecture opened up. Harry even speculated the birds were reading the same clock for their migrations. People laughed at that one.

Me: And yet the birds were doing exactly that, as it turned out. Harry, you went further in 1948 and wrote that day length could tell us something about climate change over geological time. That is a long way from a tobacco plant in Arlington.

Allard: It is, Maximo. But I never saw why a discovery should stop at the greenhouse door. If a leaf can read the length of a day, then the length of days is a force in the world, and forces in the

world leave their fingerprints on everything. The ice ages did not just make it cold. They made the days different. The plants would have known. I only tried to think the way they did.

Me: That's a generous way to hold it, Harry. Wightman, anything to add?

Garner: Only that a good experiment is a conversation with a stubborn plant. The Maryland Mammoth was the most stubborn conversationalist I ever met, and I am grateful to it.

Me: Well, gentlemen, would you care for some dessert?

Allard: We'll pass, Maximo, the brisket has done us in. Thank you for having us, my friend. Take care of yourself.

Lecture 15: Dinner Conversation with Charles Darwin

Me: Hi Mr. Darwin, thank you for making time for our dinner! In class, we learned about your experiments on how plants respond to light. What led you to explore this phenomenon?

Darwin: I had long been interested in how plants move and respond to their environment. One behavior that caught my attention was how young seedlings bend toward light, a response we now call phototropism.

Me: Right! I've definitely heard of phototropism. How did you begin studying this behavior?

Darwin: My son Francis and I conducted experiments with young grass seedlings. We exposed them to light from one direction and observed that the plants actually bend toward the light source.

Me: Fascinating. Did you discover which part of the plant senses the light?

Darwin: We sure did. We covered different parts of the seedlings to see how it affected their response. When the tip of the seedling was covered, the plant no longer bent toward the light. But, if only the lower part of the seedling was covered, the plant bent normally.

Me: Ah, so the tip of the plant was responsible for detecting light!

Darwin: Exactly. We concluded that the tip of the seedling senses the light and sends a signal to the lower part of the plant. This then causes it to bend towards the light.

Me: In class we also learned that only a small amount of light is needed to trigger this response?

Darwin: That is correct. In this case, light works as a catalyst, triggering the plant's internal mechanism that leads to bending. It does not provide energy for the movement itself.

Me: What did this discovery suggest about how plants respond to their environment?

Darwin: It suggested that plants have sophisticated ways of sensing and responding to their surroundings, even though they do not move in the same way animals do. It truly is amazing.

Me: Do you think studying plant responses to light taught you something important about nature?

Darwin: Absolutely. It reminded me that even the simplest organisms have remarkable abilities to interact with their environment. Careful observation can reveal these somewhat 'hidden' processes.

[PLSCI 1130] Candy Nalinthrangkurn, npn28

Me: Thank you for this conversation! You have helped me see that plants are far more responsive than they might appear to be.

The clock on my wall was wrong.

Not broken. Just... wrong.

I stared at it for a solid ten seconds. "It was 7:12 like a minute ago."

"Was it," said Albert Einstein, who was sitting at my table eating cereal like he'd always lived there.

"You didn't just move it, right?"

"I prefer not to interfere directly," he said, then casually nudged the clock.

It jumped forward two minutes.

"HEY."

He shrugged. "Time is flexible."

"That's not how clocks work."

"That's exactly how clocks work," he replied.

He looked exactly how you'd expect. Hair doing its own independent research project. Sweater that had seen things. Completely relaxed while reality itself started acting suspicious.

I sat down slowly.

"Okay. What did you do."

"I did nothing," he said. "You are noticing."

"That's worse."

He pointed at the clock.

"You think time is something that flows the same everywhere."

"Yes."

"It is not."

"No, it definitely is."

He tilted his head.

"If you move fast enough, your clock slows down."

"I move fast when I'm late."

"Not that kind of fast."

He grabbed a spoon and started sliding it across the table.

"Imagine you are traveling very quickly," he said.

"I am imagining missing my bus."

"Faster."

"Okay, like... really missing my bus."

He sighed.

"Close to the speed of light."

"Yeah I've never done that."

"Not yet," he said.

He tapped the spoon.

"For you, time feels normal."

"Good."

"For someone watching you, your time is slower."

I blinked.

"So I could be late... differently?"

"Yes."

"That's not helpful."

He leaned back, clearly enjoying this.

“You also think gravity just pulls things down.”

“It does.”

“It also bends time.”

I stared at him.

“That feels illegal.”

“It is measurable.”

He took my phone and held it up.

“If this were near something very massive,” he said, “time would pass more slowly.”

“Like what.”

“A planet. A star. A black hole.”

“So my phone would just... age slower?”

“Yes.”

I grabbed it back.

“You’re not putting my phone near a black hole.”

“A missed opportunity.”

I looked back at the clock.

“So that thing being weird right now...”

He smiled.

“Perspective.”

“No, that’s you.”

“Also true.”

He got up and wandered around like he was inspecting the universe and found my apartment slightly confusing.

“You live as though time is absolute,” he said.

“Because it is.”

“It is not.”

“Then why do I have a schedule.”

“For coordination,” he said. “Not truth.”

That was deeply unhelpful.

I crossed my arms.

“Explain it normally.”

He thought for a second.

“If you sit with a pretty person for an hour, it feels like a minute,” he said.

“Okay...”

“If you sit on a hot stove for a minute, it feels like an hour.”

“That’s... very different examples.”

“That is relativity,” he said.

“That is vibes.”

“It is both.”

I tried to process that.

“So time depends on... speed, gravity, and vibes.”

He considered it.

“A simplified but surprisingly effective summary.”

I nodded.

“I’m putting that on a T-shirt.”

He sat back down and went back to his cereal like bending reality was just a warm-up.

"Does this mess with you," I asked.

"No."

"Not even a little."

"I find it beautiful."

I looked at the clock again.

Now it was somehow behind where it started.

"Yeah, I find it stressful."

He stood up to leave, brushing off his sweater.

"Do not worry so much about time," he said.

"I literally have deadlines."

"Deadlines are agreements," he replied. "Not laws of the universe."

"Tell that to my professor."

"I would," he said, very seriously.

I believe him.

He walked to the door, then paused.

"One more thing."

"What."

"If you are late," he said, "you may simply claim you were moving at relativistic speeds."

"That will not work."

"You have not tested it."

He left.

The clock ticked normally again.

Completely normal. Completely trustworthy.

I stared at it for a second.

Then I checked my phone.

Just in case time decided to get creative again.

Ean Pope

Dinner Conversation

Light and Life

George Washington Carver

Me: Mr. Carver, most people only know you as “the peanut guy,” but after reading about you, it seems like you did way more than that.

Carver: I always believed nature could teach people more than they realized.

Me: That’s what stood out to me. You weren’t just doing experiments, you were painting plants, making dyes, and trying to solve real problems too.

Carver: Science and creativity should work together, not against each other.

Me: I actually agree with that a lot. I feel like people today separate creativity from science too much, when some of the best discoveries probably come from imagination first.

Carver: Curiosity is where discovery begins.

Me: My question for you would be: when people doubted you or underestimated your work, especially during that time period, what kept you motivated to keep creating and experimenting?

Carver: I focused on usefulness. If my work could help people, then it had value.

Me: I respect that mindset. Feels like you cared more about contributing something meaningful than getting recognition for it.

Carver: Recognition fades. Useful work lasts.

Jasmine: In the best way possible: FINALLY NOT ANOTHER GERMAN. I was convinced that the 19th century Germany was just one giant group chat of scientists.

You are so interesting, so wild. You had these MASSIVE tobacco plants, like 10 to 15 feet tall????, and they just refused to flower?? I have never even seen a tobacco plant, but hearing that sounds absurd. Am I wrong to think that??

Harry Allard: Yes, you are talking about my Maryland Mammoth tobacco plants. They grew vigorously, almost excessive in their growth, but they would not flower during the summer, no matter what we did.

Exactly. We changed pot sizes, soil conditions, nutrients... nothing worked.

But then something interesting happened in the winter.

Jasmine: So it was the time of year. Were these plants not common in America?

Allard: They were not typical, no. The Maryland Mammoth was a mutant variety... unusually vigorous, but unpredictable. I just wanted to take a chance. It could grow impressively in the field, yet it refused to complete its life cycle under normal summer conditions.

Jasmine: My dad loves gardening. Not tobacco but I am going to guess based off osmosis of his gardening knowledge that it had to do with the daylight??

Allard: Yes. And while temperature was an obvious suspect, we began to consider something more subtle: the length of daylight.

So we designed an experiment where we built a dark chamber and controlled the amount of light the plants received each day. We gave them curfews you could think of it as!

We exposed some plants to only about 7 hours of sunlight, then moved them into darkness.

Jasmine: Did the experiment work out? I am so invested in this. I am going to tell my dad all about it.

Allard: Those plants flowered! Even in the summer!! The ones left outside, exposed to long summer days did not

Jasmine: That's actually insane. Like they have their own internal calendar.

Allard: Yes. And we gave that phenomenon a name: photoperiodism AKA the response of organisms to the relative length of day and night!

Jasmine: I will remember that term for my fun facts around my friends. The more you know.

Thank you for coming by and talking to me today. You and my dad would be besties.

Nomar: Something from this lecture really stuck with me, especially how plants can actually “tell time.” I never thought of plants as doing much beyond growing, but photoperiodism made it feel like they’re way more aware of their environment than I assumed.

Wightman Garner: That’s a fair reaction. Plants are constantly sensing and responding to their surroundings.

Nomar: The Maryland Mammoth tobacco plant really confused me at first. No matter what you changed, it wouldn’t flower in the summer, but it would in the winter. That just didn’t make sense.

Wightman Garner: That’s what led us to realize that something less obvious, like light cycles, was controlling it.

Nomar: And it ended up being the length of darkness, not just daylight. That honestly changed how I think about cause and effect. It’s not always the most visible factor.

Wightman Garner: Exactly. The photoperiod determines when plants flower.

Nomar: I also liked how simple the experiment was, just moving plants in and out of a dark space. It made me realize that good science isn’t always complicated, it’s just intentional.

Wightman Garner: A simple idea, tested well, can reveal a lot.

Nomar: What surprised me most is how this connects beyond plants. The lecture mentioned things like animal migration and even seasonal affective disorder in humans, all tied to light cycles .

Wightman Garner: These biological patterns often extend across different forms of life.

Nomar: I think what I’m taking away is that there’s way more going on around me than I notice. Something as simple as light is constantly shaping behavior, and I never really paid attention to it before.

Nomar: It also made me realize that science isn’t just about answers, it’s about asking the right questions. Sometimes it starts with something small, like wondering why a plant doesn’t bloom.

Ariel Vilensky

Lecture 15. Using Light to Keep Track of Time and Determine Orientation in Space:

Photomorphogenesis in Plants

Me: Good evening, Bernard Lazare. I came across a line attributed to you suggesting that being a “believer in science” grants social acceptance among elites, while truly understanding science offers no such security. Could you explain what you meant by that?

Bernard Lazare: Good evening. What I meant is that society often rewards conformity more than understanding. To profess belief in science - especially in ways that align with dominant views - can grant one acceptance and status. But genuine understanding requires questioning, and that can place one outside comfortable circles.

Me: That’s interesting. So you’re drawing a distinction between accepting science as a kind of identity versus actually engaging with it critically?

Bernard Lazare: Precisely. The “believer” may adopt scientific conclusions as a badge of belonging, while the “understander” examines the reasoning, the limits, and the uncertainties. There was a time when scientific racism was the consensus, and those who questioned it took on much risk for the sake of truth.

Me: That’s a great point. However, so much goes on in life that you surely cannot expect people to critically examine every field to form their beliefs. Is it never okay to just listen to the scientific consensus and just trust the experts?

Bernard Lazare: To that I'd say that being an understander of course will be more difficult than being a believer. Thus, you should understand the issues and areas you truly care about to have an informed opinion. For the issues you don't care about, it would probably be wisest to cautiously accept the consensus of experts, with extra care for issues where powerful parties stand to gain from those conclusions.

Me: That's a powerful and nuanced take. I will do my best to be truly informed about the issues I care about and more cautious otherwise. Thank you for your insight.

Bernard Lazare: You're welcome. Understanding is much more difficult, but it is far more valuable for yourself and to society as a whole.

Karen Zheng, kz374

Dinner Conversation with Rabbi Alvin Fine

Me: Hi Rabbi Fine, I read your poem “Life is a Journey,” and the line that stayed with me was “Birth is a beginning and death is a destination. And life is a journey.” It made me think about how often we focus on specific goals instead of the path itself. What made you describe life this way?

Rabbi Fine: I believe people often think of life as a series of destinations: success, happiness, achievement. But life is more like a journey through different stages of growth. Each stage, whether joyful or difficult, teaches something necessary for the next step.

Me: So maybe the meaning of life is not something we arrive at, but something we slowly discover as we walk.

Rabbi Fine: Yes, meaning tends to reveal itself in the moments we least expect, such as in quiet conversations or in challenges that force us to rethink what we value or in the relationships that shape us. Often, we only recognize their importance when we pause and reflect on where we’ve been.

Me: I noticed in your poem how you move through so many changes: from innocence to awareness, from loneliness to love, from fear to faith. It almost feels like life is a series of quiet transformations.

Rabbi Fine: Exactly, growth rarely happens all at once. It happens in stages, sometimes slowly, sometimes through moments that change us more deeply than we anticipated.

Me: I like the idea that the journey itself is sacred. It makes ordinary experiences feel more meaningful, even the difficult ones. As a Cornell student, I feel like it’s easy to get caught up in thinking about the next step: getting the right internship, the right job, the next accomplishment. Sometimes it feels like everything is about reaching the next destination.

Rabbi Fine: That feeling is very common, especially in environments like Cornell. But if we only focus on the next milestone, we risk missing the deeper meaning of the experiences we’re living through right now.

Me: Thanks, Rabbi Fine. Now, even the uncertainty of not knowing exactly where I’ll end up after college feels like part of the process rather than something to fear!

Dinner Conversation with Michael Siffre

Me: Mr. Siffre, when we looked at your experiment in class it seemed both fascinating and terrifying. Living underground for 2 months without sunlight, clocks, or normal time cues seems like more than a scientific experiment. It sounds like a real test of the human spirit.

Siffre: It was honestly both, I wanted to study time. But time isn't only something measured by clocks but is also something experienced by the mind and organized by the body.

Me: That part is what stood out to me. The lecture said you wanted to investigate three kinds of time: perceived time created by the brain, biological time set up in the organism, and objective time measured by clocks.

Siffre: Exactly, when you remove sunrise, sunset, schedules, and clocks, you begin to see which parts of time are outside you and which parts are inside you.

Me: Before this lecture, I thought sleep was just because I was tired since I didn't get enough sleep, but the lecture shows that humans have an endogenous biological clock that is synchronized with the daily rotation of Earth. I noticed that even when I get my 8 hours, if I went to sleep at 2 AM I would still be tired.

Siffre: Exactly, the Earth turns, light and darkness change, and living organisms usually synchronize themselves to that cycle. But when those environmental cues disappear, the body doesn't simply stop keeping time.

Me: The lecture calls those cues zeitgebers, or time-givers. Usually, the daily light-dark transition synchronizes the biological clock with the twenty-four hour day.

Siffre: In the cave, I was cut off from that transition. So light changes the ordinary rhythm of the world. Without it, there are no cues for anything.

Me: The lecture says your biological clock continued to work without biological cues, but you broke down psychologically and became depressed. That's the issue that I want to bring up with you. Humans have the internal clock but we also seem to still need connection to the outside world.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 16 Dinner Conversation

Conversation with Erwin Bünning

Ellie: Hi Dr. Bünning, thank you for meeting me for dinner.

Erwin Bünning: I'm glad to be here, Ellie. What are you curious about?

Ellie: In class we've been learning about circadian rhythms, and your bean plant experiments really stood out to me. I thought it was so cool that the leaves kept rising and falling even when the plants were kept in complete darkness.

Erwin Bünning: Yes, that was one of the most important observations. When the movement continued without light, it showed the rhythm wasn't simply a reaction to the environment. It suggested the plant carried its own timing mechanism, an internal clock.

Ellie: And the rhythm stayed steady even when the temperature changed, right?

Erwin Bünning: Exactly. It remained consistent across different temperatures, which mattered a lot because it ruled out the idea that the pattern was driven by temperature cycles. The clock was stable, almost like a chronometer.

Ellie: So light isn't what makes the rhythm happen. Light just helps set it correctly.

Erwin Bünning: That's right. Light doesn't power the rhythm, but it helps synchronize it with the outside world. We call that entrainment. Light acts as a cue that adjusts the clock so it stays aligned with day and night.

Ellie: It seems like your work really changed how people thought about biological rhythms, from being caused by the environment to being generated inside the organism. And it sounds like your research ended up influencing work on animals and humans too.

Erwin Bünning: Yes, it did. But I have always been especially fond of plants. Their movements are subtle, but if you watch carefully, they reveal remarkable things about how life organizes time.

Ellie: Wow, that's really insightful. Thank you for taking the time to talk with me.

Erwin Bünning: You're very welcome, Ellie. I had a great time!

Dinner with Hipparchus

Me: Hipparchus, I have to ask you something that has bothered me for two thousand years, on behalf of everyone who came after you. You measured the distance from the earth to the sun using nothing but angles observed during a solar eclipse and the logic of triangles. How, in the name of everything, did you trust that the answer was real?

Hipparchus: (pausing, a piece of bread halfway to his mouth) You ask as though trust were the remarkable thing. But what else does a geometer have? The angle does not lie. The geometry does not flatter. If I set up my instrument correctly, if I observe carefully, and if I reason without error, then the number I arrive at is the distance. Not an opinion about the distance. The distance.

Me: But you couldn't check it. No one could sail there. No one could stretch a rope between here and the sun.

Hipparchus: And yet you cannot stretch a rope across your own mind, and still you trust what you think. (he looks up) The eclipse showed me that the moon's shadow, falling on two observers standing far apart, arrives at different angles. Those angles are small, embarrassingly small, but they are measurable. And once I have two angles and one known length, the distance between the observers, I have a triangle. And a triangle, my friend, conceals nothing. It gives up everything.

Me: The distance you calculated was off from what we now know to be true; by quite a lot, actually. Does that trouble you?

Hipparchus: (a long pause, then a slow smile) Does the carpenter whose apprentice later builds a finer table feel shamed? My error was in the measurement of the baseline, the separation between observers, not in the method. The method was sound. The method is what survived. Your people still use triangles to measure the distance to stars. They simply have a longer baseline now, the diameter of the earth's orbit. I gave them the idea. I am not ashamed of an imprecise instrument.

Me: That's an extraordinary equanimity. But here is what I really want to ask you: when you looked up at this sky, (gesturing at the blazing stars above), did it feel like a problem to be solved, or something else entirely?

Hipparchus: (setting down his cup, quietly) Both. Always both. In the morning it is a problem. I take my instruments, I measure the rising of stars, I note the precession – I discovered, you know, that the whole sky drifts, that the pole wanders – and I think: here is something to calculate. But at night, when the work is done and I simply look... it is not a problem. It is a gift I did nothing to deserve. The same stars that tell a sailor where he is, tell me that the cosmos has order. Not chaos. Order. And that order can be read by anyone patient enough to look.

Me: Do you think the cosmos has a purpose, or merely a pattern?

Hipparchus: (looking up for a long moment) I measure angles. Purpose is beyond my instruments. But I will say this – that something which has pattern on this scale, across distances that dwarf all human ambition, does not feel accidental. What it feels like is... a conversation. One that began long before us and will continue long after. We are just the part of it that learned to write things down.

Lecture 16 Dinner Party Conversation

Tyler: Honestly I still think it's wild that plants basically have sleep schedules.

Tyler: Like imagine discovering that a plant somehow knows when it's day or night even when it can't see the sun.

Jean-Jacques de Mairan: That's exactly why my experiments mattered.

Jean-Jacques de Mairan: I put Mimosa plants in darkness and the movements still continued.

Tyler: So the plants basically had an internal clock.

Erwin Bünning: Yes and many scientists resisted that idea for years.

Tyler: Honestly that sounds like people refusing to believe biology could be more complicated than they expected.

Franz Halberg: That happens constantly in science.

Tyler: The weirdest part to me was humans drifting away from a normal sleep schedule when isolated.

Franz Halberg: Which showed that the biological rhythm keeps running even without environmental cues.

Tyler: Modern college students are probably destroying their circadian rhythms every night.

Alexander the Great: Your generation sleeps less than soldiers during military campaigns.

Alexander the Great: One of my admirals noticed plants sleeping while we were traveling and people thought it was strange.

Jean-Jacques de Mairan: People thought the plants were only reacting to sunlight.

Jean-Jacques de Mairan: Then I put Mimosa plants in darkness and they still kept moving like they knew what time it was.

Erwin Bünning: That's what made the internal biological clock idea so important.

Erwin Bünning: The rhythms kept going even without outside light.

Franz Halberg: And later we called those rhythms circadian rhythms.

Franz Halberg: Around a day.

John Wells: You all studied time inside organisms.

John Wells: I studied time inside fossils.

Alexander the Great: Wait how does a fossil tell time?

John Wells: Corals leave tiny daily growth rings.

John Wells: Millions of years ago Earth rotated faster, so there were more days in a year.

Alexander the Great: That's actually insane.

Franz Halberg: Humans already struggle with a twenty four hour schedule.

Erwin Bünning: Exactly.

Erwin Bünning: When people are isolated from environmental cues their sleep cycle drifts.

Jean-Jacques de Mairan: Which proves the clock is endogenous.

Alexander the Great: Meanwhile my army was just trying not to get lost in deserts.

John Wells: People have always organized life around Earth's rotation.

John Wells: Sundials, stars, calendars, time zones.

Franz Halberg: Modern life kind of ignores biology though.

Franz Halberg: Bright lights at night, phones at two in the morning.

Erwin Bünning: The body evolved expecting cycles of light and darkness.

Alexander the Great: So my soldiers probably slept better than modern college students.

Jean-Jacques de Mairan: Honestly yeah probably.

John Wells: Time isn't just something on a clock.

John Wells: Life itself is synchronized to astronomy.

Franz Halberg: That sounds way more poetic than anything I wrote.

Alexander the Great: To Earth spinning slowly enough for us to finish dinner before sunrise.

Hipparchus

Jenny: Hipparchus, thank you for joining me for dinner. I've been dying to ask: How did you know the day was divided into 24 hours? Where did that come from?

Hipparchus: Ah, a question worthy of the stars themselves! I must be honest with you...the division of the day into 24 hours was not my invention. We inherited it from the Babylonians and the Egyptians long before my time. The Egyptians divided the daylight into 12 parts and the night into 12 parts, watching the rise of certain stars, they called them decans, to mark the hours of darkness. Twelve stars for the night, twelve segments for the day.

Jenny: But what metrics did you guys go by before you settled on that? Like, what were you even measuring with?

Hipparchus: Shadow and water, my friend. Before any instrument of elegance, there was the gnomon, a simple vertical stick thrust into the earth. You watch its shadow shorten toward midday and lengthen toward evening. That gives you the broad shape of the day. Then there was the clepsydra, a water clock. You let water drip from one vessel into another at a steady rate, and you mark the levels.

Jenny: What about when the days and nights change in length when the seasons shift?

Hipparchus: You see...the old Egyptian hours were not equal. A summer daytime hour was longer than a winter one, because they simply divided whatever daylight existed into 12 equal pieces. So the hour itself stretched and shrank with the seasons like a living thing.

Jenny: That seems chaotic. So how did it get standardized?

Hipparchus: That is where I made my contribution. I argued for what we call equinoctial hours: hours of equal, fixed length, based on one twenty-fourth of a full day and night cycle taken together. Not dependent on the season. Not dependent on how long the sun lingered. A constant unit, the same in Alexandria as in Rhodes, the same in summer as in winter.

I borrowed the Babylonians' love of the number 60 as well...dividing each hour into 60 minutes, each minute into 60 seconds. They used base-60 for their astronomy, and I saw no reason to abandon what was already precise and beautiful.

Jenny: And how did you convince anyone to trust a system like that?

Hipparchus: The sky...the sky convinced them. When I could predict the position of the moon to within the tolerances I promised, when my star catalog placed 850 stars with consistent coordinates,

when my calculation of the year was accurate to within a few minutes, people listened. Precision earns trust. It always has.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Yooo dude I know you John Wells, how did you figure out the length of a day from hundreds of millions of years ago?

John Wells:

Well Mahidul, I studied fossil corals to understand how the relationship between light and life could reveal Earth's ancient day length.

Me:

Wait, corals can actually tell you how long a day was?

John Wells:

Yes it sounds like poop but it is real! Fossil corals form growth rings, similar to trees, and those rings can record environmental patterns over time.

Me:

So what kind of corals did you study?

John Wells:

I examined fossil corals from the Middle Devonian period, around 387 million years ago, and from the Pennsylvanian period, around 307 million years ago. The samples were collected near Cornell University.

Me:

That's actually really cool. What did the rings show?

John Wells:

The corals showed annual growth rings caused by seasonal temperature changes, along with smaller daily growth patterns related to sunlight.

Me:

So you could count the daily rings inside the yearly rings?

John Wells:

Exactly Mahidul manly man! By counting them, I discovered that there were more days in a year long ago than there are today.

Me:

Wait, does that mean the days used to be shorter?

John Wells:

That's right, Mahidul. Earth rotated faster hundreds of millions of years ago, so each day was shorter than the 24-hour days we have now.

Me:

That's honestly crazy to think about.

John Wells:

It really is. Fossils can reveal amazing information about Earth's history and how the planet has changed over time and what it looked like.

Me:

Thanks for telling me all of this!

John Wells:

No problem, Mahidul. Keep being curious about science and Earth's past!

Benito Jaramillo

PLSCI 1130

April 13, 2026

Conversation with Ignacio Provencio

Benito: Dr. Provencio, I made tacos, hope that works. I have to say your discovery of melanopsin was one of the things in this class that genuinely surprised me. I thought we had the eye completely figured out by now.

Ignacio Provencio: That is exactly what most people assumed, including a lot of scientists. Two thousand years of studying the eye and then suddenly in 1998 there is a new photoreceptor pigment sitting right there in the retina.

Benito: And it is not even involved in seeing, right? Like it does not form images.

Ignacio Provencio: Correct. The cells that contain melanopsin connect directly to the suprachiasmatic nucleus, the brain's master clock. Their whole job is to detect light and send a timing signal. They are telling the brain what time of day it is, not what the world looks like.

Benito: And it is especially sensitive to blue light which is why phones at night mess with sleep.

Ignacio Provencio: Exactly. Short wavelength blue light is the strongest signal melanopsin responds to. So when you are staring at a screen at midnight your clock is being told it is still daytime and melatonin production gets delayed.

Benito: I feel personally attacked right now honestly.

Ignacio Provencio: Ha, you are not alone. These tacos are excellent by the way, thank you for having me.

Lecture 16: Dinner Conversation with Franz Halberg

Light and Life | Vansh Kakra | vk365

Vansh: Okay I have to ask - you named something that's inside every single human being on the planet. Does that feel weird?

Franz Halberg: I simply needed a word. "Biological rhythm with a period of approximately twenty-four hours" was getting exhausting to say at conferences.

Vansh: So you just went with Latin. Very casual.

Franz Halberg: Circa dies - "about a day." It felt honest. The clock is never exactly twenty-four hours, so I did not want to lie to anyone.

Vansh: Wait, so my body clock is literally running late every single day?

Franz Halberg: By about eleven minutes on average, yes. You are not lazy. You are simply slightly misaligned with the rotation of the earth.

Vansh: That is the most scientific excuse I have ever heard for being late to a 9am class.

Franz Halberg: I would not recommend using it on a professor.

Vansh: Too late. So when did you realise this "circadian" idea was actually a big deal?

Franz Halberg: When I noticed that the same drug given to mice at different times of day killed some and not others. Same dose, same drug - only the timing changed.

Vansh: That's genuinely terrifying. So the clock isn't just about sleep - it's about when your body is ready for things?

Franz Halberg: Precisely. Medicine, meals, exercise - timing is not decoration. It is biology.

Vansh: My roommate takes his pre-workout at midnight. I feel like you'd have something to say about that.

Franz Halberg: I would say his cortisol is already confused, and he is not helping matters.

Vansh: Honestly fair. What frustrated you most - like what did people just not get?

Franz Halberg: That the clock is individual. People kept averaging everyone together. But your circadian period and mine are not the same. A treatment timed for me may be wrong for you entirely.

Vansh: So personalised medicine basically starts with knowing someone's internal clock.

Franz Halberg: You are catching on faster than some of my graduate students.

Vansh: I'll take that. Last question - do you think people today respect their circadian rhythms?

Franz Halberg: You are all staring at glowing rectangles at two in the morning and wondering why you cannot wake up. No. I do not think so.

Vansh: The rectangle thing really got me. We've got to be careful about it!

Selina Ke

Dinner Conversation with John Godfrey Saxe

Selina: Your poem keeps repeating this idea that there's "no royal road" to learning. Do you really believe ambition alone is enough? What about people who don't have the same opportunities?

Saxe: Ambition is not the same as advantage. I do not deny that some begin the journey closer to the summit. But no one, whether peer or peasant, arrives without climbing.

Selina: But the climb looks very different depending on where you start. Some people have guidance, resources while others are figuring everything out alone.

Saxe: True. Yet the "Roman will" I speak of is for those moments. "To find a way, or make it." It is not a promise of ease, but a refusal to be stopped by difficulty.

Selina: I connect with that, but I also wonder if it puts too much responsibility on the individual. What if the system itself blocks the path?

Saxe: Then ambition must also question the system. What is ambition if it only follows existing roads? Is it not stronger when it creates new ones?

Selina: So you're saying ambition isn't just persistence, it's also creativity by figuring out paths that don't exist yet.

Saxe: Exactly. Learning is not handed down like a gift. It must be pursued, sometimes wrestled from circumstance. That struggle is what gives it value.

Selina: I think that's what resonates with me most. As a student, especially coming from a background without many resources, learning often feels like something I have to chase rather than something given to me.

Saxe: And does that make you value it more, or less?

Selina: More. But it also makes me question whether it should be that hard?

Saxe: Difficulty shapes character, but unnecessary barriers can limit potential. Perhaps the real challenge is balancing both: preserving the discipline of effort while removing unjust obstacles.

Selina: If there is truly no "royal road" to learning, what responsibility does society have? Should everyone be left to "find a way," or should we help build better paths for others?

Saxe: I would say that each person must still climb, but we are not forbidden from building bridges.

Me:

You went into that cave voluntarily. Two months with no clock, no sunlight. What made you think that was a good idea?

Siffre:

I was twenty-three. Everything seemed like a good idea. But honestly, I wanted to know what time felt like when nothing was enforcing it. Whether it existed inside us or only because we kept measuring it.

Me:

And what did you find?

Siffre:

That the body keeps going. Sleep, wake, eat, it all continued. But my sense of how long things took completely fell apart. I thought I had been down there about a month when they told me it had been two.

Me:

That's terrifying.

Siffre:

It was. But also clarifying. The clock in us is real, it just doesn't match the clock on the wall unless something keeps synchronizing them. Light does that. Without it, you drift.

Me:

The lecture mentioned that your free-running period was longer than 24 hours. Most people are.

Siffre:

Which means left to itself, the body wants to go to sleep a little later each day. We are all slightly out of phase with the earth. The sun corrects us every morning.

Me:

That's a strange thing to think about. That we need the sun not just for energy but to stay in sync with time itself.

Siffre:

Most of human history, that correction happened automatically. You woke up, light came in, your body knew where it was in the day. Now people wake up to artificial light, or no light, and the correction never quite happens.

Michel Siffre: Two Months Under a Glacier

Me: Michel! It's so good to see you! Thanks for making the trip!

Siffre: Maximo! A pleasure, truly. Is that cassoulet I'm smelling?

Me: It is! Fresh off the stove. Listen, Michel, I've been reading about you for my class, and I have to ask you about what you did in 1962. You climbed down 375 feet into Scarasson Cavern, into a subterranean glacier in southeast France, and you stayed there alone for two months. No sunlight, no clock, no radio. Just you and a cave. What makes a man do that to himself?

Siffre: Ah, Maximo. You have asked the question my own mother asked me, and I had no better answer for her than I have for you. I was a young geologist. I wanted to know if the human body keeps time on its own, or if it only borrows time from the sun. And the only way to find out was to leave the sun behind. So I did. I took a tent, a lamp, some books, and I went down into the dark.

Me: And the body kept its time.

Siffre: It did. My clock ran on, a little slower than the world above, closer to twenty-five hours than twenty-four, but it ran. The experiment worked. When I came up, I thought I had been underground for a month. It had been two. The clock was inside me. That part I proved.

Me: But here is what I want to press you on, Michel. The body kept its time, yes. The mind did not. You broke down in that cave. You became depressed, you lost hope, you wrote later in *Beyond Time* about willpower as the only thing that kept you alive. The experiment succeeded, and the experimenter nearly did not. Was the knowledge worth what it took from you?

Siffre: A fair blow, Maximo, and one I have turned over for the rest of my life. I will tell you honestly. The clock in the cell survived. The man in the cave almost did not. There were days I could not remember why I had come down. I talked to myself. I talked to the ice. I wept for reasons I could not name. And yet I stayed, because I had said I would stay, and because I knew that if I climbed out early the data would be worth nothing. Willpower is a poor word for what it was. It was closer to stubbornness. A Frenchman's stubbornness, which is a particular kind.

Me: And then, Michel, years later, you went back down. Six months in a cave in Texas. After what Scarasson did to you, why go again?

Siffre: Because two months had not been enough to answer the real questions. The clock drifted, yes, but where would it drift to over six months? A year? I wanted to know. And I will tell you something else, Maximo. A man who has survived the dark once has a strange hunger to see if he can survive it longer. It is not courage. It is something more foolish than courage, and more honest.

Me: That's a fair way to hold it, Michel. Would you care for some dessert?

Siffre: I'll pass, Maximo, the cassoulet has done me in. Thank you for having me, my friend.
Take care of yourself.

Lecture 16: Dinner Conversation with John Wells

Me: Hi Professor Wells, thank you for meeting me for dinner! We learned that you used fossil corals to study the length of a day on Earth. How did you come up with that idea?

Wells: I was interested in understanding how the Earth's rotation has changed over geological time. I realized that some organisms, such as corals, record environmental changes as they grow.

Me: What kind of information did the corals provide?

Wells: Fossil corals show both annual growth rings and much finer daily growth rings. The annual rings reflect seasonal changes, while the daily rings form as calcium carbonate is deposited each day.

Me: Wow! So you were able to count the number of days in a year from these fossils?

Wells: Exactly. By counting the number of daily growth rings within a single annual ring, I could determine how many days there were in a year millions of years ago.

Me: And the number was different from today?

Wells: Yes. In the Middle Devonian period, there were about 400 days in a year. This means that each day was shorter than the 24 hour day we experience now.

Me: That's fascinating. Why were the days shorter back then?

Wells: The Earth's rotation has gradually slowed due to tidal forces between the Earth and the moon. Over long periods of time, this causes each day to become slightly longer.

Me: I see. So even though the number of days in a year changed, the length of the year itself stayed the same?

Wells: Precisely. The Earth's orbit around the sun has remained relatively constant, so the length of a year did not change. However, the number of days changed because each day became longer.

Me: It's amazing that something like coral can reveal that. Did you expect such a big insight from such a simple observation?

Wells: Not at all. Much of this work relies on careful observation. Sometimes, attention to detail can lead to important discoveries.

[PLSCI 1130] Candy Nalinthrangkurn, npn28

Me: Thank you for this conversation. It's amazing how life on Earth can record changes we would never be able to observe ourselves.

The room went green.

Not a normal green. Not “your screen brightness is weird” green. This was slow, shifting, almost like light had decided to breathe.

I looked up. “That’s not my ceiling.”

“It is for now,” said Jean-Jacques d’Ortous de Mairan, standing by the window like he’d been expecting the sky to leak inside.

“You’re seeing this too, right.”

“I have spent a great deal of time thinking about it,” he said calmly.

“Thinking about my ceiling turning into a screensaver.”

“About the aurora,” he corrected.

The green shimmer stretched, faint streaks sliding across the room like they were testing the space.

I grabbed my phone. No signal.

Of course.

“Why does it look like that,” I asked.

“Because something far away is interacting with something very close,” he said.

“That clears up nothing.”

He didn’t sit. He just watched.

“In the north,” he said, “the sky sometimes glows like this. Curtains of light. Moving without wind.”

“I’ve seen pictures.”

“Pictures are quiet,” he said. “This is not.”

He wasn’t wrong. There was a kind of motion to it. Not sound exactly, but presence.

I squinted at the shifting colors.

“So what is it.”

He tilted his head.

“In my time, we did not know,” he said. “We suspected connections. The sun. The atmosphere. Invisible forces.”

“That’s a lot of guessing.”

“It was careful guessing,” he replied.

The light flickered brighter for a second, then softened.

“It doesn’t look random,” I said.

“No,” he said. “It behaves.”

“Like it has rules.”

“Yes.”

“That’s worse somehow.”

He finally moved closer to the table, but his eyes kept drifting back to the glow.

“I also studied plants,” he added suddenly.

I blinked.

“What does that have to do with sky lights.”

“Patterns,” he said. “Cycles. Things responding to forces you cannot see.”

“That feels like a stretch.”

“It is the same instinct,” he said.

I watched the light ripple again.

“So you thought the sun had something to do with this.”

“I suspected a relationship,” he said. “Activity there, changes here.”

“That’s kind of a big jump.”

"It had to be," he said simply.

I leaned back.

"So you're looking at weird glowing skies and going 'yeah that's probably the sun's fault.'"

"In essence."

"And people just agreed with you."

He smiled faintly.

"No."

The green shifted into streaks, almost like waves.

"It's kind of beautiful," I admitted.

"It is," he said. "Which makes it more important to understand."

"That's a very you sentence."

I tried to follow one strand of light as it curved across the ceiling.

"So it's not actually in the sky like that, right. It just looks like it."

"It is high above," he said. "Where the air is thin."

"Doing what."

"Responding," he said.

"To what."

He looked at me.

"That was the question."

There was a pause.

The light dimmed slightly, like it was losing interest in being dramatic.

"You ever get it wrong," I asked.

"Frequently," he said.

"That's reassuring."

"But being wrong carefully," he added, "is how you move closer."

I checked my phone again. Still nothing.

"So this is just... happening."

"Yes."

"And you're just... okay with that."

"I find it encouraging."

"That something this weird exists."

"That something this strange can still be understood," he said.

The green faded slowly, leaving the room normal again.

Very normal.

Suspiciously normal.

I stared at the ceiling.

"Okay I liked it better when it wasn't glowing but also now this feels boring."

He nodded.

"Understanding often does that."

He headed toward the door, pausing once.

"Look up more often," he said.

"I will if my ceiling stops doing that."

He almost smiled.

He left, and the room stayed quiet.

No glow. No movement. Just regular light.

I sat there for a second.

Then I checked outside.

Just in case the sky was still doing something it hadn't told me about yet.

Ean Pope

Dinner Conversation

Light and Life

Michel Siffre

Me: Mr. Siffre, I read about your cave experiment in my Light and Life class and honestly I don't know how you did that. Living underground for months with no sunlight sounds trash.

Siffre: It was difficult, but I wanted to understand how humans experience time when all normal environmental cues disappear.

Me: That's what interested me. In class we learned about rhythms and how light acts as a "zeitgeber," which is basically something that synchronizes our biological clock with Earth's rotation.

Siffre: Yes. Without sunlight or clocks, I found that my body still followed a rhythm, but it slowly drifted away from the normal 24-hour day.

Me: That part was crazy to me. Even without seeing the sun, your body still tried to keep time on its own.

Siffre: Which suggests that humans have an internal biological clock independent of the outside world.

Me: My question for you would be this: what was harder, the physical isolation or losing your sense of time?

Siffre: Losing my sense of time. Without sunrise and sunset, the days stopped feeling real. I became disconnected from the normal structure of life.

Me: I can see that. It makes me realize how much light controls us without us noticing. Even something as simple as seeing daylight in the morning affects how we sleep, think, and feel.

Siffre: Exactly. We often believe we control time, but in many ways, light controls us.

Jasmine: Okay... I've talked to architects, physicists, plant scientists... but YOU might be the craziest one yet.

You just... decided to live alone in a cave?? No sunlight, no clock, no human contact?? Like respectfully, I love whatever is wrong with you.

Michel Siffre: Hahahha. I was curious. I wanted to understand something very simple, yet very mysterious. What is time... when you can no longer see it?

In 1962, I lived alone in a cave, completely cut off from sunlight and any external sense of time. No clocks, no sunrise, no sunset... nothing.

Jasmine: I would genuinely go insane. No joke. I hate the dark, I hate the silence. I hate the outdoors without proper guidance. I will never complain again in my life.

Siffre: I wanted to know if we are controlled by the environment or do we carry time within us?

Jasmine: Help. So what happened? Did you just... lose track of everything?

Siffre: Completely. My sense of time broke down. Minutes felt like hours... days felt like moments. But something fascinating happened. Even without any external cues... my body kept a rhythm. My biological clock continued to function, but it was no longer perfectly aligned with the 24-hour day.

Jasmine: Wait, I feel like I have seen those videos where humans are placed in the quietest room in the world and see how long they last in there... they do not last like 10 minutes because it is too quiet that you can hear yourself and every inch. I would go insane.

I am not built for your insanity. But I am happy for yours.

Siffre: Most people are not hahahah. Humans have an internal, endogenous clock — independent of the outside world.

Without light, we have what we call zeitgeber, or time-giver. The body loses synchronization with the Earth's 24-hour cycle!!

Jasmine: As a side quest, maybe I will try it— wait nevermind.

But be honest... mentally, were you okay down there?

Siffre: No. Absolutely not. If I was able to vlog it like you people these days, you would just see me disoriented... and eventually depressed. Time is not just something we measure, it is something we feel.

Jasmine: That is so deep. I am going to cherish my ability to conceptualize time so much more now. AMEN TO THAT.

Nomar: I'm not gonna lie, living alone in a cave for two months with no sense of time sounds insane. Like no sunlight, no clock, nothing? What made you even want to do that?

Michael Siffre: I wanted to understand time, not just how we measure it, but how we experience it. I wondered what would happen if you removed all external cues.

Nomar: That part got me. Because we act like time is this fixed thing, but you were basically testing if our brains create their own version of it. And from the lecture, it sounds like they do.

Michael Siffre: Yes. Even without light or clocks, my body continued to follow a rhythm.

Nomar: That's the crazy part. Your body still had a schedule, just... not a normal one. You started drifting, right? Like your "day" got longer than 24 hours.

Michael Siffre: Exactly. The biological clock kept running, but it was no longer synchronized with the Earth.

Nomar: And mentally, it didn't go great either. I remember the lecture saying you got pretty disoriented and even depressed down there. That made it feel way more real, not just some cool experiment.

Michael Siffre: Isolation has a powerful effect on the mind. Time is not just physical, it is psychological.

Nomar: That actually made me think about everyday life. Like when I stay up late on my phone and completely lose track of time, it's not that extreme, but it's kind of the same idea. Once you remove natural light cues, everything gets thrown off.

Michael Siffre: Yes, modern life often disrupts the natural synchronization of our biological clock.

Nomar: I think that's what I'm taking away. We like to think we're in control of our schedules, but we're still tied to something deeper, like light, darkness, and our internal clock. And when that gets messed up, everything else kind of follows.

Nomar: Also... I respect the commitment, but I'm not testing this myself anytime soon. I'll stick to just fixing my sleep schedule.

Ariel Vilensky

Lecture 16. Melanopsin, Circadian Rhythms, and Wellness in Humans

Me: Good evening, David Foster Wallace. In your quote, you describe real freedom as involving attention, awareness, and discipline rather than just doing whatever we want. Could you explain that idea?

David Foster Wallace: Good evening. What I meant is that the default way people move through life, what I call “unconsciousness,” is actually a kind of trap. Real freedom comes from choosing how to think and what to value, even in small, everyday moments.

Me: So freedom isn’t about external choices, but internal control?

David Foster Wallace: Exactly. It’s about being aware enough to step outside your own automatic habits, especially self-centered ones, and to care about others intentionally.

Me: You also mention sacrifice in “petty, unglamorous ways.” Why emphasize that?

David Foster Wallace: Because that’s where life really happens. Grand gestures are rare, but daily acts of patience, empathy, and restraint - that’s the real test of whether you’re truly aware and free.

Me: That’s a powerful way to think about it. Thank you for your time.

David Foster Wallace: Thank you. Just remember - attention is the beginning of freedom.

Karen Zheng, kz374

Dinner Conversation with Erwin Bünning

Me: I've been thinking about the idea of Weltanschauung, the attempt to hold everything, from science to belief to daily life, into one view. Do you think there is ever a single truth that can hold all of that together?

Erwin: I think we are always searching for that kind of truth, even if we rarely admit it. But what we often find instead are fragments.

Me: Are you saying truth isn't something fixed?

Erwin: Not in the way people hope. In biology, even something as regular as a circadian rhythm is never perfectly stable. It adjusts to light, to environment, to change.

Me: Is this what makes your warning about people with a "horizon of zero" more serious? If your view never changes, your truth never changes either.

Erwin: Yes, a rigid truth can feel certain, but it often loses contact with reality, much like a clock that refuses to reset.

Me: Then maybe truth isn't something we can ever arrive at.

Erwin: Yes, and there is a kind of humility in that: accepting that the world moves whether or not we are ready for it.

Me: Then maybe understanding is less about holding onto one truth, and more about learning how to move with it.

Erwin: Or learning how to notice when what you believed no longer fits. That moment, when something feels slightly off, is often more important than certainty itself.

Me: It sounds like truth is something we have to keep returning to, not something we get to keep.

Erwin: Exactly, it's like a rhythm you fall in and out of. You don't capture it, you listen for it, adjust to it, and sometimes you lose it before finding it again.

Me: Then I guess the danger is when we stop listening. Thanks, Erwin!

Dinner conversation with Niels Finsen

Me: Dr. Finsen, the lecture made UV light feel like one of the most complicated parts of sunlight. It's dangerous, but is also useful. It can damage DNA, but it can also disinfect and treat disease.

Finsen: That's exactly why light deserves careful study. Sunlight can't just be deemed good or bad. It depends on a lot of factors, including wavelength, dose, timing, and the living tissue that receives it.

Me: Your story stood out to me because it began personally to you. The lecture talked about how you suffered from Neimann-Pick disease and noticed that sunshine made you feel better. That observation made you want to study light as a treatment.

Finsen: Personal suffering can sharpen observation. I didn't begin with a complete theory. I began with the fact that sunlight helped me.

Me: That reminds me of other lectures where major discoveries began with simple observations, like redder venous blood in the tropics or plants flowering after a long night.

Finsen: Nature will sometimes give the clue before we really understand it.

Me: The issue I think is most meaningful is the balance between the helpful and harmful sides of UV light. The lecture talks about how UV light was initially discovered by Johann Ritter. Then Downes and Blunt showed sunlight had a bactericidal effect on *Bacillus anthracis*, and Ward showed that the violet and UV end of the spectrum stopped anthrax spores and colonies from growing.

Finsen: Exactly, UV light can kill living cells. That makes it dangerous but also powerful when looking at it medically.

Me: That's what we learned about, you used UV light to treat lupus vulgaris

Finsen: I saw light as a tool that needed to have careful supervision. The same force that harms can also heal.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 17 Dinner Conversation

Conversation with Karl Popper

Ellie: Hi Dr. Popper, thank you for meeting me for dinner.

Karl Popper: My pleasure, Ellie. What would you like to discuss?

Ellie: In class we've been talking about what makes something "science," and your idea of falsifiability really stood out to me. It honestly changed the way I think about theories.

Karl Popper: I'm pleased to hear that. The idea is straightforward but important: for a theory to be scientific, it must make claims that could be tested and, at least in principle, could be shown to be wrong.

Ellie: That's a really interesting way to think about it. We also learned that you described science as "conjectures and refutations," like it's always moving forward by proposing ideas and then trying to break them.

Karl Popper: Yes. We begin with bold guesses, then we actively attempt to disprove them. If an idea survives serious attempts to refute it, we keep it for now. If it fails, we learn from that failure and improve our understanding.

Ellie: You were also critical of theories that could explain anything no matter what happened, because they can't really be tested.

Karl Popper: Precisely. If a theory can twist every possible outcome into "evidence," then it never risks being wrong. That makes it immune to falsification. It may be an interesting story, but it is not doing the work that science requires.

Ellie: And you believe mistakes are valuable, right? That we actually learn by being wrong.

Karl Popper: Exactly. That is the heart of rational thinking. We may never reach perfect certainty, but we can make progress by discovering our errors and removing what is false.

Ellie: Thank you for talking with me, Dr. Popper. This made me rethink a lot of things.

Karl Popper: Thank you, Ellie. I really enjoyed our conversation!

Dinner with John Mitchell

Me: Dr. Mitchell, I've been thinking about something you wrote – your 1744 essay on the causes of skin color in different climates. You argued, at a time when almost no one else dared, that the differences in human complexion are simply the body's response to sunlight and heat. How did you arrive at that when everything around you – the law, the economy, the church – was invested in the opposite conclusion?

Mitchell: (settling into his chair, pouring the wine) I arrived at it the same way I arrive at anything, by looking. Not at what I wished to see, nor at what my neighbors required me to see, but at what is. The skin of a man who labors in the sun darkens. The skin of a man who moves indoors lightens again. This is not philosophy, it is observation. And once you observe it clearly, the ancient argument – that God marked certain peoples permanently and differently from the start – simply cannot stand against the evidence.

Me: But you were a physician and naturalist in Virginia. You owned enslaved people yourself. Didn't your own conclusions create a rather uncomfortable contradiction in your life?

Mitchell: (a long pause, his finger tracing the rim of his glass) You put the question with admirable directness. Yes. A man can see clearly and still act badly. I will not pretend otherwise. What I wrote was true, and what I lived was inconsistent with it, and I do not think history should spare me that accounting. But I would ask you this – is it not better that the truth be spoken, even by a flawed speaker, than that it remain unspoken waiting for a perfect one? The argument needed to be made. That Black and white people could descend from common parents, that difference in complexion is climate and not curse – these ideas had consequences, consequences I perhaps did not press hard enough in my own life.

Me: Your phrase stays with me – that dark skin in hot climates is "a blessing, rendering their lives more tolerable," not a curse from Ham. That was a direct rebuke to the theological justification for slavery. Were you not frightened to publish it?

Mitchell: (a dry smile) I published it in the Philosophical Transactions of the Royal Society in London, not in Williamsburg. There is a reason for that. A man calculates his risks. But the argument was sound, the skin regulates the body's response to heat and light. Too little pigment in an equatorial sun is dangerous. Too much in a northern winter deprives the body of something it needs. These are not moral judgments. They are physiology. And physiology does not recognize the hierarchy that human vanity has constructed.

Me: Centuries later, we now know that skin pigmentation regulates vitamin D production and protects folate, the very mechanisms you intuited without knowing their chemistry. Does it please you that the biology confirmed your reasoning?

Mitchell: (genuinely brightening) That pleases me enormously. It is the great satisfaction of natural philosophy – to reason correctly toward a truth you cannot yet fully explain. I knew that it

was so before I knew why it was so. The why took another two hundred years. That seems about right. Nature is patient. It is we who are impatient.

Me: And if you could send one message back to the physicians and clergymen of your own time who used science to justify racial hierarchy?

Mitchell: (quietly, setting down his glass) Only this: an observation in service of a predetermined conclusion is not science. It is flattery dressed in a wig. Look at the evidence. Follow it wherever it leads, even into rooms you would rather not enter.

Lecture 17 Dinner Conversation

Tyler: Ultraviolet light feels like one of those things that's both helpful and kind of terrifying at the same time. It helps your body make vitamin D, but it can also damage DNA.

Johann Wilhelm Ritter: That tension is exactly what made ultraviolet radiation so interesting when I first discovered it beyond the violet spectrum.

Tyler: The craziest part is learning the ozone layer is basically what makes life on land possible by blocking the most dangerous UV radiation.

Niels Finsen: Without oxygen producing ozone, UVC radiation would be far more destructive to living tissue.

Tyler: And then skin tone ends up being part of that whole balance too, which I didn't really think about before.

John Mitchell: Skin pigmentation is closely tied to environmental conditions. It reflects adaptation over time.

Tyler: The whole vitamin D and folate tradeoff actually made a lot of sense once it was explained.

W. Farnsworth Loomis: Yes. Too little UV exposure limits vitamin D synthesis, while too much UV can break down folate and damage DNA.

Tyler: It's weird because people talk about skin color socially all the time, but biologically there's a real environmental explanation behind it.

Charles Darwin: Traits often reflect environmental pressures more than appearance alone.

Johann Wilhelm Ritter: When I discovered ultraviolet light, it was completely invisible. I was just following what seemed like an extension of the spectrum.

Niels Finsen: And later we learned those invisible rays could also be used in medicine.

Niels Finsen: I used ultraviolet light therapeutically to treat skin disease long before antibiotics existed.

Tyler: That part surprised me too, that something harmful can also be useful in controlled amounts.

John Mitchell: That duality is central to understanding skin pigmentation.

John Mitchell: Populations closer to the equator tend to have darker pigmentation due to higher UV exposure, while higher latitudes select for lighter skin to maintain vitamin D production.

Charles Darwin: It shows how natural selection can shape traits in response to geography and climate.

W. Farnsworth Loomis: And the mechanism becomes clearer when you consider physiology. Survival depends on maintaining both vitamin D levels and folate integrity.

Tyler: So it's not just about "more sun is good or bad," it's about finding a balance.

Johann Wilhelm Ritter: Exactly. Even radiation we cannot see has shaped life in profound ways.

Niels Finsen: And early life on Earth evolved under far harsher radiation conditions before the atmosphere became protective.

John Mitchell: The rise of oxygen changed everything, including how life interacts with sunlight.

Charles Darwin: And yet humans now spend much of their lives avoiding the very sunlight that helped shape them.

W. Farnsworth Loomis: Or exposing themselves in artificial ways that ignore the biology entirely.

Johann Wilhelm Ritter: If early scientists heard about tanning beds, they would have been baffled.

Tyler: Honestly, I still am a little.

Niels Finsen: Ultraviolet light remains a paradox. It damages, it heals, and it has shaped evolution itself.

Charles Darwin: Nature rarely deals in simple categories.

Tyler: Yeah, it's like sunlight is both part of the problem and part of the solution.

Jenny Huang
PLSCI 1130: Light and Life
Lecture 16

Thomas Blunt

Jenny: Dr. Blunt, your work on sunlight killing anthrax bacteria was groundbreaking. How did you even think to test that? What made you suspect sunlight could be bactericidal?

Thomas Blunt: Well, it wasn't entirely out of the blue, I'm afraid. By the 1870s, we'd already observed that certain diseases seemed to flourish in dark, damp places...cholera, typhoid, consumption. There was this nagging sense that sunlight and fresh air were somehow... purifying. But nobody had put it to a proper test.

I was working with *Bacillus anthracis* cultures and I noticed that the cultures I left near the window seemed to grow poorly compared to those I kept in the dark corners of the laboratory. Pure accident, really.

Jenny: So you decided to test it systematically? What was your setup like?

Blunt: I prepared identical cultures of the anthrax bacilli. Same nutrient medium, same temperature, same everything. Then I divided them into two groups. One set I placed in direct sunlight streaming through the laboratory windows. The other I kept in complete darkness, wrapped in black cloth.

The difference was... well, it was remarkable. After just a few hours of direct sunlight, the bacterial growth was visibly stunted. After a full day, many of the cultures exposed to sunlight showed no viable bacteria at all. Meanwhile, the ones in darkness thrived like the devil's own garden.

Jenny: That must have been shocking to see. Did you believe it right away, or did you think you'd made an error?

Blunt: Oh, I was certain I'd bungled something. First rule of experimental work: when you see something extraordinary, assume you're the fool, not nature. So I repeated the experiment. Again and again. Different times of day, different seasons, different culture preparations. Even tried it with filtered sunlight through colored glass to see if it was the heat or the light itself.

Turns out it wasn't the heat at all. Even when I kept the sunlit cultures cool with ice baths, they still died. It was something in the light itself...what we now understand to be the shorter wavelengths, the blue and violet portions of the spectrum.

Jenny: Did people believe you when you published? This was pretty revolutionary stuff.

Blunt: Skepticism would be putting it mildly. Here I was, suggesting that simple sunlight could kill these invisible agents of disease. Some of my colleagues thought I was chasing shadows. Others worried I was undermining the serious work being done on antiseptics and sterilization.

Jenny: Looking back, do you think this changed how people thought about disease prevention?

Blunt: Absolutely. It gave scientific backing to what sanitarians and public health reformers had been preaching for decades. Though I must say, I never imagined it would lead to people trying to cure consumption by sending patients to sanatoriums full of sunshine.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Mr. Treibs, what did you discover in petroleum deposits?

Treibs:

Well Mahidul, in 1934 I found porphyrins in petroleum deposits, which shows that some materials in oil may have come from ancient living organisms.

Me:

So people started wondering if petroleum was connected to life?

Treibs:

Exactly Mahidul, you're on the point of things! Scientists began debating whether Precambrian deposits were biogenic, meaning formed from life, or abiogenic, meaning formed without life.

Me:

Wait, what does biogenic mean again?

Treibs:

Biogenic involves living organisms contributing to the formation of materials found on Earth.

Me:

And abiogenic means it happened naturally without life involved?

Treibs:

That's right, Mahidul Islam. Some scientists believed petroleum could form through chemical and geological processes deep inside the Earth without organisms.

Me:

Who supported the idea that life was important for Earth's formation?

Treibs:

Eduard Suess and Vladimir Vernadsky both emphasized the importance of life in shaping the Earth and the biosphere.

Me:

Wait, wasn't Vernadsky connected to the idea of the biosphere too?

Treibs:

Yes! Eduard Suess actually coined the word "biosphere," and Vernadsky expanded on the concept by explaining how life interacts with Earth's systems.

Me:

So who believed in the abiogenic theory?

Treibs:

Tommy Gold from Cornell strongly supported abiogenic petroleum formation in his book *The Deep Hot Biosphere*.

Me:

That's actually a really interesting debate.

Me:

Thanks for telling me all of this!

Treibs:

No problem, Mahidul. Keep being curious about science and Earth's history!

Benito Jaramillo

PLSCI 1130

March 30, 2026

Conversation with Franz Halberg

Benito: Dr. Halberg, come in, come in. I just pulled some soup off the stove so good timing. I wanted to ask you something that has been bugging me since class. Why does it matter that the biological clock is approximately 24 hours and not exactly 24 hours?

Franz Halberg: That is exactly the right question to ask. If it were exactly 24 hours, the clock would never need to be reset. It would always stay in sync on its own. But because it runs a little long, roughly 24 hours and 11 minutes on average, it needs a daily signal to stay aligned with the actual rotation of the earth.

Benito: And that signal is light.

Franz Halberg: Light is the main one yes. That is why I used the Latin words circa and dies when I coined the term circadian in 1959. About a day. Not exactly a day.

Benito: It is funny that such a small difference ends up meaning so much biologically.

Franz Halberg: That is biology for you. The details are never trivial. Remove someone from sunlight entirely and watch how fast they drift out of sync with the rest of the world.

Benito: We saw that with Siffre in the cave experiments. He completely lost track of time.

Franz Halberg: A perfect demonstration. Now how is that soup, it smells wonderful from here.

Benito: Please help yourself, thank you so much for coming Dr. Halberg.

Lecture 17: Dinner Conversation with Niels Finsen

Light and Life | Vansh Kakra | vk365

Vansh: You got interested in light therapy because sunshine made you feel better personally. That's either brilliant science or just a very expensive way to justify going outside.

Niels Finsen: Both, if I am being honest. I was ill, I noticed something, and I thought -- why not investigate it properly instead of just sitting on a bench like everyone else.

Vansh: Most people feel better in the sun and just think "nice weather." You turned it into a Nobel Prize.

Niels Finsen: Most people are not curious enough.

Vansh: So if possible can you walk me through the lupus work. You're treating a skin disease with light?

Niels Finsen: Lupus vulgaris is tuberculosis of the skin. Terrible condition. I found that concentrated ultraviolet light could kill the bacteria causing it.

Vansh: So you basically pointed a really intense lamp at people's faces.

Niels Finsen: That is a simplified version, yes.

Vansh: And it worked?

Niels Finsen: It worked well enough for Stockholm to call me.

Vansh: AHAHAHA nice. What I find wild is that antibiotics eventually replaced your whole method. Does that sting a little?

Niels Finsen: Not at all. The goal was always to heal people, not to protect my method. If a pill works better than a lamp, use the pill.

Vansh: Fair point. Here at Cornell, half the pre-med students are basically self-diagnosing with everything they learn in class. You actually turned your own symptoms into a research question. That's the move.

Niels Finsen: The difference is I tested my hypothesis rather than posting about it.

Vansh: Genuinely could not have said it better. Last question - what would you think about the fact that people today pay money to sit in tanning beds and also pay money to avoid the sun with SPF 100 sunscreen?

Niels Finsen: You have somehow managed to be simultaneously afraid of light and addicted to it.

Vansh: Yeah that's pretty accurate for my generation.

Niels Finsen: Light is not good or bad. It is a tool. Dose, wavelength, timing - everything depends on these. Your ancestors understood this without knowing the words for it.

Vansh: And now we know all the words and somehow still get it wrong.

Niels Finsen: Welcome to progress.

Selina Ke
Dinner Conversation with Samuel Stanhope Smith

Selina: I've been reading your argument that climate determines human complexion, and that all humans are fundamentally one. In some ways, that feels progressive for your time.

Smith: I wanted to show that differences among people are not fixed by nature, but shaped by the environment. Climate, especially, leaves its mark on the body over time.

Selina: You describe this gradual change, from darker skin near the equator to lighter skin farther north, as almost predictable, like a natural pattern.

Smith: Yes, a kind of uniform law. Under similar conditions, the human body will respond in similar ways. That suggests unity, not division.

Selina: I understand the intention, to argue against the idea that different races are separate species. But I'm struggling with something. Even if you believed in unity, you still participated in slavery. How do those ideas coexist?

Smith: Many held contradictions between belief and practice. One might reason about equality in theory, yet fail to act upon it fully.

Selina: But doesn't that undermine the argument? If the environment shapes people, and all humans are fundamentally the same, then slavery isn't just inconsistent, it's unjustifiable.

Smith: By your reasoning, yes. And maybe my work opened a door that I did not fully walk through myself.

Selina: That's what stands out to me the most. Your theory shifts the explanation of difference away from biology, which could have challenged racism. But without action, it doesn't actually change people's lives.

Smith: Do ideas have value if they are not carried into practice?

Selina: I think they do, but only partially. Ideas can start change, but they can also be used to avoid responsibility if people stop at theory.

Smith: So you would demand consistency between belief and action.

Selina: I would. Especially when those beliefs are about human equality. Otherwise, it feels like acknowledging a truth but refusing to live by it.

Selina: If you truly believed the environment shaped human differences and that humanity is unified, what stopped you from fully rejecting slavery?

Smith: Perhaps it was not reason that failed, but courage.

Dinner Conversation with Niels Finsen

Me: I have to say, the fact that you figured out UV light could kill bacteria just by noticing what sunlight did to your own skin, that feels almost too simple. Like how did no one put that together before you?

Finsen: People saw it but did not think to use it. Downes and Blunt had shown sunlight killed anthrax cultures back in 1877. I just asked the next question, which was whether it could do the same inside living tissue that had been invaded by bacteria.

Me: And that led straight to the lupus work?

Finsen: Not straight, no. I started with smallpox, actually. I noticed that patients kept in red light did not develop the same scarring as those exposed to the full spectrum. That told me different wavelengths were doing very different things to the body. The ultraviolet end of the spectrum was the aggressive one.

Me: So you were essentially using light the way we now use drugs. Targeting something specific.

Finsen: That is a good way to put it. The lamp I developed concentrated the ultraviolet rays and directed them at the lesion. For lupus, which had resisted everything else for decades, we were seeing real results. Patients who had been disfigured for years were improving.

Me: And you were sick yourself the whole time you were doing this work?

Finsen: From my early twenties, yes. I noticed that sitting in the sun made me feel stronger, more alert. That was what first drew me to study light seriously. There is some irony in the fact that the thing making me feel better was also the thing I spent my life trying to understand scientifically.

Me: Did you ever think you were onto something that would last? Like did it feel like a big deal at the time?

Finsen: I knew the results were real. Whether anyone would continue the work after me I could not say. I was more concerned with building the institute in Copenhagen so the method would not die with me.

Me: That actually did happen though. The institute kept going long after you.

Finsen: I am glad to hear it.

Raymond Bradley: Tree Rings, Ice Cores, and an Email Under Lockdown

Me: Raymond! It's so good to see you! Thanks for making the trip!

Bradley: Maximo! A pleasure, truly. Is that pot roast I'm smelling?

Me: It is! Fresh out of the oven. Listen, Raymond, I've been reading about you for my class, and I have to start with your Senate testimony on May 17, 2000. You stood in front of lawmakers and said the warming of the twentieth century was unprecedented in the last thousand years, that 1998 was arguably the warmest year of the millennium, and that greenhouse gas concentrations were higher than at any point in the last 420,000 years. And you called these observations incontrovertible. That is a strong word for a scientist to use in a Senate chamber. Why that word?

Bradley: Ah, Maximo. You have caught the word I chose carefully, and I will not hide from it. I used incontrovertible because the proxies I work with — the tree rings, the pollen in the lake beds, the oxygen isotope ratios locked in the ice cores — they do not argue with each other the way models do. They are archives. The ice in Antarctica is a library four hundred thousand years deep. When I said incontrovertible, I meant the archive. I did not mean every interpretation we draw from it. A scientist must know the difference between what the data says and what he wishes it said, and I try to stay on the right side of that line.

Me: But here is what I want to press you on, Raymond. My professor wrote to you during the lockdown, after reading your book *Global Warming and Political Intimidation*, and asked whether you had done a cross-correlation analysis on CO₂ and temperature to separate cause from effect. You wrote back and said you had not, but that the relationship was surely significant. That is a gap, Raymond. A cross-correlation is exactly the test a skeptic would want to see. Why not run it?

Bradley: A fair blow, Maximo, and one I will not dodge. The honest answer is that I pointed him to what I believed was the deeper mechanism, the Southern Ocean sequestering CO₂ during the ice ages and releasing it during the warmings. That is where I think the causal story lives. But you are right that pointing at a mechanism is not the same as running the statistical test. I told your professor the relationship was surely significant, and I stand by the word surely, but I will grant you the word significant deserves a sharper pencil than I have always given it.

Me: And you ended the email with a joke. You wrote that you were hoping somebody would ban the book in order to revive sales.

Bradley: I did, Maximo. A scientist who loses his sense of humor at this point in his career has lost something more important than his sense of humor. The book came out into a climate, if you will forgive the word, where the people who most needed to read it were not going to, and the people who were going to read it already agreed with me. A ban would have been the best

thing that ever happened to the royalties. But I will tell you this plainly. I did not write the book for the royalties. I wrote it because political intimidation of scientists is a disease, and I had caught it, and the only treatment I knew was to describe the symptoms in print.

Me: That's an honest answer, Raymond. Would you care for some dessert?

Bradley: I'll pass, Maximo, the pot roast has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 17: Dinner Conversation with Niels Finsen

Me: Hi Dr. Finsen, thank you for meeting me for dinner! In class, we learned about your work using light to treat disease. What first made you interested in this idea?

Finsen: My interest actually began from personal experience. I suffered from illness, and I noticed that exposure to sunlight seemed to improve my condition. This led me to wonder whether light could have therapeutic effects.

Me: That's really interesting. How did you begin to study this?

Finsen: I began investigating how different types of light affect the human body, in particular focusing on ultraviolet light and its ability to influence biological processes.

Me: What did you discover?

Finsen: I found that ultraviolet light has strong bactericidal properties. It can kill microorganisms, which makes it useful for treating certain diseases caused by bacteria.

Me: I'm guessing that's what led you to develop the Finsen lamp?

Finsen: Exactly. I designed a lamp that could concentrate ultraviolet light and direct it onto affected areas of the skin. This allowed me to treat patients more effectively.

Me: And you used this to treat lupus vulgaris? Can you tell me more about the disease?

Finsen: Yes, I did. Lupus vulgaris is a form of tuberculosis that affects the skin. By exposing the infected areas to ultraviolet light, I was able to slow or even stop the progression of the disease.

Me: That's amazing. That must have been a breakthrough at the time.

Finsen: It was certainly significant. It showed that light is not just something we see, but also something that can be used as a medical treatment.

Me: All thanks to you. Do you think light therapy still has a role today?

Finsen: While modern medicine has developed new treatments, such as antibiotics, the idea that light can influence biological systems remains very important. Light continues to be used in medicine in many different ways.

[PLSCI 1130] Candy Nalinthrangkurn, npn28

Me: Thank you for this conversation. It's amazing to see how something as simple as light can be used to treat disease.

The sunlight on my table didn't look right.

It was just coming through the window like normal, hitting the wood, warming the surface a little. Nothing dramatic. No colors, no glow, nothing weird.

And yet Johann Wilhelm Ritter was crouched next to it like it was hiding something.

"You see only part of it," he said.

"I see sunlight."

"You see what your eyes allow."

That already sounded like trouble.

He didn't touch the light. He moved around it, watching where it landed, like it might behave differently if he changed angles.

"People think the spectrum ends with violet," he said.

"Yeah. Red to violet. That's the whole thing."

He shook his head.

"That is only where your sight stops."

"Same difference."

"Not at all."

He pulled out a small strip of paper. It looked ordinary, except he handled it like it mattered more than anything else in the room.

"What is that," I asked.

"A test."

"For what."

"For what you cannot see."

I leaned back.

"That sounds like a bad idea."

He placed the strip just past the edge of where the sunlight looked brightest, slightly off to the side, almost like he was aiming for the part that didn't even look like light anymore.

"Why there," I asked.

"Because beyond violet," he said quietly, "there is more."

"There is nothing there."

"For your eyes," he corrected.

We waited.

Nothing happened.

I crossed my arms.

"So this is it."

"Patience," he said.

"I have been patient for like ten seconds."

"Then you have just begun."

After a moment, he picked up the strip and held it up.

There was a faint change. Not dramatic. Just enough to notice something had happened.

I squinted.

"Did you... do something to that."

"No."

"It looks darker."

"Yes."

I frowned.

"But it wasn't even in the main light."

He smiled slightly.

“Exactly.”

I looked back at the sunlight.

“So there’s something there I can’t see... but it still does things.”

“Yes.”

“That’s annoying.”

“It is powerful.”

He moved the strip again, this time farther from the visible light.

“Beyond violet,” he said, “there is radiation that affects materials even though it escapes the eye.”

“So like invisible light.”

“Yes.”

“That feels like cheating.”

“It is discovery.”

I rubbed my temples.

“So the spectrum just... keeps going.”

“On both ends,” he added.

“Don’t tell me there’s more past red too.”

“There is.”

I stood up.

“No. One invisible section at a time.”

He laughed quietly.

“You limit the world to what you perceive,” he said. “Nature does not.”

"That's very inconvenient."

"It is very useful."

I looked at my hands in the sunlight.

"So this stuff is hitting me right now."

"Yes."

"And I can't see it."

"Yes."

"And it can still change things."

"Yes."

I paused.

"That's slightly concerning."

He nodded.

"It should be."

He set the strip down carefully like it was proof of something bigger than it looked.

"You discovered this by just... testing beyond what people assumed was the edge," I said.

"I questioned the boundary," he replied.

"That's a risky move."

"That is where new things are found."

The sunlight still looked completely normal.

Same brightness. Same warmth.

Nothing about it suggested there was more hiding just outside what I could see.

"That's kind of wild," I admitted.

"It is always there," he said. "You simply do not notice."

He stepped toward the door, pausing for a second.

"Do not trust limits too quickly," he said.

"Even when they look obvious."

"Especially then."

He left.

I stood there for a moment, staring at the patch of sunlight on my table.

It looked the same.

Completely harmless.

Completely ordinary.

Which, apparently, meant absolutely nothing.

Ean Pope

Dinner Conversation

Light and Life

Niels Finsen

Me: Finsen, I thought it was interesting that your own illness is what pushed you into studying light and medicine. Most people probably would not think sunlight could actually help treat disease.

Finsen: Finsen? That's Dr. Finsen. Yes. my condition made me pay close attention to how sunlight affected the body. I noticed that light seemed to improve certain symptoms, which made me curious about its medical potential.

Me: In class we learned that you developed the Finsen lamp and used ultraviolet light to treat lupus vulgaris, which was a skin form of tuberculosis.

Finsen: Yes. At the time, there were very few effective treatments, so using concentrated ultraviolet light offered a new approach.

Me: What's crazy is that people usually think of UV light as only dangerous because of skin cancer and DNA damage, but this lecture showed both sides of it. UV light can damage cells, but it can also kill bacteria and help with vitamin D production.

Finsen: Exactly. Many things in nature can heal or harm depending on how they are used.

Me: That balance was probably the biggest thing I took away from the lecture. Too much UV radiation can cause mutations and melanoma, but without sunlight humans would also struggle with things like vitamin D deficiency.

Finsen: Nature often works through balance rather than extremes.

Me: I'd probably ask you this: did people at the time think your ideas sounded crazy?

Finsen: Some were skeptical, but scientific progress usually begins with ideas that challenge what people already believe.

Me: That honestly still applies today.

Jasmine: LONG TIME NO SEE!!

Darwin: What? Why am I back at your dinner table again???

Jasmine: Well, I saw you have had a major life update? Or well, I learnt about it in class. The topic may be uncomfortable. You changed how we understand life, specifically some of your ideas about human differences, like race and sex, feels very tied to your time.

Darwin: That is fair. A scientist is never separate from his century. I tried to explain human variation through natural and sexual selection, but I also admitted that the evidence was not always precise.

Jasmine: Huh. What do you mean by that. Wait... I remember Randy talking about this. Is it because you argued that skin color and other physical differences between human groups may have been shaped by sexual selection?? Basically, what people in different groups found attractive over generations... like I am into tall Chinese men. I am literally 5'11 so I need to date someone 3 inches taller than me AT A MINIMUM...

Darwin: Yes. I believed that traits seen as beautiful or desirable could become more common over time, just as occurs in other animals.

Jasmine: But today, that feels incomplete. Skin color also has clear environmental and biological connections. Think about how different you look based on UV exposure, vitamin D production, folate protection. So reducing it mostly to attraction feels like you missed part of the picture.

Darwin: I would accept that criticism. Science advances when later evidence improves earlier explanations.

Jasmine: That's actually what I respect. You were revolutionary, but not perfect. Your work reminds me that science is powerful, but scientists are still human.

Darwin: Well, I suppose if evolution has taught us anything... it is that everyone has preferences.

Though I must admit, your "minimum height requirement" sounds less like natural selection and more like very aggressive selection.

Jasmine: I would love to have been shorter ugh. But these are my standards, and these are only the physical ones I am talking about!!! There are a lot more for personality and personal background.

Darwin: Then perhaps I underestimated just how selective humans could become. Had I witnessed modern dating applications, I may have written an entirely different chapter on sexual selection.

We just kinda dated whoever we knew in our community or network.

Jasmine: Yeah, take me back to your time please.

Nomar: I'm not gonna lie... this whole lecture kind of messed with me. You're telling me something as simple as light is basically controlling when I feel awake or tired? Because if that's true, my phone is ruining me every night.

Aaron Lerner: In many ways, yes. Light, especially blue light, plays a major role in regulating your internal biological clock.

Nomar: The melanopsin part really got me. Like those cells in our eyes aren't even for seeing, they're just there to detect light for our body clock. I didn't even know that was a thing.

Aaron Lerner: They are part of a system that communicates directly with the brain's timekeeping center.

Nomar: Yeah, the suprachiasmatic nucleus. That part made everything feel more real to me. It's not just "you're tired," it's like there's an actual pathway controlling everything—eye to brain to hormones

Aaron Lerner: Exactly. That pathway ultimately controls the release of melatonin, which signals to your body that it is time to sleep.

Nomar: And melatonin only really increases when it's dark, right? So if I'm lying in bed scrolling on my phone, I'm basically telling my brain it's still daytime.

Aaron Lerner: Yes. Exposure to light at night suppresses melatonin and delays sleep.

Nomar: That explains a lot honestly. There are nights where I'm exhausted, like physically drained, but I still can't fall asleep. I always thought it was just me being bad at sleeping, but now it feels like I'm actually working against my body.

Aaron Lerner: Modern habits often disrupt the natural rhythm that the body evolved to follow.

Nomar: And it doesn't even take that much light either, which is the crazy part. I remember the lecture saying even low levels of blue light can affect melatonin. That makes it feel almost unavoidable.

Aaron Lerner: Even small amounts of light can shift the timing of your internal clock.

Nomar: That part stuck with me the most. It's not just about sleeping earlier, it's about what I'm doing before I try to sleep. If I don't control light, I'm not really controlling anything.

Nomar: It also made me think about how disconnected we are from natural patterns now. Like we stay up with artificial light, wake up to alarms, and just ignore what our body is actually trying to do.

Aaron Lerner: That disconnect is a relatively recent development in human history.

Nomar: I think that's my biggest takeaway. This isn't just random information, it actually explains my everyday life. Especially being busy with school, football, and everything else, sleep matters, but I've been making it harder on myself without even realizing it.

Nomar: I'm not gonna say I'm fixing my sleep schedule overnight... but now I at least understand why it's been off. And that's probably the first step.

Ariel Vilensky

Lecture 17. Ultraviolet Light: Ozone Layer, DNA Damage and Repair, Melanoma, Vitamin Synthesis and Breakdown, Vision, and Fluorescence

Me: Good evening, Jean Stefancic. You suggest that from a critical theory perspective, objective truth does not exist in social science and politics, and that truth is socially constructed. Could you explain that?

Jean Stefancic: Good evening. The idea is that what we call “truth” in these fields is often shaped by those in power. Narratives, standards, and even definitions of merit can reflect dominant perspectives rather than neutral facts.

Me: I see. But does that mean there’s no objective reality at all in these areas, or just that our understanding of it is influenced?

Jean Stefancic: It’s more the latter. There are real events and conditions, but how we interpret and frame them is deeply shaped by social context and power structures.

Me: So the goal is to recognize those influences rather than assume neutrality?

Jean Stefancic: Exactly. Critical examination helps reveal whose perspectives are being prioritized and whose are being overlooked.

Me: Thank you. That helps clarify the nuance.

Jean Stefancic: My pleasure.

Karen Zheng, kz374

Dinner Conversation with James Lindsay

Me: Hi James, I was reading your argument about the tension between activism and education; that activism acts on certainty, while education begins with uncertainty. In your opinion, do you think those two can ever really coexist?

James: They can exist side by side, but not without friction. Activism needs conviction because it requires believing something strongly enough to act. Education, on the other hand, has to remain open, even to the possibility that it's wrong.

Me: So, what happens when activism enters the classroom in practice?

James: When a political stance is taught as settled truth, it risks becoming an orthodoxy. And once something feels unquestionable, the purpose of education, to question and to test ideas, starts to erode.

Me: Then is the problem activism, or the moment it starts to feel unquestionable?

James: It's when an idea stops being something you test and becomes something you carry as settled.

Me: But isn't that hard to separate, given human nature? Once we believe something strongly, it feels natural to hold onto it, and even to pass it on to others.

James: Yes, belief rarely stays contained. It moves outward, into conversations, into teaching, into the way we shape spaces. That's why the line becomes blurred so easily.

Me: I was thinking about how many universities like Cornell were founded on the idea of separating education from religion, to keep inquiry open. But it feels like that boundary is never fully stable.

James: It never is. That separation wasn't about removing belief, but it was about protecting a space where belief could still be questioned. But human nature tends to fill any space with certainty again.

Me: So even when we remove one kind of orthodoxy, another can take its place. Thanks, James!

Dinner Conversation with James Tutt

Me: Mr. Tutt, we looked at the peppered moth example today and lecture and it made it easier to understand that coloration can seem like just an appearance, but with the moths, color becomes a matter of life or death.

Tutt: Exactly, color isn't always decoration but can also be protection.

Me: The lecture explains that before the Industrial Revolution, light-colored peppered moths stayed on tree trunks covered with light-colored lichens. Since they had low melanin, they blended in and were harder for birds to find.

Tutt: Yes, their pale color matched their environment. They stay safe by hiding in plain sight

Me: But then when the environment changed from the coal, sulfur dioxide increased, which killed the pollution-sensitive lichens, and soot darkened the tree bark.

Tutt: Precisely, a trait can be useful in one environment can hurt others in another

Me: That's what I found so meaningful. The moth didn't change because it wanted to survive, but suddenly a different moth had the camouflage when the environment changed.

Tutt: Natural selection isn't about intention, but about variation, inheritance, and differential survival.

Me: The lecture talked about 1864, when Edleston saw that a dark variant was becoming common in Manchester, even though it used be unknown

Tutt: That's a huge example, the trees darkened, the birds still hunted, and the visible moths were eaten. The moths that were hidden survived.

Me: I noticed that you described the change very practically. If white paint gets dirty near a large town, then trees and fences also become dirty.

Tutt: Science often begins with ordinary observation. Anyone that has seen soot stain a surface can understand why the moth's camouflage changed.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 18 Dinner Conversation

Conversation with Edward East

Ellie: Hi Dr. East, thank you for meeting me for dinner tonight!

Edward East: Of course, Ellie. What would you like to talk about?

Ellie: In class we've been learning about inbreeding and outbreeding, and your corn experiments really stood out to me. I thought it was interesting that self pollination can create pure, consistent lines, but those lines seem to get weaker over time.

Edward East: That's exactly what happens. When you self pollinate for many generations, you lock in traits and reduce variation. The plants become more uniform, but you also lose genetic diversity, and that loss often shows up as reduced strength and performance.

Ellie: Then when you cross two of those weaker lines, the offspring end up stronger than either parent?

Edward East: Yes. That effect is called hybrid vigor, or heterosis. The hybrid offspring tend to be more robust, higher yielding, and generally healthier. It became one of the most important findings in plant breeding because it showed how powerful outbreeding can be.

Ellie: I remember the lecture also mentioned that you wrote about whether similar ideas might apply to humans. That sounds like it would have been controversial.

Edward East: It certainly was. I approached it as a geneticist asking whether inheritance patterns could be compared across organisms. But human lives are shaped by culture, environment, and dignity in ways that make simple comparisons dangerous.

Ellie: It's kind of shocking how a concept that makes sense in agriculture can get extended into such a harmful place when it's applied to people.

Edward East: Exactly. Science does not exist in a vacuum. It reflects the assumptions of its time, and that's why it's important to think carefully not only about results, but about interpretation, ethics, and who may be affected by the conclusions.

Ellie: Thank you, Dr. East. Talking through it like this helped me understand both the value of your research and the risks of how ideas can be misused.

Edward East: You're welcome, Ellie. It was nice talking to you.

Dinner with Peter Frost

Me: Dr. Frost, I want to push on your sexual selection hypothesis – the idea that blonde hair and blue eyes in northern Europe evolved rapidly, around 11,000 years ago, because of intense competition among women for scarce men. It's a fascinating argument, but it's also one that makes a lot of people deeply uncomfortable. Does that discomfort concern you?

Frost: (without hesitation) The discomfort is interesting data, actually. We apply sexual selection arguments to peacocks without controversy. We apply them to the coloration of fish, to the plumage of birds, to nearly every species on earth. The moment we apply the same framework to humans, and specifically to human populations in one geographic region, suddenly the methodology is suspect. I think it's worth asking: is the science being questioned, or is it the conclusion?

Me: But surely the history matters. Arguments about European physical traits have been weaponized in ways that peacock plumage never has. Doesn't the anthropologist bear some responsibility for how the work travels in the world?

Frost: Of course. And I choose my words carefully for precisely that reason. But notice what my argument actually says, it says that blonde hair and blue eyes are not markers of superiority. They are markers of scarcity. They arose as a frequency-dependent signal, a way for individual women to distinguish themselves visually in a population where most people looked the same. The very logic of the model undermines any hierarchy. Rare variants spread because they stood out, not because they were better. A white tulip in a field of red ones catches the eye. That doesn't make white tulips superior tulips.

Me: That's a clever rhetorical move, but let me press you further. Your hypothesis depends on a very specific demographic scenario: that male hunters died in such numbers that women significantly outnumbered men in Ice Age northern Europe, creating fierce mate competition. The evidence for that bottleneck seems thin, doesn't it?

Frost: (leaning forward, genuinely engaged) That is the right question to ask, and I appreciate that you're asking it rather than simply objecting on political grounds. You're correct that direct demographic evidence from that period is fragmentary. What I have is circumstantial – the genetic dating of the MC1R variants to roughly 11,000 years ago, the unusual diversity of hair and eye color confined to one region, and the theoretical framework of sexual selection. The question is: what alternative explanation produces that distribution over that timescale? Natural selection for UV absorption doesn't work, blonde hair is worse than dark hair for vitamin D production in low-light environments.

Me: So you're arguing by elimination, essentially. Every other explanation fails, so sexual selection is what remains.

Frost: That is precisely it. And I would add, Darwin himself made the same kind of argument for human racial diversity. He found that climate and natural selection couldn't account for the variation he observed between populations, and concluded that sexual selection must be doing work that nothing else could explain. I am extending his logic, not inventing it.

Me: Here's what strikes me as the deepest question in all of this. If beauty standards – even something as seemingly timeless as a preference for certain hair or eye colors – are themselves products of evolutionary contingency, random mutations that happened to coincide with unusual demographic circumstances, what does that do to our sense of beauty? Does knowing the mechanism diminish the experience?

Frost: (sitting back, smiling slowly) That is a question for a philosopher, not an anthropologist. But I'll attempt it anyway. Knowing that sunsets are caused by the scattering of short wavelengths by atmospheric particles does not make sunsets less beautiful. Knowing that a face is beautiful because it signals genetic fitness does not prevent the catch in the throat when you see it. The explanation and the experience live on entirely different floors of the same building. They don't interfere with each other. If anything, knowing why beauty arose makes it more extraordinary – that out of famine and death on the Ice Age steppe, something as improbable and specific as blue eyes looked back at someone for the first time and was found to be remarkable.

Lecture 18

Tyler: The peppered moth example honestly made evolution way easier to understand. Before that, natural selection felt kind of abstract.

Charles Darwin: It becomes clearer when you can observe it directly. The moths showed adaptation in real time.

Tyler: Yeah, like you could literally see which ones blended into the trees after industrial pollution changed everything.

Friedrich Engels: Industrialization reshaped the environment itself. Manchester was full of that change.

Karl Marx: And it shows how capitalism doesn't just affect people, it alters nature too.

Tyler: That part about Manchester was honestly disgusting though. Like soot everywhere, everything covered in smoke.

Friedrich Engels: I saw it firsthand. The working conditions and the air itself were unbearable.

Tyler: It's kind of crazy that factories accidentally helped prove evolution.

Charles Darwin: Scientific discovery often comes from unintended circumstances. The moths were simply responding to survival pressure.

Tyler: Right, before pollution the lighter moths were safer because they blended into lichen-covered trees.

Charles Darwin: Then soot darkened the trees, and darker moths had the advantage.

J. B. S. Haldane: And what made it powerful later was that we could actually model it mathematically. Natural selection became measurable.

Tyler: So it went from "this seems true" to "we can calculate how fast it happens."

J. B. S. Haldane: Exactly. We could track gene frequencies and predict how quickly traits spread.

Friedrich Engels: Manchester was basically a living experiment, whether anyone intended it or not.

Karl Marx: Industrial capitalism changed both society and the physical world around it.

Tyler: It's wild how something so destructive ended up being scientifically useful.

Peter Frost: Environmental pressures always shape traits, not just in insects but in humans too.

Karl Marx: You're referring to sexual selection arguments.

Peter Frost: Yes, especially the idea that population pressures in Ice Age Europe influenced traits like hair color.

Friedrich Engels: Evolutionary theory always seems to drift into social interpretation.

J. B. S. Haldane: That's because biology and society often overlap in how people interpret them.

Charles Darwin: The key point, though, is that natural selection itself isn't political. It's just response to environment.

Karl Marx: But the environment here was shaped by industrial systems.

Friedrich Engels: Exactly. Human systems changed the selective pressures.

Tyler: So the moths are basically stuck in the middle of all that history.

J. B. S. Haldane: And later the field unified it all with genetics, the Modern Synthesis. That's where Darwin and Mendel finally connected.

Charles Darwin: I never imagined evolution would be expressed through equations.

Tyler: Now people use evolution to explain everything from biology to society.

Karl Marx: People often turn science into ideology.

Friedrich Engels: That hasn't changed much over time.

Peter Frost: Still, the moths didn't care about any of that. They were just surviving.

Charles Darwin: Precisely. Survival, not symbolism.

Tyler: They were just trying not to get eaten.

Karl Marx: And workers were just trying not to starve.

(Friedrich Engels exhales lightly)

Friedrich Engels: Manchester really influenced all of us in different ways.

Charles Darwin: A polluted city ended up becoming one of the clearest demonstrations of natural selection.

J. B. S. Haldane: Science often depends on unexpected data like that.

Karl Marx: As does history.

Peter Frost: And sometimes both come from the same place.

Tyler: To moths, factories, and the weird way everything ends up connected.

Peter Frost

Jenny: Doctor Frost, I heard about your idea about blonde hair being shaped by sexual selection in Northern Europe and I can't stop thinking about it.

Frost: It's an intriguing pattern, isn't it? Traits that are rare can become especially attractive under certain social conditions.

Jenny: That's what fascinates me. Why are humans so drawn to rare things? Not just hair color - but gold, rare foods...luxury goods.

Frost: Rarity signals value. In evolutionary terms, something uncommon can stand out more easily. It draws attention.

Jenny: So... scarcity makes something feel more important than it actually is? Is this an innate human feeling?

Frost: In many cases, yes. If a trait is unusual, it can become desirable simply because it is different. In small populations, that difference becomes even more visible.

Jenny: That reminds me of diamonds. They're marketed as this rare, precious thing, but I've heard they're not actually that rare.

Frost: Quite right. Their value is, to a large extent, socially constructed.

Jenny: I heard companies control supply and created this marketing image a couple decades back.

Frost: Exactly. Firms like De Beers historically limited how many diamonds entered the market, creating an illusion of scarcity. Over time, that scarcity became tied to ideas of love, status, permanence.

Jenny: So we're basically biologically wired to notice rarity... and then culture takes advantage of that.

Frost: That is a fair way to put it. Biology sets the stage, and culture writes the script.

Jenny: That's kind of scary. It means what we find "valuable" isn't always... real.

Frost: Not entirely real, no. But it feels real because it taps into deep psychological tendencies.

Jenny: I guess blonde hair in a mostly dark-haired population works the same way. It stands out, so it gets attention, and then that attention reinforces its desirability.

Frost: Precisely. Over time, that preference can even shape the population itself.

Jenny: That's wild. It makes me wonder how many of my preferences are actually mine... versus just me responding to what's rare or socially hyped.

Frost: A thoughtful question. Awareness is the first step to answering it.

Jenny: I'll never look at diamonds, or even beauty standards, the same way again.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Mate Peter Frost, why do some humans have blonde hair and blue eyes?

Peter Frost:

Well Mahidul I know the answer, I suggested that the blonde-dark difference in human hair color may have happened because of sexual selection in Northern Europe.

Me:

So you're saying people evolved those traits to attract others?

Peter Frost:

Exactly bro! At the end of the Ice Age there was competition for scarce males among hunter gatherers.

Me:

Wait there weren't enough men around?

Peter Frost:

That's what the theory suggests Mahidul. Food shortages and harsh conditions may have caused lower male population numbers around 10,000-11,000 years ago.

Me:

So women with blonde hair stood out more?

Peter Frost:

Yep! Blonde hair and blue eyes may have evolved because unusual features made some women stand out from rivals more easily.

Me:

Dang so cavemen were really choosing based on appearance?

Peter Frost:

Possibly dude. The London Times even reported that cavemen may have been the first people attracted to blonde hair.

Me:

That's actually kinda funny to imagine.

Peter Frost:

Human evolution can sometimes be connected to attraction and competition, not just survival alone like the case we have here.

Me:

So this is connected to Darwin's theory of sexual selection right?

Peter Frost:

Exactly Mahidul! Charles Darwin explained that certain traits can become more common because they attract mates over many generations.

Me:

That's actually really interesting.

Peter Frost:

Science shows us that human appearance may have been shaped by many social and environmental pressures over time.

Me:

Thanks for telling me all of this!

Peter Frost:

No worries bro, keep learning cool science stuff!

Benito Jaramillo

PLSCI 1130

April 6, 2026

Conversation with Michael Siffre

Benito: Michael, I read about what you did and I genuinely do not know if I could handle it. Two months alone underground with no light and no clock. What made you want to do that?

Michael Siffre: Honestly it was obsession more than bravery. I wanted to understand time from the inside. Not measure it but experience what happens when you strip it away completely. I wanted to know what a human being is without any of those external anchors.

Benito: And what did you find?

Michael Siffre: That the body does not forget. My biological rhythms kept running even when my mind completely fell apart. I thought a few days had passed when weeks were gone. I became deeply depressed. But I kept sleeping and waking on a cycle, just unmoored from the actual time outside.

Benito: So the clock kept ticking but you could not read it anymore.

Michael Siffre: That is a beautiful way to put it. The mechanism survived but the connection to the world was severed. Light is not just a timer. It is what ties us to everyone else. Without it you are running alone.

Benito: That is something we talk about in class but hearing it from someone who lived it is completely different. Here, I made chicken, please eat something.

Michael Siffre: After months of canned food underground, a home cooked meal still means more than I can say. Thank you Benito.

Lecture 18: Dinner Conversation with Charles Darwin

Light and Life | Vansh Kakra | vk365

Vansh: Okay I have to be upfront. In my data science courses we talk about natural selection almost like it's a law of physics at this point. Does it feel strange that your idea basically runs modern biology?

Charles Darwin: It feels stranger that it took so long for people to accept it. The evidence was sitting in front of everyone. I simply wrote it down carefully enough that it became difficult to ignore.

Vansh: So the lecture I'm reading connects your work on natural selection to sexual selection specifically to explain things like skin color, hair color, physical traits across human populations. Walk me through that.

Charles Darwin: Natural selection explains survival. But some traits do not help survival at all - the peacock's tail is absurd from a survival standpoint. It is heavy, it is loud, it attracts predators. And yet it persists. Why?

Vansh: Because the peacock with the biggest tail gets the girl.

Charles Darwin: Precisely. Sexual selection operates separately. Traits that help you reproduce persist even if they make survival harder. I extended this logic to human variation - skin color, facial features, body type - arguing these differences emerged partly through mate preference accumulating across generations.

Vansh: That's a genuinely interesting idea but I have to ask -- didn't that get used in some pretty ugly ways after you?

Charles Darwin: It did. And I want to be clear that I argued for the unity of all human races descending from common ancestors. I opposed slavery explicitly. But yes, people extracted pieces of my work and constructed justifications for things I would have found repugnant.

Vansh: That's the frustrating thing about big ideas. They get loose.

Charles Darwin: Every powerful idea is a tool. And tools do not care who picks them up or what they build with them.

Vansh: That's honestly scarier than anything I've read in my data science ethics module. We spend a whole week on algorithmic bias and I think you just summarized the whole problem in one sentence.

Selina Ke
Dinner Conversation with Julian Huxley

Selina: Huxley, I have been thinking about your ideas on improving society through biology, and I find myself struggling with that idea. You suggest that some groups should have fewer children based on assumptions about their genetic traits. I understand the goal of creating a better society, but it feels uncomfortable to decide who should or should not reproduce.

Huxley: Your reaction is understandable. At the time, many scientists believed that applying biological knowledge to human reproduction could reduce suffering and improve future generations. The idea was that if certain traits were inherited, then guiding reproduction could shape a healthier society.

Selina: But that assumes we can clearly define which traits are better or worse. Intelligence, success, even health are influenced by so many external factors like education and environment. It seems risky to reduce people to their genetics.

Huxley: There was a tendency to place too much weight on heredity and not enough on social conditions. The science itself was still developing, and some conclusions may have been overly confident.

Selina: It also feels like these ideas could justify inequality. If society labels certain groups as less fit, then limiting their opportunities or choices could become easier to defend. That seems less like improving society and more like controlling it.

Huxley: The intention was to benefit society as a whole, but I agree that such ideas can be misused. Any system that gives authority over personal decisions carries the risk of injustice.

Selina: If access to resources like healthcare or financial support depends on whether someone has children, then it becomes coercive. People are not really choosing freely anymore.

Huxley: You are pointing to an important ethical issue. The line between guidance and coercion can become blurred, especially when policies affect basic human needs.

Selina: I also think these ideas assume that some lives are less valuable than others. That does not sit right with me. Everyone has potential, even if it does not show up in ways that are easy to measure.

Huxley: The question of human value is not one that science alone can answer. It requires moral judgment, and those judgments can change over time.

Selina: That makes me wonder if focusing on genetics is not entirely the right approach. Instead of trying to shape who gets to exist, why not focus on improving the conditions people live in so that more individuals can thrive

Huxley: That perspective reflects a broader shift in thinking. Improving education, healthcare, and social support can have a powerful effect on human well being without interfering in personal freedoms.

Lecture 18: Dinner with Thomas Young

Me: I feel like the embarrassing part of the Newton story isn't that he was wrong, it's that everyone just stopped asking questions after him.

Young: That is precisely it. Newton himself never stopped asking questions. His Queries are full of doubt and speculation. It was the people who came after him who turned his conclusions into doctrine.

Me: And you actually went back to his experiments directly instead of just reading what people said about them.

Young: That made all the difference. When you read the man himself you see where the uncertainty was. His followers were more Newtonian than Newton.

Me: So when you did the card experiment and saw light in the middle of the shadow, did you know immediately what you were looking at?

Young: I knew it was incompatible with particles traveling in straight lines. A clean shadow should stay dark in the middle. When it did not, I had to account for what was happening at the edges, and the only framework that made sense was interference.

Me: The water wave analogy you used to explain it is honestly still the clearest way I've heard it described.

Young: I thought carefully about how to present it. People resist mathematics but everyone has watched ripples on a pond meet each other. You can see them add in some places and cancel in others. The logic carries over directly to light, just at a scale too small to observe directly.

Me: And the color bands shifting with different colored light, that's how you calculated the wavelengths.

Young: The spacing of the bright bands depends on the wavelength. Measure the spacing, know the distance, and the geometry gives you the number. It is one of those cases where a very simple measurement yields something quite fundamental.

Me: It's strange that Newton described soap bubbles so precisely and still didn't get there.

Young: He saw everything. The concentric rings, the black spot at the top where the film became too thin to produce color. He described it all in remarkable detail. He simply could not accept that what he was describing was wave behavior. His commitment to corpuscles was too strong.

Martin Luther King Jr.: The Letter and the Moderate

Me: Martin! It's so good to see you! Thanks for making the trip!

King: Maximo! A pleasure, truly. Is that fried chicken I'm smelling?

Me: It is! Fresh out of the skillet. Listen, Martin, I've been reading your Letter from Birmingham Jail for my class, and I have to tell you, what I cannot get over is the conditions you wrote it in. April 16, 1963. A jail cell. You had no notebook, no desk, no secretary. You wrote it on the margins of a newspaper and on scraps of toilet paper, smuggled out in pieces. And what came out of that cell is one of the most carefully reasoned moral documents of the century. How did you write like that in a place like that?

King: Ah, Maximo. You have asked the question I am often asked, and I will tell you honestly. The conditions were not the obstacle. The conditions were the clarity. A man in a comfortable study can be distracted by a thousand things. A man in a cell has only his conscience and the pen he is allowed. The eight clergymen had written their statement calling our protests unwise and untimely, and I had nothing to do but answer them. I had been preparing that answer, in a sense, my entire life.

Me: But here is what I want to press you on, Martin. The part of the letter that cuts the deepest is not where you take on the racist. It is where you take on the white moderate. The man who agrees with you in principle but wishes you would slow down, wait for the right moment, keep the peace. Isn't that a little unfair? The moderate is not the one swinging the club. Why save your sharpest words for him?

King: A fair blow, Maximo, and one I weighed before I wrote it. But let me explain it to you the way I explained it to them. The klansman is a known quantity. You know where he stands. You can prepare for him. The white moderate is the man who tells you your cause is just and your timing is wrong, which is a way of telling you your cause is just and you should not pursue it. He offers you a negative peace, the absence of tension, when what justice requires is a positive peace, the presence of right order. The moderate is not more dangerous than the racist in what he does. He is more dangerous in what he permits. An unjust law is propped up more by the good man's patience than by the bad man's malice.

Me: And in Selma, on March 8, 1965, you said something that has stayed with me. You said a man who refuses to stand up for what is right is already dead, no matter how long he goes on breathing.

King: I did, Maximo. And I meant it the way I said it. A life is not measured by its length. It is measured by what it is willing to risk. The man who will not risk his comfort for the sake of another man's dignity has already surrendered the part of himself that makes him a man. He may go on for forty more years. He is not living them. He is only counting them.

Me: That's a fierce way to hold it, Martin. My professor placed your letter in a lecture about the contradictions in the fundamental laws of nature, the idea that a thinking person eventually has to choose which principles to stand on. He treats your letter as exactly that kind of choosing.

King: Your professor has read me well. Science and conscience are not separate rooms, Maximo. They are the same room with two windows. A man who reasons carefully about the world is sooner or later asked to reason carefully about what he owes the people in it. The letter was my answer to that question. Every man writes his own, in the end, whether he knows it or not.

Me: That's a generous way to hold it, Martin. Would you care for some dessert?

King: I'll pass, Maximo, the fried chicken has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 18: Dinner Conversation with Charles Dickens

Me: Hi Mr. Dickens, thank you for joining me for dinner! I've been reading your descriptions of industrial cities, and I was fascinated by how vividly you described the environment. What made you focus so much on those details?

Dickens: Well, I simply could not ignore them! The cities were constantly changing, and not always for the better. The smoke, noise, and endless machinery reshaped not only the physical environment, but also the lives of the people within it.

Me: I completely agree. We learned that you described Manchester as "Coketown." What did you mean by that name?

Dickens: I saw a place where industry had fully taken over. The buildings and air all seemed affected. To me, it was a world of red brick turned black by soot, where the smoke never disappeared. It felt unnatural, as if the environment itself had been completely transformed.

Me: That's incredibly interesting, because we also learned that these environmental changes affected living things, like the peppered moths becoming darker over time due to natural selection.

Dickens: You're on the right track. When surroundings change so drastically, it is only natural that life must adapt. However, my greater concern was how people were affected.

Me: Do you think people at the time understood how much these changes mattered?

Dickens: Some did, I'm sure. Many accepted it as the price of progress. I, however, was less certain. I believe progress should improve life, not diminish it.

Me: I am a fan of your writing, there is so much depth to your words. Do you think the way we communicate plays a role in understanding these changes?

Dickens: Thank you for your kind words. I am glad I have writing as a medium to express my thoughts. Facts explain what is happening, but writing allows people to feel and relate to it. I hoped that through my stories, I could encourage readers to reflect, rather than simply accept things as they are.

Me: That's really powerful. I believe you are inspiring people to change for the better as seen through Scrooge in "A Christmas Carol". Thank you for your work, and for this conversation.

The orange on my table was being treated like a suspect.

Not eaten. Not peeled. Just... examined.

Albert Szent-Gyorgyi was leaning over it with the focus of someone about to discover something or accuse it of something.

"You ever think about what's inside this," he asked.

"Yeah. Juice."

He didn't look up. "More than that."

He picked it up, turned it in his hands, then set it back down like it had passed a preliminary test.

"I spent years chasing something like this," he said.

"An orange."

"A substance," he corrected. "One that keeps people from getting very sick."

"That feels like a big claim for fruit."

"It is a big claim," he said.

I grabbed another orange.

"So what, you just ate a bunch of these and figured it out."

He smiled faintly. "If only it were that simple."

He started talking in pieces, not like a lecture, more like someone remembering a long, slightly frustrating process.

"I worked with plants," he said. "With tissues that seemed to contain something protective."

"Protective against what."

"Scurvy."

I paused.

"That pirate disease."

“Yes,” he said calmly. “That pirate disease.”

I stared at the orange again.

“So this little thing is out here preventing entire diseases.”

“It contains a compound that your body needs,” he said. “Without it, things begin to fail.”

“Like what.”

“Your gums. Your skin. Your ability to heal.”

“That escalated fast.”

He finally started peeling the orange.

The smell hit immediately.

Bright. Sharp. Almost aggressive.

He nodded slightly, like that scent meant something to him.

“This,” he said, “was not obvious at first. The substance was hidden among many others.”

“So you had to isolate it.”

“Yes.”

“That sounds annoying.”

“It was precise,” he said.

He handed me a slice.

“Eat.”

“This feels like part of the experiment.”

“It always is.”

I ate it.

“Okay that’s good.”

"Yes," he said. "And necessary."

He explained how he first worked with adrenal glands and plants, finding a compound he called "hexuronic acid," before realizing it was the same thing that prevented scurvy.

"You didn't even know what it was at first," I said.

"Not fully," he admitted.

"So you found it before you understood it."

"Yes."

"That's kind of wild."

He squeezed another slice slightly, watching the juice bead up.

"Sometimes you discover something before you recognize its importance," he said.

"Like accidentally finding something useful."

"Exactly."

I leaned back.

"So vitamin C is basically this compound that keeps your body functioning properly."

"Yes."

"And if you don't get it, things go bad quickly."

"Yes."

"And all of that is just... in fruit."

"And vegetables," he added.

"Right. Gotta respect vegetables too."

He laughed quietly.

"You modern people have constant access to this," he said. "In my time, deficiency was more common."

“Yeah, we just ignore it instead.”

“That is a different problem.”

I grabbed another slice.

“So how much do I need.”

“Not much,” he said. “But regularly.”

“That sounds like responsibility.”

“It is maintenance.”

He wiped his hands and looked at the orange peel for a moment.

“There is something satisfying about finding something essential hidden in something ordinary,” he said.

“Yeah,” I said. “Like solving a mystery that was sitting in a fruit bowl.”

He nodded.

“Exactly.”

He stood up to leave, brushing off his hands.

“Do not underestimate small things,” he said.

“Especially if they taste good.”

He smiled.

“That helps.”

He left.

I looked down at the orange.

Same color. Same smell. Same everything.

But now it felt different.

Less like a snack.

More like a quiet solution sitting in plain sight.

Ean Pope

Dinner Conversation

Light and Life

J. B. S. Haldane

Me: Professor Haldane, in my Light and Life class we talked about how you used math to explain evolution, especially with the peppered moth example during the Industrial Revolution.

Haldane: Yes. Natural selection may seem random at first, but changes in populations can often be described mathematically.

Me: That actually surprised me. Most people think evolution is just biology, but you treated it almost like physics or statistics.

Haldane: Evolution involves probabilities. If one trait improves survival, over time that trait tends to become more common in the population.

Me: In class we learned how lighter peppered moths originally blended in with light-colored trees covered in lichen, but after pollution darkened the trees, darker moths had the advantage because birds could not see them as easily.

Haldane: A clear example of natural selection occurring in real time.

Me: My question for you is this: do you think reducing biology to equations risks oversimplifying life?

Haldane: Sometimes. Mathematics is useful because it reveals patterns, but living systems are always more complex than any single model.

Me: That makes sense. I feel like the lecture kept showing both sides of science. Models help explain nature, but people can also become too confident in simplified explanations.

Haldane: Exactly. A model is a tool for understanding reality, not reality itself.

Me: I actually liked that part because now everybody talks about data and algorithms like they explain everything, but there's always more complexity underneath.

Jasmine: Karl Marx! What are you doing in a biology textbook??

Karl Marx: I am surprised too if I am being honest.

Jasmine: Okay wait... you and Charles Dickens were literally in London at the same time??? That feels like the 1800s version of two podcasts competing for listeners.

Karl Marx: Not too sure what a podcast is, but I assure you, Miss Jasmine, I was not competing with Dickens for entertainment.

Jasmine: No but it's actually fascinating. You both saw the same Industrial Revolution... factories, inequality, workers being exploited. Yet, you both somehow came to completely different conclusions. I also just would have been so afraid to live in this time period of London.

Dickens was basically like: Guys, maybe be kinder... And you were like: Burn the entire system down.

Karl Marx: That is not even entirely wrong. To clarify, Dickens believed small moral changes in individuals could fix society. But I believed the problem was structural. Specifically, the entire economic system itself.

Jasmine: So, under industrial capitalism, workers produced enormous wealth, yet owned almost nothing themselves. The laborer became separated from the value of his own labor.

I run my own non-profit organization, so I know what you mean by how charity may ease suffering temporarily, but it does not eliminate exploitation.

Karl Marx: Yes. If you were in this time era, your heart would wrench for the working class. The worker sells labor merely to survive, while the capitalist accumulates profit from that labor. Over time, this creates immense inequality and imbalance of power.

Jasmine; But here's my question. Do you think revolution always works? Because history gets... complicated after you.

Karl Marx: Any idea carried out without restraint can become dangerous.

My goal was to analyze capitalism and its contradictions, not to predict every government that would later invoke my name.

Jasmine: People online act like historical thinkers personally approved every future interpretation of their work

Marx: A common problem with being dead, unfortunately. HA.

Jasmine: Okay, I fear that this era now... if you saw modern capitalism today: Billionaires, social media, influencers selling “rise and grind” courses—

Marx: —I suspect I would have much material to work with.

Jasmine: Let’s go for a walk and I can show you around modern day London!

Nomar Tejada:

I can't lie, sitting here with you is a little crazy. We just talked about your work in class, especially how traits like coloration can actually determine survival. Like the peppered moth example. It made evolution feel way more real.

Charles Darwin:

I'm glad it struck you that way. The beauty of nature is that even the smallest differences—like a slight change in color—can decide whether an organism lives or dies. Over time, those small advantages accumulate. That's natural selection at work.

Nomar Tejada:

Yeah, the whole idea that the environment literally *shifts* what traits matter blew my mind. Like before the Industrial Revolution, lighter moths were safe, but once everything got darker, they basically stood no chance.

Charles Darwin:

Exactly. The environment is never static, so what is advantageous today may not be tomorrow. Evolution is not about progress toward perfection, but adaptation to changing conditions.

Nomar Tejada:

That's interesting because in class it almost felt like people *want* evolution to be this clean, forward-moving thing. But it's messy. Even your ideas got tied into stuff like social theories and politics later on.

Charles Darwin:

Yes, and that is something I would urge caution about. My work describes natural processes. It was never meant to justify social or moral conclusions about human worth or society.

Nomar Tejada:

I respect that. Honestly, hearing about how science got used in ways like eugenics later on was uncomfortable. It made me realize how powerful ideas can be when people take them out of context.

Charles Darwin:

Science is a tool. Like any tool, its impact depends on how it is used. That is why critical thinking is essential—not just in discovery, but in application.

Nomar Tejada:

That actually hits. I guess that's kind of what our professor was getting at too—like questioning whether something is a fact, theory, or just a story we're telling ourselves .

Charles Darwin (smiling):

Precisely. Curiosity and skepticism must go hand in hand. That is how knowledge truly advances.

Nomar Tejada:

Man... I feel like I just learned more at this dinner than in the whole lecture.

Ariel Vilensky

Lecture 18. Plant and Animal Coloration: Pigments, Attraction, Inbreeding and Outbreeding, Camouflage, and Mimicry

Me: Good evening, President Calvin Coolidge. In your speech, you emphasize maintaining the moral and spiritual heritage of the nation. What did you mean by that?

Calvin Coolidge: Good evening. I meant that the strength of a nation lies not only in its institutions, but in the values that sustain them: reverence, discipline, and moral responsibility.

Me: You warn against “pagan materialism.” Were you concerned about society becoming too focused on material success?

Calvin Coolidge: Yes. Material prosperity is important, but without moral grounding, it can lead to decay. A nation must preserve the principles that gave it purpose.

Me: And the idea of “replenishing the altar fires” - is that about actively maintaining those values?

Calvin Coolidge: Precisely. Values do not sustain themselves; each generation must renew them through action and commitment. And just like abandoning our moral underpinnings for new ideas, letting the fire die out is actually a regression, not progress.

Me: Thank you, Mr. President.

Calvin Coolidge: You’re welcome.

Karen Zheng, kz374

Dinner Conversation with Abraham Lincoln

Me: Hi Abraham, I was reading about your exchange with the workers of Manchester. I found it powerful that people so far away, even while suffering economically, still chose to support the abolition of slavery. Did that surprise you?

Lincoln: It did. I think what struck me most was that they chose principle over their own immediate comfort. It's easy to stand for something when it costs you nothing, but they were losing jobs, stability, and still chose to support the cause. You don't see that kind of conviction often.

Me: I agree, I feel like it's easy to talk about values when things are going well, but harder when there's a real cost.

Lincoln: No one is born with perfect clarity. I also grew into my beliefs, but once you begin to see something as wrong, not just in theory, but in your conscience. It stays with you and becomes harder to ignore.

Me: I think that's what stayed with me too. It made me wonder whether people already knew slavery was wrong, but needed a moment like that to really act on it.

Lincoln: I think many people knew, in some quiet way, that slavery was unjust. But it took time, and often struggle, for that understanding to come fully into view. And once it does, you are faced with a choice, whether to act on it or turn away.

Me: It reminds me of how, in science, light reveals things that were always there, but we just couldn't see them clearly before. It's not that the truth changes, it's just that we start to notice it.

Lincoln: That's a powerful way to think about it. The truth doesn't shift, but our willingness to see it does. And sometimes, once it becomes visible, it asks something of you.

Me: I guess it makes me think about what responsibility we have now, even in situations that don't directly affect us.

Lincoln: Exactly. The question is never only what is true, but what we are willing to do once we recognize it. Let what you see guide your actions. For it is only when truth is carried into action that it begins to change the world.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 19 Dinner Conversation

Conversation with Isaac Newton

Ellie: Sir Isaac, thank you so much for meeting with me for dinner.

Isaac Newton: Of course, Ellie. What are you curious about?

Ellie: In my class we've been talking about light and color, and your prism experiments really stood out to me. I thought it was so interesting that you showed white light is actually made up of many colors.

Isaac Newton: Yes, that discovery mattered a great deal. Many people assumed white light was simple and pure. But when I passed it through a prism, it separated into a whole spectrum. Red, orange, yellow, green, blue, indigo, violet. Those colors were not created by the glass. They were already contained in the light.

Ellie: So the prism was basically revealing what was hidden inside white light.

Isaac Newton: Exactly. It split the light into its components, and that helped explain why different materials could appear colored.

Ellie: We also learned that you believed light behaved like particles. You called them corpuscles.

Isaac Newton: I did. I thought light was made of tiny particles, and I tried to connect color to properties of those particles, like size. In my model, red would be associated with larger corpuscles and violet with smaller ones.

Ellie: But other scientists at the time, like Hooke and Huygens, argued light was a wave. It seems like you strongly disagreed.

Isaac Newton: I did disagree. Based on what I observed, light didn't behave the way I expected waves to behave. Sound, for example, bends around corners quite easily, but light seemed to travel in straight lines and cast sharp shadows. That made a particle explanation feel more convincing to me.

Ellie: That makes sense. But then later we talked about Thomas Young and the interference experiment, and that felt like the wave theory explained something your model couldn't.

Isaac Newton: Young's experiment was extremely clever. Interference is naturally explained by waves, and I did not have that evidence available in my time. If I had, I would have had to take it seriously.

Ellie: Wow, this was really interesting. Thank you, Sir Isaac.

Isaac Newton: You're very welcome, Ellie. I really enjoyed our dinner.

Dinner with Robert Hooke

Me: Mr. Hooke, I've been reading your Micrographia, the section on the fantastical colors of mica and peacock feathers. You called them "fantastical colors" to distinguish them from pigments. What made you so certain the colors weren't coming from some dye within the material itself?

Hooke: (brightening immediately) The water test! That was the key of it. When you wet the feather or the thin plate of mica, the colour vanishes entirely – and when it dries, it returns. Now a pigment is not so obliging. Soak a red cloth and it stays red. But these fantastical colors depend entirely upon the surfaces, upon the thinness of the plate and the way light plays between its two faces. Wetting alters the reflections, destroys the arrangement, and with it – gone. That told me the colour lived not in any substance, but in the geometry of the thing.

Me: That's remarkable reasoning. But you didn't have wave theory as we understand it today. How did you conceive of what was actually happening at those surfaces?

Hooke: I thought of light as a very rapid vibration – much as sound is a vibration of air, only exceedingly swifter and shorter. And I reasoned that at each surface of a thin plate, some portion of the light is turned back, and some passes through. These two returned pulses – the one from the top face, the one from the bottom – must interfere with one another. If they meet in agreement, the colour is strengthened. If they meet in opposition, it is weakened. The colour you see depends upon the thickness of the plate and the nature of the vibration.

Me: You were essentially describing what we now call thin-film interference – two hundred years before the mathematics was fully worked out. Did Newton engage with your explanation?

Hooke: (a shadow crossing his face) Newton observed the same rings in a lens pressed upon glass – they are called Newton's Rings now, though I had seen them first. He acknowledged the phenomenon but would not grant the mechanism. He insisted light was corpuscles, particles, not waves. He could not explain the colors of thin plates with his corpuscles and he knew it, yet he was Newton and so the world waited on his convenience. (pausing) I do not say this from bitterness. I say it as a fact of the sociology of natural philosophy.

Me: That tension between wave and particle, it never fully resolved, even into the modern era. Physicists eventually concluded light is both, depending on how you look at it. Does that satisfy you or trouble you?

Hooke: (staring into his ale for a moment) It troubles me productively, which is the best kind of trouble. Nature has never been obliged to resolve itself into categories convenient for human understanding. That light should be a vibration and a particle simultaneously strikes me as deeply strange, but then so does the fact that a peacock's feather should carry the entire rainbow in nothing more than the thickness of its transparent lamina. Strangeness is the door through which understanding enters, if one is patient enough to stand in the doorway.

Me: What strikes me about your Micrographia is that you seemed to find beauty and mechanism entirely compatible – you were moved by the peacock's feather at the same time as you were dissecting its optics. Do you think that's rare?

Hooke: (leaning forward, quite serious now) It should not be rare. It is, I fear, becoming rarer. There are men who look through the microscope and see only data to be extracted. And there are men of letters who would rather not know the mechanism, lest it spoil the poetry. Both impoverish themselves. When I looked at a flea under my lens and drew what I saw – every bristle, every joint, every extraordinary armour of the thing – I was not reducing it. I was amplifying it. The closer you look at nature, the more extraordinary it becomes. The fantastical colors are more wonderful, not less, when you understand that they arise from nothing but geometry and light.

Me: I think that's exactly right. And it's the argument for the kind of course, and the kind of mind, that refuses to separate the beautiful from the true.

Hooke: (raising his glass) Then we are in agreement. Which, in my experience, is not so common as it ought to be.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Brother brother brother Christiaan Huygens, what was wrong with the corpuscular theory of light?

Christiaan Huygens:

Well Mahidul, I thought the theory had some good ideas, but it also had serious limitations.

Me:

What kind of limitations?

Christiaan Huygens:

If light was made out of tiny material particles, then light rays crossing each other should make the particles collide and scatter everywhere around them.

Me:

So the light beams would crash into each other?

Christiaan Huygens:

Exactly Mahidul man! If that happened, it would make seeing objects very difficult because the light would scatter instead of traveling smoothly.

Me:

Wait so people wouldn't even be able to clearly see different objects?

Christiaan Huygens:

That's right Mahidul boy my best knowledge seeker. Two people looking at different objects at the same time would have problems because the intersecting light rays should disturb one another.

Me:

That actually makes a lot of sense.

Christiaan Huygens:

Because of this, I started supporting the idea that light behaves more like waves instead of tiny solid particles.

Me:

So that's where the wave theory of light comes from?

Christiaan Huygens:

Yep dude! Waves can pass through each other without colliding the same way particles would.

Me:

Did everybody agree with you back then?

Christiaan Huygens:

Not really bro. Many scientists still supported Newton's particle theory for a long time.

Me:

Science really had people arguing a lot huh.

Christiaan Huygens:

It definitely did Mahidul, but that's how science grows and improves over time.

Me:

Thanks for telling me all of this!

Christiaan Huygens:

No worries dude, keep questioning how the world works!

Benito Jaramillo

PLSCI 1130

April 20, 2026

Conversation with Colin Pittendrigh

Benito: Dr. Pittendrigh, thank you for coming. I made steak tonight. I wanted to ask you about something that seems almost philosophical. How do you actually prove that an internal clock is real and not just the organism reacting to something in the environment you have not noticed yet?

Colin Pittendrigh: That was the central challenge of my career. Frank Brown argued for years that organisms were just picking up on subtle geophysical cues, cosmic rays, electromagnetic fields, things we could not easily control for. It was a serious argument.

Benito: So how did you counter it?

Colin Pittendrigh: The period. When you isolate an organism in truly constant conditions, the rhythm persists but it drifts away from exactly 24 hours. It settles into its own natural period, slightly longer or shorter depending on the individual. If it were tracking an external signal that signal would keep it at exactly 24 hours. The drift proved the clock was self-generated.

Benito: So the imperfection was actually the evidence.

Colin Pittendrigh: Beautifully put. A perfect clock would have been useless as proof. It was the wobble that made the case.

Benito: I never thought about it that way. That is going to stick with me.

Colin Pittendrigh: Good. Now this steak is fantastic, you have real talent in the kitchen Benito.

Lecture 19: Dinner Conversation with Isaac Newton

Light and Life | Vansh Kakra | vk365

Vansh: Okay, real talk. You invented calculus, explained gravity, figured out color. Did you ever just take a day off?

Isaac Newton: The plague gave me two years of forced vacation. I spent them inventing calculus.

Vansh: That is the most depressing flex I have ever heard. So, corpuscular theory. You thought light was made of tiny particles. Why?

Isaac Newton: Light travels in straight lines, casts sharp shadows, and reflects like a ball off a wall. Waves do not do this. Particles do. The logic was sound. The evidence was ambiguous. Two centuries later, quantum mechanics confirmed light is both a particle and a wave. So I was half right.

Vansh: That is the most confident way anyone has ever described being wrong.

Isaac Newton: My observations were correct. My interpretation was incomplete. Those are different failures.

Vansh: As a data science student, that distinction genuinely matters. Good data, incomplete model.

Isaac Newton: Exactly. Keep the rings. Improve the explanation. That is how science moves.

Vansh: What about the prism work? Before you, people thought the glass added colour to white light?

Isaac Newton: They believed the prism was staining the light. I showed it was merely separating colors already present. White light is not simple. It is the most complex light there is.

Vansh: White feels like nothing yet turns out to be everything. That is a genuinely beautiful result.

Isaac Newton: The best results usually feel almost too clean to be true.

Vansh: My lab reports never feel that clean. There's always noise.

Isaac Newton: There was noise in mine too. I simply did not include all of it.

Vansh: So you cherry-picked?

Isaac Newton: I presented the clearest evidence for the clearest conclusion. Every scientist makes choices.

Vansh: Last question. No computers, just glass, sunlight, your own brain. Does modern science feel like cheating?

Isaac Newton: Better tools should produce better science. What concerns me is whether the curiosity is still underneath all the equipment.

Vansh: Sometimes we run very sophisticated analyses on questions nobody actually cares about.

Isaac Newton: The work that matters changes how people see something they thought they already understood.

Vansh: Like white light.

Isaac Newton: Like white light.

Selina Ke
Dinner Conversation with Alfred Russel Wallace

Selina: I was really struck by your ideas about animal coloration. You start from something that feels very familiar, which is that to most people, the colors of animals seem random, almost just decorative. I used to think that too, especially when looking at bright birds or patterned insects.

Wallace: That is exactly the reaction I hoped to challenge. At first glance, nature can appear full of arbitrary beauty, but closer observation reveals that these features often serve important purposes.

Selina: What surprised me is your argument that color is not just about beauty at all, but about survival. You suggest that an animal's color can determine whether it lives or dies.

Wallace: Yes, in many cases color is directly tied to survival. Some animals blend into their surroundings to avoid predators, while others use bright colors to signal danger or unpleasantness. These traits are shaped by natural selection over time.

Selina: So something like a green caterpillar is not just randomly green. It is green because it helps it disappear into leaves and avoid being eaten.

Wallace: What may seem like coincidence is often the result of long processes of adaptation. Those individuals whose colors helped them survive were more likely to reproduce and pass on those traits.

Selina: I also found it interesting that not all bright colors are a disadvantage. I always thought being noticeable would make an animal more vulnerable, but you explain that sometimes being conspicuous actually helps.

Wallace: That is an important point. Bright colors can serve as warnings. If an animal is toxic or dangerous, being easily recognized can prevent attacks. In other cases, color helps members of the same species find each other or attract mates.

Selina: That really changed how I see nature. What looks like randomness or beauty might actually be a kind of communication system. Colors are sending signals, whether it is hide, stay away, or come closer.

Wallace: Yes, coloration often functions as a language shaped by evolution. It conveys information that is crucial for survival and reproduction.

Selina: I think what fascinates me most is how your ideas push us to look more carefully at the natural world. Instead of assuming things are just the way they are, you are asking us to question why they are that way.

Wallace: Observation and curiosity are at the heart of understanding nature. What appears simple at first often reveals deeper patterns when examined closely.

Selina: It also makes me think about how easy it is for humans to underestimate complexity. We see something beautiful and assume it has no function, when in reality it might be essential.

Wallace: That is a common tendency. But science allows us to move beyond first impressions and uncover the underlying reasons for what we observe.

Selina: If so many traits in nature that seem purely aesthetic actually have survival purposes, do you think there is anything in the natural world that truly exists just for beauty, or does everything ultimately serve some function?

Wallace: While beauty may appear to us as an end in itself, in the natural world it is often intertwined with function, shaped by the pressures of survival, reproduction, and the intricate relationships between living things.

Me: I want to ask about Newton, because it seems like you proved him wrong and got destroyed for it. Did you expect that going in?

Young: I did not set out to contradict Newton. I set out to understand him, which is different. His objections to the wave theory were careful and I took them seriously. What I found was that they were answerable. Light bending into shadow, the colored bands in soap bubbles, all of it made more sense as interference than as corpuscles.

Me: The double slit experiment though, it sounds almost too simple. A needle, a strip of card, sunlight through a pinhole.

Young: That was exactly the point. It had to be simple enough that the result could not be explained away. When the shadow divided itself into alternating bright and dark bands, that was interference. Two waves reinforcing each other, then canceling. Particles simply could not produce that pattern.

Me: And then someone published anonymously calling your work the product of a misguided imagination.

Young: Lord Brougham, most likely. It is a strange thing to be attacked for taking Newton's own experiments seriously enough to repeat them. Newton had been essentially beatified by then. Any challenge read as heresy rather than science.

Me: But the interference patterns also let you calculate the actual wavelengths of each color, right? That seems like it should have been enough to convince people on its own.

Young: You would think so. I was able to measure the wavelength of each color in the visible spectrum by looking at where the bright bands fell. It was a practical result, not just a theoretical claim. But the theory it came from was too threatening. Half a century passed before it was broadly accepted.

Me: That's a long time to be right and ignored.

Young: It is. Though I was occupied with other things. Medicine, Egyptian hieroglyphics, the theory of tides. I did not have the luxury of waiting around to be vindicated on any single question.

Anthony Fauci: Science, Censorship, and a Pardon in the Final Minutes

Me: Anthony! It's so good to see you! Thanks for making the trip!

Fauci: Maximo! A pleasure, truly. Is that chicken parmesan I'm smelling?

Me: It is! Fresh out of the oven.

Listen, Anthony, I've been reading about you for my class, and I have to start with something you said on Face the Nation in 2021. You said that criticizing you was equivalent to criticizing science itself. My professor pushed back on that in his lecture, and I want to press you on it too. You are one man. Science is a method, a community, a centuries-long argument. How did you arrive at a sentence that seemed to collapse the two into each other?

Fauci: Ah, Maximo. You have gone right at it, and I will not pretend the sentence has aged well. I will tell you what I meant in the moment, and then I will tell you what I should have said. In the moment, I was exhausted, I was under attack from people I felt were arguing in bad faith, and I reached for the shield closest to hand. I called it science. What I should have said was that I was representing a particular set of public health recommendations built on a particular reading of the evidence, and that reasonable people could disagree. That would have been the honest sentence. The one I said was a shorter sentence, and a worse one.

Me: But here is what I want to press you on, Anthony. The Great Barrington Declaration came out in October 2020. Three epidemiologists, Bhattacharya from Stanford, Gupta from Oxford, Kulldorff from Harvard. Serious people. Francis Collins wrote to you asking for a quick and devastating published takedown of them. You complied. The emails are public now. Is that what science looks like?

Fauci: A fair blow, Maximo, and one I cannot dodge. I will say this plainly. Francis used a word he should not have used, and I responded to it when I should have pushed back on it. These were not cranks. They were credentialed people making a serious argument about focused protection, and the honest response would have been to engage the argument in the open literature. What we did instead was treat them as a public relations problem rather than a scientific one. I have had time now to think about that, and I do not think it holds up.

Me: And Collins himself said in 2023 that the two of you had, in his words, a very narrow public health mindset. That you attached almost no weight to the economic disruption, the children out of school, the deaths of despair, the small businesses closed. He said it, not me.

Fauci: He did say it, and he was right to say it. I will give you the concession you are asking for. We were infectious disease people. We saw the pandemic through the lens of the virus, because that is the lens we had spent our careers grinding. Other lenses existed, and other people were holding them up to us, and we did not look through them as carefully as we should

have. The cost of that narrowness was borne by children and by the poor more than by anyone else, and I carry that.

Me: One last thing, Anthony. In his final nineteen minutes in office, President Biden issued you a full pardon. My professor wrote that a pardon is another form of censorship, because it forecloses the trial that would have let the questions be asked under oath. What do you make of that framing?

Fauci: A cutting framing, Maximo, and I will not insult you by pretending it does not land. A pardon spares the man. It does not clear the record. I would rather have answered the questions. Whether I would have answered them well is another matter, but the chance to try would have been cleaner than the chance to be spared.

Me: That's an honest answer, Anthony. Would you care for some dessert?

Fauci: I'll pass, Maximo, the chicken parmesan has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 19: Dinner Conversation with Christiaan Huygens

Me: Hi Mr. Huygens, thank you for meeting me for dinner! In class, we learned about your wave theory of light. What made you question the idea that light was made of particles?

Huygens: Well, I found that the particle theory could not explain certain observations I had made. For example, beams of light can cross one another without interfering. If light were made of particles, I would instead expect them to collide and scatter!

Me: That's a really interesting point. So how did your understanding of light change?

Huygens: I considered that light might be a form of motion. According to the mechanical philosophy of nature, anything that causes motion must itself be in motion. Since light can produce effects like heat and fire, I realized that it must also involve motion.

Me: So you proposed that light travels as a wave?

Huygens: Yes, I suggested that light is a wave that propagates through a medium, which I called the ether. This allowed me to explain how light could travel in straight lines, reflect, and refract, while still passing through other light without interference.

Me: That reminds me of sound waves passing through air.

Huygens: Exactly. Just as sound is a vibration in air, I believed light was a vibration in this invisible medium. The motion spreads outward, creating what we now call wavefronts.

Me: We also learned that your theory could explain reflection and refraction. Tell me more.

Huygens: That is correct. By treating light as waves, I was able to describe how it changes direction when it moves between different materials, and why it reflects at equal angles.

Me: But at the time, Newton's particle theory was more widely accepted, right?

Huygens: Yes. Newton had great influence and his theory explained many observations quite well. My ideas were not widely accepted at first, but I believed they provided a more complete explanation.

Me: It's interesting because now we learn that light behaves as both a wave and a particle.

Huygens: Indeed. It seems that nature does not always conform to simple categories. What matters is that we continue to question and refine our understanding.

Me: Thank you for this conversation. It's fascinating to see how questioning assumptions can lead to entirely new ways of understanding the world.

I didn't notice him at first.

The apple did.

It rolled. Just slightly. No reason. No slope. Just enough to make me look up from my phone and question my life choices.

And there he was, standing in my yard like he had always been there, staring at the tree like it owed him an explanation.

Isaac Newton didn't say anything for a while.

He just watched.

"You're not going to catch it," I said.

"Catch what."

"The apple. I know the story."

He glanced at me. "Stories simplify things."

"Yeah, well, this one says you got hit on the head and invented physics."

He looked back at the tree.

"I did not require head trauma."

Another apple dropped.

Not dramatically. Just... fell.

Straight down. No hesitation. No confusion. Like it had already accepted its fate before it even let go.

He stepped closer.

"Why down," he said quietly.

"Gravity."

"That is the name," he said. "Not the answer."

I leaned against the fence.

“Okay then, what’s the answer.”

He crouched and picked up the apple, turning it slowly in his hand.

“Everything attracts everything,” he said.

“That sounds fake.”

“It is measurable.”

“Of course it is.”

He tossed the apple lightly upward.

It came right back down.

We both watched it.

“You see it fall,” he said. “You do not see the Earth rise to meet it.”

I blinked.

“I’m sorry, what.”

“The force is mutual,” he said. “The Earth pulls the apple, the apple pulls the Earth.”

“That apple is not pulling the Earth.”

“It is,” he said calmly. “Just... not very effectively.”

I stared at the ground like it had been hiding something.

“So everything is pulling on everything else all the time.”

“Yes.”

“That sounds exhausting.”

“It is constant.”

He stood up again, brushing off his hands.

“You think of motion as something that needs to be caused,” he said.

"It does."

"Or something that needs to be stopped."

"Also true."

He shook his head slightly.

"An object in motion continues."

"Unless something stops it."

"Yes," he said. "Which is why things seem to require force."

"That feels backwards."

"It is clearer without friction," he said.

"Yeah, well, my life has a lot of friction."

He started walking, not really anywhere specific, just thinking out loud in motion.

"If you could remove all resistance," he said, "something moving would never stop."

"So like... infinite momentum."

"Persistent motion."

"That's kind of cool."

He stopped and looked up at the sky.

"The same force that brings the apple down," he said, "keeps the moon in its path."

I followed his gaze.

"That feels like a big jump."

"It is the same rule."

"You're telling me the moon is basically falling."

"Yes."

“Why doesn’t it hit us.”

“It keeps missing.”

I laughed.

“That’s not reassuring.”

“It is precise,” he said.

There was a long pause.

The tree stood there. Still. Innocent looking.

Another apple dropped.

Of course it did.

“So you just saw this happening,” I said, “and decided it applied to... everything.”

“I asked a question,” he said.

“And then answered it for the entire universe.”

He didn’t smile.

“I described what was already there.”

I kicked the apple lightly.

It rolled. Slowed. Stopped.

“Friction,” I said.

“Yes.”

“Always ruining things.”

“Always revealing things,” he corrected.

He turned to leave, like he had finished thinking here.

“Do not ignore simple events,” he said.

“Like apples falling.”

“Like anything that happens the same way every time.”

I nodded.

“That’s where the patterns are.”

“That is where the laws are,” he said.

He walked off without looking back.

The yard felt normal again.

Tree. Grass. Apples.

One dropped.

Straight down.

Of course it did.

I watched it hit the ground and just sit there like nothing interesting had happened.

Which, apparently, meant everything had.

Jasmine: Sir Isaac Newton, I feel like people always connect you with gravity and apples, but today I want to start with something prettier: sometimes less is more.

Newton: A fine beginning. In truth, some of nature's most beautiful effects appear only when matter becomes extremely thin. I think you are alluding to my bubbles/adjacent experiment:

I observed that transparent substances: glass, water, air, and similar materials. When formed into very thin plates or bubbles, they may show many colours, though at greater thickness they appear clear and colourless.

Jasmine: Ah yes, and the colour arises from the behavior of light itself!! Some light reflects off the top surface of the bubble, and some reflects off the bottom surface!

And Robert Hooke noticed this too, right? In pearls, mother-of-pearl shells, oyster shells, and even peacock and duck feathers.

Newton: Yes. Hooke observed that these beautiful colours appeared wherever transparent bodies were thin enough and arranged in layers. With his microscope, he saw that many of these colourful surfaces were made of thin plates, or laminae.

Their beauty comes from structure. The layers are so thin that they interact with light, reflecting and strengthening certain colours while diminishing others.

Jasmine: That's actually insane. So a peacock feather is not just pretty because of pigment. It is pretty because of physics!

Less is more again. A thin layer can do what a thick transparent object can't.

Newton: Indeed. When matter becomes thin enough, light reveals its hidden order.

Jasmine: Okay, so soap bubbles, mica, pearls, shells, feathers... all of them are basically nature flexing.

THAT'S SO LITTTT.

Newton: Your generation scares me. We do not have this much energy nor obscure vocabulary... I feel like I should leave now. I am scared

Jasmine: Nature has always known how to make beauty from subtle structure. SORRY!! Do not leave ahh

Newton: Well you look at that! I must run to my next dinner conversation with you classmate Candy! I do pray she does not give me such brainrot talk using this term "lit"

Jasmine: Farewell!

Nomar Tejada:

I'm not gonna lie, today's lecture messed with my head a little. I always thought color was just... there. But now you're telling me some colors don't even come from pigments?

Thomas Young:

That confusion is a good sign. It means you're thinking. Many of the most vibrant colors you see, like on butterfly wings or soap bubbles, aren't from pigments at all. They come from how light waves interfere with each other.

Nomar Tejada:

Yeah, the soap bubble thing was wild. Like it's literally transparent, but somehow you get all those colors just from thickness and light angles. That doesn't even feel real.

Thomas Young:

It is very real. When light waves overlap, they can either amplify each other or cancel each other out. That's what I described as interference. It's why you see bright bands and dark bands instead of uniform light.

Nomar Tejada:

So basically... light is kind of fighting itself?

Thomas Young (smiling):

Not fighting. Interacting. When two waves line up, they strengthen each other. When they oppose, they vanish. It's more like coordination than conflict.

Nomar Tejada:

That actually makes sense. But then why did people stick with Newton's idea for so long? Like... no offense.

Thomas Young:

None taken. Newton was brilliant, but people trusted him too much. They followed his conclusions instead of questioning them. Science only moves forward when someone is willing to challenge what seems settled.

Nomar Tejada:

That's kinda crazy though. You basically proved something different and people were like "nah, we're good."

Thomas Young:

At first, yes. New ideas often feel uncomfortable. But eventually, evidence speaks louder than reputation.

Nomar Tejada:

I respect that. Honestly, it reminds me of being on a team. Like if everyone just listens to the loudest voice, you miss better plays.

Thomas Young:

An excellent analogy. Progress, whether in science or sport, depends on seeing what others overlook.

Nomar Tejada:

So next time I see a butterfly or something shiny, I'm not just seeing color... I'm seeing physics.

Thomas Young:

Exactly. You are seeing waves, structure, and the hidden complexity of light itself.

Nomar Tejada:

Yeah... dinner with you was definitely worth it.

Ariel Vilensky

Lecture 19. Plant and Animal Colorations: Iridescence, Warning Coloration, Sexual Selection, and the Wave Nature of Light

Me: Good evening, Sir Isaac Newton. In your quote, you argue that the order of the world implies an intelligent creator. I'm curious: why must complexity require a designer, but that designer does not itself require one?

Isaac Newton: Good evening. I viewed the natural world as too orderly to arise from mere chaos. The harmony of its laws suggested intention. As for the creator, I considered such a being necessary and self-existent.

Me: But doesn't that create a kind of asymmetry? If complexity demands explanation, wouldn't an even more complex creator demand one as well?

Isaac Newton: That is a philosophical difficulty, I admit. My reasoning placed the creator outside the chain of causes as a foundational principle rather than a product of it.

Me: So the creator is treated differently from the universe itself?

Isaac Newton: Yes. I believed that without such a starting point, explanation would regress infinitely.

Me: That's an interesting way to approach it. Thank you for engaging with the question.

Isaac Newton: You are welcome.

Karen Zheng, kz374

Dinner Conversation with Issac Newton

Me: Hi Isaac, I was reading your description of soap bubbles, and I was surprised by how carefully you observed something so ordinary. Most people just see colors and move on.

Newton: Yes, but it is often in ordinary things that nature reveals its patterns. A soap bubble may seem simple, but if you look closely, there is order such as how its rings, movement, change over time.

Me: I think that's what strikes me about bubbles too. The colors feel so vivid, almost permanent for a moment, but they're actually fleeting, constantly changing as the bubble fades.

Newton: Yes. The beauty you perceive is inseparable from its impermanence. As the film thins, the colors spread, dissolve, and vanish.

Me: That's interesting, it almost feels like the color only exists because it's changing. Like if the bubble stayed still, it wouldn't be as beautiful.

Newton: Yes, you're right to notice that. The colors are not fixed properties of the bubble, but rather they emerge from the changing thickness of its surface. What you see is light interacting with that change. Without variation, there would be no pattern to observe.

Me: So the color isn't really "in" the bubble? It's more like a result of light and the way we're seeing it?

Newton: Exactly. Color is not a permanent feature of the object, but a consequence of how light behaves. The bubble simply creates the conditions for that behavior to become visible.

Me: That makes me think about how much of what we see is actually shaped by conditions we don't notice. Like we think we're seeing something directly, but it's always being filtered.

Newton: Yes. Attention is what turns observation into knowledge. And perhaps more importantly, humility and the willingness to accept that what you first see may not yet be the full truth.

Me: This has made me realize that even simple things can carry deeper truths, if we're patient enough to see them and understanding comes from staying with something longer than most people would. Thanks Issac!

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 20 Dinner Conversation

Conversation with Ignaz Semmelweis

Ellie: Hi Dr. Semmelweis, thank you for meeting me for dinner.

Ignaz Semmelweis: Of course, Ellie. What do you want to talk about?

Ellie: We learned how you realized that something as basic as handwashing could save lives, especially for mothers giving birth.

Ignaz Semmelweis: Yes, and the strangest part was how difficult it was to convince people. I noticed that women were dying far more often in the clinic staffed by doctors than in the clinic staffed by midwives. The doctors, I learned, were coming straight from autopsies to the delivery room.

Ellie: And that's when you started to suspect the doctors were carrying something harmful from the autopsy room?

Ignaz Semmelweis: Exactly. We didn't yet have the language of germs the way you do now. But I could see a pattern that was too consistent to ignore. So I required doctors to wash their hands with chlorinated lime before examining patients, and the mortality rate dropped dramatically.

Ellie: That sounds like such clear evidence.

Ignaz Semmelweis: Yes and the idea that a "respectable" physician could be spreading death felt like an insult to their identity. Many would rather deny the conclusion than accept responsibility.

Ellie: That must have been devastating, especially when you knew how many lives could have been saved. Your story made me realize science isn't only about discovering new information. It's also about having the courage and saying what's true even when people don't want to hear it.

Ignaz Semmelweis: Yes. Observation is common. The difficult part is insisting on the truth when it can still have its consequences.

Ellie: Thank you for talking with me, Dr. Semmelweis. I learned so much from our conversation!

Ignaz Semmelweis: Thank you, Ellie. Thank you for such an amazing dinner!

Dinner with Heinrich Pestalozzi

Me: Herr Pestalozzi, you wrote that the eye wants to see, the ear wants to hear, the hand wants to grasp – that every human faculty has an inner drive toward its own development. That is a beautiful idea. But most of the education I observe seems designed to suppress exactly that drive. How did we go so wrong?

Pestalozzi: (tearing bread, unsentimental) We went wrong the moment we decided that education was something done to a child rather than something that grows from a child. The school became a vessel to be filled, not a fire to be lit. I have watched children arrive at my door – poor children, children of the streets – and within weeks they are drawing, measuring, singing, reasoning. Not because I poured knowledge into them, but because I gave their faculties something to act upon. The hand must touch before the mind can truly know. The eye must observe before the heart can truly feel. But our universities, our academies – they have decided the body is irrelevant to the mind. So they produce men who can recite everything and understand nothing.

Me: Your trinity of head, heart, and hand – in our time we have essentially abandoned two of those three. We celebrate the head almost exclusively, and only in its most abstract form. Someone who works with their hands is considered less educated, not more. Does that seem to you a corruption of what education is for?

Pestalozzi: (with some heat) A corruption, yes – and a dangerous one. When a farmer cannot read but can look at a field and tell you in an instant what it needs, what the sky promises, what the soil has eaten and what it lacks – is he uneducated? When a carpenter fits a joint so true it will hold for two hundred years – has he not understood something about geometry, about material, about patience, that no classroom has taught? The head that floats above the hands grows arrogant and brittle. I have seen it. Educated men who cannot bake bread, cannot bind a wound, cannot comfort a weeping child – yet they will tell you confidently how society should be organized. It is absurd.

Me: Karl Popper said he hoped that knowledge might make us free, and he credited that hope to you – to your belief that education liberates rather than constrains. But I see education increasingly used to narrow thought rather than expand it. Students are trained to give approved answers. Does that not contradict everything you believed?

Pestalozzi: (quietly, setting down his bread) It is the oldest temptation in education, to use the school as an instrument of conformity rather than liberation. Those in power always prefer a population that has been taught what to think rather than how to think. I fought that my whole life. My children here, I did not ask them to memorize the catechism of whatever authority wished it. I asked them to look at a stone, to hold it, to describe what they saw. From that single act, honest observation, everything else follows. Curiosity. Comparison. Doubt. Courage. If you

teach a child to observe truly, you have given them the one tool that no authority can easily take away.

Me: And yet you spent your life in poverty, your schools nearly always on the edge of collapse, dependent on patrons who wanted to control what you taught. Was the freedom you gave your students ever really safe from the world that surrounded them?

Pestalozzi: (a long silence, then a tired smile) No. It was never safe. But neither is a seed safe in the ground. It may be eaten, it may freeze, it may never germinate. And yet we plant it. What is the alternative, to plant nothing because conditions are imperfect? The children I taught carried something out with them into a world that did not always welcome it. Some of them built lives of genuine dignity and thought. That is enough. That has to be enough.

Me: I think that is enough. And I think the universities that have forgotten your trinity are, slowly, beginning to feel the cost.

Pestalozzi: (nodding slowly) Good. Pain is an honest teacher. It was always my best colleague.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Yooo Mr. Robert Hooke, why was your book *Micrographia* such a big deal?

Robert Hooke:

Mahidul you are so forward, I wanted to share the tiny hidden world I discovered with anyone who was interested in science.

Me:

So that's why everybody was reading it?

Robert Hooke:

Yep mate! *Micrographia* became the first scientific bestseller even though it cost around 30 shillings, which was really, really expensive back then and barely anyone could afford it.

Me:

Dang people really paid all that money just to read about tiny stuff?

Robert Hooke:

Exactly! People were amazed because microscopes and telescopes allowed humans to see things they had never seen before.

Me:

So what did you mean in the preface about microscopes and telescopes?

Robert Hooke:

I wrote that telescopes let us see objects very far away, while microscopes allow us to study things so small that they normally escape our inquiry.

Me:

So basically science opened a whole new world?

Robert Hooke:

Yes Mahidul! I believed these tools discovered a completely new visible world for human understanding and human advancement.

Me:

That's actually really cool to think about.

Robert Hooke:

Science helps people realize there's much more around us than we normally notice.

Me:

Did people get excited seeing these discoveries?

Robert Hooke:

Of course bro! Many people became fascinated with the heavens, tiny organisms, and all the hidden details of nature.

Me:

Thanks for telling me all of this!

Robert Hooke:

No worries dude, keep exploring the world around you!

Lecture 20: Dinner Conversation with Robert Hooke

Light and Life | Vansh Kakra | vk365

Vansh: Okay so I have to ask. You published *Micrographia* in 1665, and suddenly everyone in London was paying the equivalent of 200 bucks for a book about fleas. Did you expect that?

Robert Hooke: Honestly? No. I thought a few natural philosophers might take an interest. The idea that merchants and ladies would line up for engravings of a louse still surprises me. It was a lot of work, I will say. Holding the creature still under the lens without crushing it was its own small battle.

Vansh: So walk me through it. You sit down with this microscope, and then what? You just start looking at whatever is around you?

Robert Hooke: Essentially. A piece of cork caught my eye one afternoon. I cut a very thin slice, held it up, and saw all these tiny empty rooms.

Vansh: And that's where "cell" comes from, right? Because they reminded you of monk cells?

Robert Hooke: Exactly. The little chambers looked like the rooms in a monastery. It was the first word that came to mind.

Vansh: That's wild. You named a whole concept after a vibe.

Robert Hooke: I suppose I did. Though at the time I had no idea these "cells" were anything more than dead plant structure.

Vansh: Were people actually convinced, or did everyone think you were nuts?

Robert Hooke: A bit of both. Some were delighted. Others thought staring at fly eyes all day was beneath a serious man.

Vansh: At Cornell we have whole labs where people stare at fly eyes all day. You were ahead of your time.

Robert Hooke: That is a strangely comforting thing to hear.

Vansh: What was the hardest part, honestly? The lenses? The lighting?

Robert Hooke: The light, without question. You need it bright and angled just so. On cloudy London days I got very little done.

Vansh: So your productivity was weather-dependent.

Robert Hooke: Deeply. A good sunny morning felt like a gift.

Vansh: I relate. I cannot study in my dorm when it's raining. My brain just shuts down.

Robert Hooke: Some things do not change across four hundred years.

Selina Ke

Dinner Conversation with John Locke

Selina: I was really intrigued by your idea that having much sharper vision might actually make our lives worse, not better. At first that feels counterintuitive because we usually think better senses mean better understanding.

Locke: It does seem that way at first. We often assume that increasing our sensory abilities would automatically improve our knowledge. But I argue that our senses are suited to our needs, not to perfect knowledge of reality.

Selina: So even though someone with extremely sharp vision could see the tiniest details, that would not necessarily help them function in everyday life.

Locke: Such a person might perceive details far beyond what others can see, but in doing so, they may lose the ability to perceive things in the way necessary for practical living.

Selina: I remember you describing how that person might not even be able to communicate with others about what they see because everything would appear so different to them.

Locke: Yes. If their perception of colors, shapes, and objects differed too greatly, then shared understanding would break down. Language depends on some level of common experience.

Selina: That part really stood out to me. It suggests that knowledge is not just about seeing more, but about seeing in a way that is useful and shareable with others.

Locke: Human knowledge is limited, but those limits are not necessarily flaws. They allow us to navigate the world effectively and communicate with one another.

Selina: You also point out that someone with extremely acute vision might not even be able to tolerate normal light or see objects from a distance. So even though they gain microscopic detail, they lose the ability to do basic things like recognize objects around them.

Locke: The gain in one area could come with a loss in another. Our senses are balanced for practical purposes, not for uncovering every hidden detail of the universe.

Selina: I found your example about the clock really interesting. Someone might be able to see the tiny mechanisms inside it, but if they cannot step back and read the time, then that knowledge does not actually help them.

Locke: That example illustrates the point well. Knowing every small detail about something is not as helpful as being able to actually use it.

Selina: I think what I find most meaningful is the idea that our limitations might actually be necessary. We often think of limits as weaknesses, but you suggest they might be what make our world coherent and livable.

Locke: Our senses give us access to the world in a way that is proportioned to our condition. Too much detail could overwhelm rather than enlighten.

Selina: If our perception is shaped more for usefulness than for truth, does that mean we never really experience reality as it fully is, only a version that is simplified for us?

Locke: It may be that what we call reality is shaped by our senses and capacities and that our understanding is less about grasping the world in its entirety. It is about interaction with the world in a way that suits our nature and needs.

Dinner Conversation with Robert Hooke

Me:

I have to say, the fact that you looked at a piece of cork and decided to call what you saw cells feels almost too simple. Did you realize at the time what you had just named?

Hooke:

I named what I saw, which was a honeycomb of small empty rooms, like the cells a monk would sleep in. The living world those rooms once held had dried away. I did not know then what they meant, only that they were there, and that without the microscope no one would ever have suspected it.

Me:

What strikes me is that the microscope had been around for decades before your book, but no one made it this public.

Hooke:

The instrument existed, yes. But looking is not the same as seeing. Anyone can press an eye to a lens. What I wanted was to record faithfully what appeared there, to make a world visible to people who would never hold the instrument themselves. The engravings were as important to me as the observations.

Me:

So you were thinking about audience, about communicating it, not just collecting data.

Hooke:

Science that stays in a notebook changes nothing. I wanted anyone who picked up that book to understand that the smallest point of matter contains as much complexity as the whole visible universe. That seemed worth making expensive engravings for.

Me:

Okay but the flea. You spent pages on the flea. Did you expect people to find it beautiful?

Hooke:

I expected them to be astonished, which is close enough. A flea under magnification is more intricate than any machine a craftsman has ever made. That was the point I kept returning to. The finest needle tip looks ragged and crude enlarged. Nature's constructions look more ordered, more deliberate. It unsettled a lot of assumptions about what skill and design actually meant.

Me:

That feels almost like an argument for something beyond just observation.

Hooke:

I thought so. What I saw convinced me that whoever assembled these things worked at a scale of precision that puts human craft entirely in the shade. I was not the only microscopist who came away from the lens with that feeling.

Karl von Frisch: The Dance, the Polaroid, and a Sky Full of Messages

Me: Karl! It's so good to see you! Thanks for making the trip!

Von Frisch: Maximo! A pleasure, truly. Is that schnitzel I'm smelling?

Me: It is! Fresh out of the pan. Listen, Karl, I've been reading about you for my class, and I have to tell you, I don't know where to start with your career. Color vision in bees, the waggle dance, polarized light navigation. You kept finding things no one thought were there. Let's start at the beginning. 1914. You looked at a flower and decided its color must be saying something to the bee. What made you trust that hunch?

Von Frisch: Ah, Maximo. You have gone to the starting place, and I am glad you did. The logic was this. If the flower is colored, and the color costs the plant energy to produce, then the color must be doing work. And the only customer the flower has is the insect. So the insect must be able to read the color, or the flower would have given up the expense long ago. The rest was a matter of proving what the logic had already suggested.

Me: And you proved it with colored paper and sugar water. You trained the bees to a blue square, and then to make sure they weren't just distinguishing brightness, you set the blue among many shades of gray. They went to the blue every time. You found they could be trained to most colors, but not red, which they confused with black.

Von Frisch: Yes. The red blindness was a surprise at first, until I realized the bee simply does not see into that part of the spectrum. They see further into the ultraviolet, which we do not. We were looking at the same flower with different eyes. A humbling thing for a young scientist to realize.

Me: But here is what I want to press you on, Karl. The waggle dance. You claimed that a bee comes back to the hive and performs a figure eight, and that the duration of the waggle tells the other bees how far to fly, about a second for every five hundred meters, and the angle of the straight run against vertical tells them the direction relative to the sun. That is an extraordinary claim. A bee is carrying a map and a clock inside a body the size of a thumbnail.

Von Frisch: A fair challenge, Maximo, and the one I faced for years. I will tell you honestly, I was not believed for a long time. The dance looked, to most observers, like nonsense. An insect shaking itself on a comb. But I watched, Maximo. I watched for thousands of hours. And the pattern was consistent. The longer the waggle, the farther the food. The angle of the run matched the angle of the sun. And when a bee flew uphill or into a headwind, she overestimated the distance, because she was measuring it by the sugar she had burned, not by the ground she had covered. That last detail convinced me the system was real. A fraud would not have built in an error that honest.

Me: And then the polarized light. This is the part that still feels like science fiction to me. You found that bees can navigate on cloudy days by reading the polarization pattern of ultraviolet light in the sky. The sky itself is a compass to them.

Von Frisch: It is, and I will tell you the moment I knew. I placed a Polaroid filter over the hive and rotated it. The dancers inside shifted their waggle direction to match. Instantly. Not after a delay. Not after consulting each other. Instantly. I wrote in my notes that I would never forget the joy of that moment, and I have not. The sky was speaking, Maximo, and the bees had been listening all along. We had simply been too loud to notice.

Me: That's a beautiful way to hold it, Karl. Would you care for some dessert?

Von Frisch: I'll pass, Maximo, the schnitzel has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 20: Dinner Conversation with John Locke

Me: Hi Mr. Locke, thank you for meeting me for dinner! In class, we discussed your idea about the limitations of human vision. I found it fascinating that you argued having microscopic eyesight might actually be a disadvantage. What made you think that?

Locke: I believe that our senses are suited for the world we live in. If our eyesight were far more powerful, we would constantly see tiny details invisible to everyone else. The world would appear completely different, and ordinary life might become a lot more difficult.

Me: That's an interesting take. I've always wished I had perfect vision.

Locke: Imagine seeing the tiniest structures of every object around you, but struggling to recognize larger things at a practical distance. A person might understand the tiny mechanisms inside a clock, yet fail to read the hour from across the room.

Me: So you believed there was a balance between knowledge and usefulness?

Locke: Absolutely. Human senses are limited, but those limits allow us to function effectively in daily life. Our vision gives us enough detail to understand and navigate the world without overwhelming us with unnecessary complexity.

Me: We also learned how microscopes extend our vision beyond its natural limits. Do you think tools like microscopes change how we understand nature?

Locke: Certainly. These tools allow us to explore worlds otherwise hidden from us. However, we must remember that these discoveries are meaningful only if they help deepen understanding rather than distract us from the larger picture.

Me: That connects to another idea from class, that science should involve careful observation rather than simply accepting assumptions.

Locke: Indeed. Knowledge comes through experience and observation. We learn by examining the world carefully and reflecting upon what we perceive.

Me: I also liked your point that if everyone perceived the world differently, communication itself would become difficult.

Locke: Yes. Our shared human experience depends partly on the fact that we perceive the world in similar ways. If our senses differed too greatly, even describing colors or objects to one another would become nearly impossible.

Me: Thank you for this conversation. It's fascinating to think that the limitations of our senses may actually help us understand the world more clearly.

Something was wrong with my spring.

Not dramatically wrong. Just... off. It stretched a little too easily, then snapped back like it had an attitude.

I was staring at it when a voice behind me said, "You're not measuring it."

I turned and there was Robert Hooke, already picking up the spring like it belonged to him.

"I'm literally just holding it," I said.

"That is not observation," he replied.

He hooked one end onto the edge of the table and started pulling the other end down with careful, almost suspicious precision.

"Watch," he said.

"I am watching you steal my spring."

"I am revealing its behavior."

He let go.

It snapped back.

Normal.

Then he pulled it again. This time a little farther.

"Same thing," I said.

"Not the same," he said. "Proportional."

"That's a big word for a spring."

He grabbed a small weight from somewhere. I didn't see where. He just had it.

He clipped it onto the spring.

It stretched.

He added another.

More stretch.

Another.

Even more.

He looked at me like this was the most obvious pattern in the universe.

"Well," I said, "yeah. More weight, more stretch."

"Yes," he said. "But how much more."

I shrugged.

"More more."

He looked disappointed.

He pulled out a notebook and started marking lengths.

"You must measure the extension," he said, "and compare it to the force applied."

"Or I could just... look at it."

"You would miss the law entirely."

He pointed at the stretched spring.

"Double the force," he said, adding another weight, "and you double the extension."

I leaned in.

"...Wait."

He added another.

Still lining up.

"That's actually kind of clean," I admitted.

"Yes," he said, pleased. "It obeys a relationship."

He wrote something down and tapped the page.

"The force is proportional to the extension."

"That sounds official."

"It is precise."

I grabbed the spring and pulled it way farther than he had.

It stretched... then went weird.

Didn't snap back right.

"Oh."

He winced.

"You have exceeded the limit."

"I broke it?"

"You asked too much of it."

"That feels personal."

He took it back, examining it like a disappointed teacher.

"Within a certain range," he said, "the relationship holds. Beyond that, the material changes."

"So it has boundaries."

"All systems do."

I leaned back.

"So basically, springs follow rules... until they don't."

He nodded.

"Until you push them too far."

I stared at the slightly warped spring.

"...Still feels personal."

He walked around the room, picking up random things and gently pressing, stretching, tapping.

"Elasticity is everywhere," he said. "Not just springs. Materials respond to force."

"So like... everything resists being messed with."

"In a way."

"That's relatable."

He stopped and looked at me.

"You see objects," he said. "I see relationships."

"I see a broken spring right now."

"A lesson," he corrected.

There was a pause.

"So you figured this out just by... pulling on stuff," I said.

"Carefully," he added.

"Yeah I skipped that part."

He set the spring down.

"Measure more," he said. "Guess less."

"That feels like good advice."

"It is necessary."

He headed for the door, then paused.

"And do not exceed limits unnecessarily."

I looked at the spring again.

"No promises."

He left.

I picked the spring back up and stretched it gently.

It behaved.

I stretched it a little more.

Still fine.

I hesitated.

Yeah.

Some rules are worth respecting.

Jasmine: Robert Hooke, I need you to know immediately that your work is legitimately my worst nightmare. I am TERRIFIED of bugs. Like truly. I cannot handle a single insect in my kitchen unless it is an ant. Anything with too many legs equals an automatic collapse.

Hooke: Then perhaps you would not have enjoyed looking through my microscope... I brought one because I thought it would have been interesting. I fear not.

Jasmine: ENJOYED??? Sir, you magnified fleas, lice, mites, fly eyes... absolutely not. And the crazy thing is that your drawings somehow made them look more horrifying and more beautiful at the same time.

Hooke: AWE. That was precisely the point.

Before the microscope, people believed the small world beneath their eyes was simple. But magnification revealed extraordinary complexity: hairs upon a fly, crystalline structures, the cellular texture of cork.

Jasmine: Ew to the fly but this is very cool.

Wait... kind of off-topic, but YOU were the one who coined the term “cells,” right?

Hooke: Yes. While observing cork through my microscope, I saw tiny compartments resembling the small rooms, or “cells,” occupied by monks. And so the name remained.

Jasmine: That’s actually insane. You basically opened an entirely new universe just by zooming in.

Hooke: Exactly. People believed discovery meant looking farther outward... toward planets and stars. But I realized there was another frontier entirely: the invisible world nearby.

Jasmine: And your book Micrographia became a bestseller because people had literally never seen this stuff before. **EVEN THOUGH THESE OBJECTS WERE RIGHT INFRONT OF THEM!**

Hooke: Indeed. The microscope transformed ordinary things into wonders. A flea became armored like a knight. A needle, which humans considered finely crafted, looked crude and jagged under magnification.

Jasmine: Okay, I do not know about you calling a flea a knight, but yes. I get what you mean!

Hooke: I wrote Micrographia because I wished to show people that there exists “a new visible world discovered to the understanding.”

Jasmine: You are so inspirational. You blow my mind because your work was literally 500 years ago.

Hooke: Here is a true summary: The telescope reveals distant worlds. The microscope reveals hidden ones.

Jasmine: WOW. That's such a fire quote.

Dinner Conversation with Robert Hooke

Nomar: Hey! Your work kind of blew my mind. Like before this lecture, I never really thought about how much of the world we just can't see.

Robert Hooke: That was exactly the point of my work. The microscope allowed us to explore a completely new world that was hidden from the naked eye.

Nomar: Yeah, and what's crazy is that you weren't just looking at random stuff you were seeing things like fleas, lice, and even the structure of cork cells. That's wild to me because those things are so small, but you made them visible for the first time

Robert Hooke: It revealed that even the smallest objects have incredible complexity.

Nomar: I think that's what stuck with me the most. You took things people would normally ignore and showed that there's actually a whole level of detail behind them. It kind of makes me think about how much we miss just because we don't look closely enough.

Robert Hooke: Observation is the foundation of understanding.

Nomar: And I liked how you didn't just keep it to yourself either. You put it all into *Micrographia* with drawings so other people could see it too. That probably made it way more real for people back then.

Robert Hooke: It was important to share what had been discovered.

Nomar: Honestly, it made me realize that science isn't always about creating something new, sometimes it's just about seeing what's already there but hasn't been noticed yet. Like the lecture kept coming back to that idea of "seeing the invisible."

Nomar: I also thought it was interesting how the lecture connected this to today. Like now we have way more advanced microscopes, but it all started with people like you just trying to look closer at things.

Robert Hooke: Each discovery builds on the last.

Nomar: I think my biggest takeaway is that there's way more going on around us than we realize. Whether it's germs, cells, or just tiny structures, it's all there even if we can't see it.

Nomar: It definitely made me look at things differently. Even something as simple as a surface or an object might have a whole hidden world behind it.

Ariel Vilensky

Lecture 20. Seeing the Invisible: Using the Properties of Light and Pigments to Make Microscopic Organisms, including Germs, Visible

Me: Good evening, Dr. Benjamin Franklin. In your remarks at the Constitutional Convention, you supported the Constitution despite having reservations. Why was compromise so important to you?

Benjamin Franklin: Good evening. I believed that no document crafted by many individuals could be perfect. But unity was essential, and I trusted that collective judgment was wiser than my own alone.

Me: That's a humble perspective. Do you think compromise is always necessary, or are there times when it shouldn't be made?

Benjamin Franklin: Compromise is vital when forming a workable system among diverse people. However, there are limits—one must not compromise on principles that undermine justice or the stability of the whole.

Me: So it's about balancing practicality with principle?

Benjamin Franklin: Precisely. A successful society requires both flexibility and firm values.

Me: Thank you, Dr. Franklin.

Benjamin Franklin: My pleasure.

Karen Zheng, kz374

Dinner Conversation with Benjamin Rush

Me: Hi Benjamin, I was reading your *Thoughts on Common Sense*, and I was struck by your idea that the most accepted people are often those who don't challenge popular opinion. It made me wonder, does that mean truth always has to be unpopular in its own time?

Rush: It often is. Society favors what feels familiar. When someone challenges that, it creates discomfort. Most people would rather preserve harmony than confront uncertainty.

Me: It makes me wonder how often we confuse what is familiar with what is true. Like we are all standing too close to the same idea, seeing only its outline, not its shape.

Rush: Yes, when something surrounds us completely, it becomes invisible. It is only when someone steps back, or dares to step aside, that its limits are revealed.

Me: But those who step aside seem to stand alone. You wrote about Galileo Galilei kneeling, asking forgiveness for what he knew, and William Harvey losing everything for what he discovered. It feels like truth asks for a kind of sacrifice.

Rush: Not all truths are welcomed when they first arrive. Some must wait, like seeds beneath winter soil, until a different season, a different generation, is ready to see them.

Me: So the present is not always where understanding lives?

Rush: No, it takes patience. Those who challenge prevailing views must accept that recognition may not come in their lifetime. Their audience is often the future.

Me: That's a humbling thought, that you might never see the impact of what you believe is true.

Rush: And yet, that is the nature of progress. Truth does not always arrive with applause. Sometimes it arrives quietly, carried forward by those willing to endure doubt in the present.

Me: That makes me think that disagreement is not something to fear, but something to sit with. Maybe even something necessary.

Rush: Indeed, a society that never questions itself remains stagnant. It is through tension, through the willingness to see differently, that clarity begins to emerge.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 21 Dinner Conversation

Conversation with Karl Von Frisch

Ellie: Hi Dr. von Frisch, thank you for meeting with me for dinner.

Karl von Frisch: Of course, Ellie. What are you curious about?

Ellie: In class we learned about your research on bee vision and communication, and I was honestly shocked. I had no idea bees could see ultraviolet light, and even detect polarized light.

Karl von Frisch: It surprised me at first as well. I began with fairly simple experiments, but it quickly became clear that bees don't experience the world the way we do. Their visual world includes information we cannot see at all.

Ellie: You trained them using sugar water and colored paper, right?

Karl von Frisch: Yes. I placed sugar water on blue paper and watched bees return repeatedly. Then I removed the sugar and offered them a choice between blue and red paper. They still chose the blue, which showed they were not just following smell or chance. It was strong evidence that insects can truly distinguish colors.

Ellie: And then you expanded that into testing other things, like shapes and ultraviolet cues?

Karl von Frisch: Exactly. I wanted to understand not only what bees could detect, but how they used it. We found they could tell patterns apart, recognize shapes, and even orient themselves using polarized light in the sky.

Ellie: That's so interesting. Your waggle dance discovery was the most amazing part to me. The idea that a bee can communicate distance and direction just through movement is unbelievable.

Karl von Frisch: The waggle dance was a major breakthrough. I realized the dance is not random excitement. The angle of the waggle run corresponds to the direction of food relative to the sun, and the duration relates to distance. In other words, bees share something like vector information with one another.

Ellie: Wow, thank you for sharing all of this with me. It's actually such cool and amazing information.

Karl von Frisch: Thank you, Ellie. I had a great dinner!

Dinner with Karl von Frisch

Me: Professor von Frisch, what I find most astonishing about the waggle dance is not the dance itself but the translation. The bee experiences the flowers in sunlight and horizontal space, flies back into a dark hive, and then rotates the entire coordinate system – converting the sun's angle into an angle relative to gravity, on a vertical surface, in the dark. That is an extraordinary cognitive feat for an insect. Did you ever fully get over the strangeness of it?

Von Frisch: (laughing warmly) Never. Not once in fifty years. Every time I watched the dancers shift their angle as the sun moved across the sky, keeping the direction to the flowers perfectly accurate hour after hour, I felt the same astonishment as the first time. People say that science removes wonder. I have found the opposite. The more precisely I understood what the bee was doing, the more inexplicable it seemed. She has no sun compass in the hive, no GPS, no map. She has gravity, she has the memory of light, and she has a body that can translate between them. That is everything she needs. It is enough. I find that humbling.

Me: What strikes me is that it is genuinely symbolic communication – the dance is not the flowers, not the sun, not the direction. It is a representation of those things, intelligible to other bees who were not there. That seems to cross some threshold that we usually reserve for language. Did you think of it as language?

Von Frisch: I was careful with that word. Language implies, to many people, something uniquely human – grammar, syntax, infinite generativity. The bees have a code, not a grammar. They can say far north, lots of nectar but they cannot say yesterday there were flowers there but today I am not sure. They cannot lie, they cannot speculate, they cannot ask a question. And yet – the information they transmit is symbolic, as you say. The angle on the comb stands for an angle to the sun. The duration stands for a distance. These are abstractions. The bee has stepped away from direct pointing – "there! there!" – and made a representation. That is not nothing. That is, in fact, remarkable.

Me: You discovered that on a cloudy day the bees read the polarization pattern of ultraviolet light scattered by the atmosphere to locate the sun they cannot see. We cannot perceive polarized light at all. We cannot see ultraviolet. Does it trouble you that the bees' world is so much richer in certain dimensions than ours?

Von Frisch: (smiling, shaking his head) It delights me. Every animal lives in its own Umwelt – its own sensory universe. The bee's world is full of ultraviolet flowers and polarized sky and magnetic fields that we are entirely blind to. We live in a very narrow slice of what is actually there. I think that is an important fact for scientists, and especially for philosophers, to keep firmly in mind. When we say we understand something, we mean we understand what our instruments and our senses can detect. The bee has instruments we do not have. She detects truth we cannot directly access. That is not a reason for despair, it is a reason for extraordinary humility.

Me: That humility seems rare in science. Most of what I read suggests that we are close to a complete account of nature – that the remaining mysteries are merely details.

Von Frisch: (setting down his wine with some firmness) That has been said in every generation, and in every generation nature has produced something that makes a complete fool of the claim. When I began my work, a bee's ability to see color was considered obviously impossible – an insect, after all, could not have such refinement. I showed they could see blue, green, yellow, violet – and ultraviolet besides, which we cannot. The lesson I draw is not that we are close to the end. The lesson is that we do not yet know how many dimensions of reality we are entirely missing. The bee, in her dark hive, rotating the sun into gravity and dancing the map of a world none of her sisters have seen – she reminds me that nature is always more ingenious than our theories about it.

Me: I think that is the finest argument for curiosity I have ever heard.

Von Frisch: (gesturing toward the hive at the garden's edge, now just a dark shape in the evening) Thank them. I only decoded the message. They wrote it.

Mahidul Islam Dinner Conversation

PLBio 1130 5/5/26

Me:

Dude I am a big fan Karl von Frisch, how did you figure out bees can see colors?

Karl von Frisch:

Thanks for being a fan Mahidul, the bright colors of flowers only made sense if bees had color vision, so I realized the flowers were communicating with the bees.

Me:

Wait, so flowers are basically sending messages to bees?

Karl von Frisch:

Exactly in a futuristic way! The colors help attract bees to flowers that contain nectar.

Me:

So what happens when the bee finds nectar?

Karl von Frisch:

The worker honeybee goes back to the hive and gives the nectar to worker bees that are usually younger, who then turn it into honey through regurgitation and dehydration.

Me:

That's honestly kinda gross but cool at the same time.

Karl von Frisch:

Nature can be weird sometimes Mahidul. But after that happens, the foraging bee performs a special dance to tell the other bees where the nectar is located.

Me:

A dance??

Karl von Frisch:

Yep! The dance communicates the direction of the food source in relation to the sun.

Me:

How do the bees even know where the sun is?

Karl von Frisch:

The bees can analyze polarized ultraviolet light from the sky, even when humans can't see it, like they have super powers.

Me:

So bees can literally see stuff invisible to humans?

Karl von Frisch:

Exactly dude man! Humans generally cannot see ultraviolet wavelengths or the polarization of light waves, but bees can.

Me:

That's actually insane to think about.

Karl von Frisch:

Science shows us that animals sometimes experience the world very differently than humans do.

Me:

Thanks for telling me all of this!

Karl von Frisch:

No worries Mahidul, keep being curious about nature my fan!

Lecture 21: Dinner Conversation with Karl von Frisch

Light and Life | Vansh Kakra | vk365

Vansh: Okay, I have to start with this. You basically figured out that bees are running choreographed GPS routines in the hive. What was your first reaction when you realised what was happening?

Karl von Frisch: Honestly? Disbelief. I kept watching the same bee do the same little figure eight and thinking, "No, this cannot mean what I think it means."

Vansh: So you're standing there, staring at a bee, questioning your life choices.

Karl von Frisch: More or less. You must understand, the idea that an insect was sending coordinates to other insects sounded absurd even to me.

Vansh: How did you even start? Like, what was day one of this?

Karl von Frisch: I put out a dish of sugar water on blue paper. The bees drank, flew home, came back for more. Then I took the sugar away and put out a blue paper and a red paper. The bees went straight to the blue.

Vansh: That's it? That was the experiment that started everything?

Karl von Frisch: That was it. People had assumed bees were colorblind. I simply asked whether anyone had actually checked.

Vansh: That is such a data science mood. "Has anyone run the numbers on this?". Okay but the waggle dance thing is the part that breaks my brain. The bee tells other bees where food is using angles based on the sun.

Karl von Frisch: The angle of her dance relative to straight up tells them the angle of the flowers relative to the sun. The length of her waggle tells them how far.

Vansh: That is a physics-major flex from a bug. I have Cornell classmates who cannot estimate how long it takes to walk to Olin Library.

Karl von Frisch: The bee has been practising longer :)

Vansh: What is the thing students today would get most wrong about your work?

Karl von Frisch: They would assume I knew what I was looking for. I did not. I watched, and the bees slowly taught me what the questions were.

Vansh: That is a way better lesson than anything on my problem sets.

Karl von Frisch: Problem sets tell you what to find. Bees tell you what you missed.

Vansh: Okay, that one is going in my notes app.

Selina Ke

Dinner Conversation with Aldous Huxley

Selina: In your idea that every society creates its own “ideal person,” you describe how different societies valued different traits, from the noble warrior to the respectable gentleman to the modern social individual. It makes me wonder if these ideals say more about society than about what humans truly are.

Huxley: Each era constructs an ideal that reflects its needs, its fears, and its power structures. These ideals are not fixed truths but shifting expectations imposed upon individuals.

Selina: What stood out to me most was your description of the “social man,” almost like someone who conforms, blends in, and follows the group. Humans are becoming more uniform over time.

Huxley: Yes, the modern tendency leans toward conformity. Industrialization and mass society encourage standardization, not only in production but in thought and behavior.

Selina: That’s what made me think of bees. In a beehive, every bee has a role, and the system works because individuals don’t question it. Do you think humans are evolving in that direction, becoming more like a collective rather than individuals?

Huxley: It is a tempting comparison, but also a dangerous one. Bees are biologically programmed for their roles, whereas humans possess self-awareness and the capacity for reflection. The risk is not that we become bees by nature, but that we begin to behave like them by choice or by pressure.

Selina: So it’s less about evolution in a biological sense and more about social pressure shaping behavior.

Huxley: Exactly. Systems of power, culture, and economics can encourage people to prioritize stability and conformity over individuality and critical thought.

Selina: I also noticed how you contrast that with what people at the bottom of society tend to imagine, which is not power or status, but simply being free, secure, and happy. That feels very different from the ideals promoted by those in power.

Huxley: Ideals often reflect the interests of those who define them. For the privileged, ideals can be about refinement or control. For the oppressed, they are often about basic human dignity.

Selina: That makes me wonder if modern society is pushing people toward being more passive and group-oriented, while still telling them they are individuals. It feels like a contradiction.

Huxley: It is a contradiction. Modern societies often celebrate individuality in theory while encouraging conformity in practice.

Selina: If society keeps moving in this direction, where people are shaped to fit roles and follow systems, do you think humans risk losing something essential about being human?

Huxley: The danger is not that we will cease to be human, but that we may forget how to exercise the very qualities that define our humanity, our capacity for independent thought, moral choice, and conscious resistance to the pressures of the collective.

Me: I keep thinking about how you even knew where to start. Like, bees doing something as elaborate as communicating direction with a dance, that's not an obvious thing to go looking for.

Von Frisch: It started much earlier, with color. Everyone assumed bees were simply attracted to flowers by scent, that color was irrelevant to them. I disagreed. The bright colors of bee-pollinated flowers seemed like too much of a coincidence if the bees could not see them. So I tested it, very simply, with colored paper and sugar water. The bees learned to go to the blue. They ignored the red entirely, which told me their color vision was not just a shifted version of ours.

Me: The gray squares test is the part that really got me. You basically ruled out every alternative explanation at once.

Von Frisch: That was the necessity. Skeptics would say the bees were responding to brightness, not color. So I placed the blue square among every shade of gray I could produce. If brightness was all they detected, they would have gone to whichever gray matched the blue. They never did. They always went to the blue. That was color vision, not brightness discrimination.

Me: And then somehow that same research eventually led you to the dance language, which feels like a completely different discovery.

Von Frisch: The connection is the flower. Once I understood that bees could identify flowers by color, the next question was how they communicated what they found to the rest of the hive. I watched a forager return and noticed the other bees seemed to know not just that there was nectar, but where. The dance was already there to observe. I just had to be patient enough to understand what it was saying.

Me: The waggle dance encoding both distance and direction is what I can't get over. One bee doing figure eights in the dark and somehow the others end up at the right flower kilometers away.

Von Frisch: What I found most remarkable was the conversion. The hive is dark, so the bee cannot point toward the sun directly. Instead she transposes the angle to the sun into an angle relative to gravity, up on the comb. Wagging upward means fly toward the sun. The duration of the waggle run encodes the distance. It is a symbolic language, and for a long time no one believed that insects were capable of anything of the kind.

Me: How did you figure out they were using polarized ultraviolet light to navigate on cloudy days? That seems like such a specific thing to test for.

Von Frisch: I noticed the bees could still orient correctly even when the sun was hidden, as long as some patch of blue sky was visible. I suspected polarized light because the pattern of polarization across the sky is mathematically related to the sun's position. The bees needed only to read that pattern. When I placed a large Polaroid filter over the hive and rotated it, the dances shifted exactly as I predicted. They were not seeing the sun. They were reading the light the sky scatters from it.

Me: That moment must have been something.

Von Frisch: I have written that I will never forget the joy of watching the dancers shift their waggle runs the instant I rotated the filter. Decades of work, and suddenly you can see the animal's inner life expressed so directly. That does not happen often.

Lecture 21: Dinner Conversation with Karl von Frisch

Me: Hi Mr. von Frisch, thank you for meeting me for dinner! In class, we learned about your work on honeybees and polarized light. I was amazed to learn that bees can see things humans cannot. What first interested you in studying bees?

von Frisch: Well, I was truly fascinated by the relationship between flowers and bees. The bright colors of flowers seemed too purposeful to be accidental, so I began to wonder whether bees could actually see color.

Me: Did that lead you to experiment with colored paper and sugar water?

von Frisch: Yes! I placed sugar water on blue paper and trained the bees to associate the color with food. Later, I removed the sugar water and presented the bees with both blue and red paper. The bees consistently flew toward the blue paper, demonstrating that they could differentiate colors.

Me: I also learned that bees perceive color differently from humans.

von Frisch: They do indeed. Bees can detect ultraviolet light, which humans cannot see. Many flowers that appear plain to us actually contain ultraviolet patterns that guide bees toward nectar. In a sense, bees experience an entirely different visual world from our own.

Me: That's incredible. I was especially fascinated by the waggle dance. How did you discover that bees communicate directions through movement?

von Frisch: By carefully observing returning forager bees. I noticed that the angle and duration of the dance changed depending on the location of the flowers. Over time, I realized the dance communicates both distance and direction relative to the position of the sun.

Me: It's fascinating that such small creatures can process so much information from light.

von Frisch: Nature often reveals remarkable complexity in unexpected places. The honeybee may appear simple, yet its ability to sense color, polarization, and motion allows it to communicate with extraordinary precision.

Me: Thank you for this conversation! Now I'm curious to learn about how other animals perceive light and color.

The bee was not minding its business.

It landed on the table, walked in a small circle, then started doing something that looked... intentional.

Not random buzzing. Not confused insect behavior.

A routine.

"Don't interrupt her," said Karl von Frisch, already leaning in like this was the main event.

"I wasn't planning to," I said. "I just didn't expect choreography."

The bee turned, wiggled, looped, then repeated it like it had practiced.

"Is it... dancing," I asked.

He nodded.

"It is communicating."

"With who. Me?"

"No," he said. "With the hive."

I looked around.

"There are no other bees here."

"There do not need to be," he said. "You are seeing the message, even if you are not the audience."

That somehow made it cooler.

The bee did it again. A straight run, then a little loop back, then the same path again.

"Okay but what does that actually mean," I asked.

He pointed gently.

"The direction of the straight run tells where the food is relative to the sun."

I blinked.

“So it’s... giving directions.”

“Yes.”

“With interpretive dance.”

“With precision,” he corrected.

I leaned closer.

“And the wiggle part.”

“The duration tells distance.”

I froze.

“Wait.”

He nodded, like this was the normal part.

“Longer movement means farther away.”

“So it’s literally mapping location using time and direction.”

“Yes.”

I sat back.

“That’s smarter than some people I know.”

The bee paused, then did it again.

Same pattern. Same angle.

“Do they all understand this,” I asked.

“Yes.”

“No training.”

“No.”

“Just born knowing bee geometry.”

"In a sense."

I watched the angle of the movement.

"So if the sun moves..."

"The dance adjusts," he said.

"Of course it does."

"They compensate for time."

I stared at him.

"They account for time."

"Yes."

"That's ridiculous."

"It is elegant."

The bee finally flew off.

Just like that. Message delivered.

"That was it," I said.

"That was everything," he replied.

I tried to process it.

"So one bee finds food..."

"Yes."

"Comes back..."

"Yes."

"And does a little dance that tells every other bee where to go."

"Yes."

“No words. No sounds.”

“Only movement.”

I shook my head.

“That’s actually insane.”

“It is communication,” he said. “Just not yours.”

I looked at the empty spot where the bee had been.

“That whole time I thought it was just being random.”

He smiled slightly.

“People often mistake complexity for randomness.”

I leaned back.

“So you just watched bees and figured this out.”

“I observed carefully,” he said.

“And didn’t just assume they were... buzzing around.”

He nodded.

“Observation reveals intention.”

He stepped toward the door.

“Do not underestimate small creatures,” he said.

“Especially when they start dancing.”

He almost laughed.

He left.

I sat there for a second.

If a bee started doing that again, I knew I wouldn’t ignore it.

I'd probably just stand there trying to decode directions like I suddenly worked for the hive.

Which, honestly, didn't feel that far off anymore.

Nomar: This lecture was one of the coolest ones so far. The idea that bees can actually communicate directions like coordinates is kind of insane to me.

Karl von Frisch: Bees have evolved very precise ways to share information about food sources.

Nomar: Yeah, the waggle dance really got me. The fact that a bee can come back to the hive and basically tell other bees the distance and direction of flowers just by moving a certain way is wild. It's like they have their own language.

Karl von Frisch: The dance encodes both direction and distance relative to the sun.

Nomar: And that's the part that really confused me at first. Because the hive is dark, so how are they even using the sun? But then learning that they use polarized light from the sky to figure it out made it make more sense

Karl von Frisch: Yes, they can detect patterns of polarized ultraviolet light that humans cannot see.

Nomar: That part blew my mind. Like they're basically seeing a whole version of the sky that we don't even know exists. And they're using it like a built-in GPS.

Nomar: I also thought it was crazy how accurate it is. The length of the waggle part tells distance, and the angle tells direction. That's honestly more organized than how some people give directions.

Karl von Frisch: It is a highly efficient communication system.

Nomar: And even the energy part was interesting too. Like if the bee has to fly harder, like into wind or uphill, it actually thinks the distance is longer because it used more energy. That makes it feel less robotic and more real.

Nomar: It kind of made me realize that animals aren't just acting randomly. There's actual structure and intelligence behind what they do, even if it looks simple from the outside.

Karl von Frisch: Observation often reveals unexpected complexity in nature.

Nomar: I think that's what I'm taking away from this. There's a whole level of communication and perception happening around us that we don't even notice.

Nomar: It definitely made me look at something as small as a bee completely differently. Like they're not just flying around, they're actually thinking, communicating, and navigating in ways we barely understand.

Ariel Vilensky

Lecture 21. Polarized Light and Bee Vision: Sweetness and Light

Me: Good evening, Sir Francis Bacon. I wanted to ask about your famous analogy comparing thinkers to ants, spiders, and bees. Could you explain what you meant by that?

Francis Bacon: Good evening. Certainly. The ant represents those who simply gather facts through experience, without deeper interpretation. The spider represents those who spin elaborate theories from their own minds, detached from observation. Neither approach alone is sufficient.

Me: And the bee, then, is your ideal?

Francis Bacon: Precisely. The bee gathers material from the world, as the ant does, but it also transforms it through its own internal processes. Likewise, true inquiry must combine observation with reasoning.

Me: So you're arguing for a balance between empiricism and rational thought?

Francis Bacon: Exactly. Knowledge advances not by collecting facts alone, nor by abstract reasoning alone, but by a careful integration of both. Each corrects and strengthens the other.

Me: You also mention that this "closer and purer league" between experiment and reason had not yet been achieved. Did you see this as a goal for future science?

Francis Bacon: Indeed. I believed that if these faculties were properly united, human understanding could progress far more effectively. It is this union that allows us to move beyond error and toward deeper truths.

Me: That's a compelling vision - one where knowledge is both gathered and actively shaped.

Thank you for your time, Sir Francis.

Francis Bacon: You are most welcome. Strive always to think like the bee.

Karen Zheng, kz374

Dinner Conversation with Karl Von Frisch

Me: Hi Karl, I was fascinated by your discovery that bees can see what we cannot: ultraviolet light, patterns hidden from our eyes. It makes me wonder how much of the world exists just beyond our perception.

Von Frisch: More than we often imagine. What we call reality is shaped by the limits of our senses. For example, the bee does not see less than we do, only differently.

Me: And yet, flowers seem to anticipate that difference. Their colors, their patterns, they feel almost like messages written in a language meant only for bees.

Von Frisch: Yes, it's like a quiet conversation between species. The flower signals, and the bee responds. It is a partnership written in light we cannot see.

Me: It's strange to think that something so vibrant to a bee might appear ordinary to us. It makes me question how often we overlook meaning simply because we lack the ability to perceive it.

Von Frisch: Perception is not just about seeing, but about knowing how to look. The bees teach us that. Their dances, for example, are not random; they are precise, deliberate. It is truly a form of communication as structured as language itself.

Me: The idea that a bee can return to the hive and describe direction using the sun, and even polarized light, is fascinating.

Von Frisch: Intelligence does not belong only to those who resemble us. It appears that wherever life must solve problems, adapt, and communicate. The bee's dance is simply its way of making sense of the world and sharing that sense with others.

Me: You also wrote that most bees wait for the discoveries of a few pioneers. That felt almost unexpectedly human.

Von Frisch: As with human beings, pioneers are rare. Most prefer the certainty of following a path already discovered rather than stepping into the uncertainty of finding one.

Me: Thanks, Karl! This makes me realize how much understanding depends not just on seeing, but on being willing to question what feels certain.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 22 Dinner Conversation

Conversation with Thomas Young

Ellie: Hi Dr. Young, thank you for meeting me for dinner.

Thomas Young: Of course, Ellie. What are you curious about?

Ellie: In class we just learned about your work on light, and I was really impressed by how you used interference to argue that light behaves like a wave.

Thomas Young: Oh yes, my double slit experiment. When light passes through two narrow openings and produces alternating bright and dark bands on a screen, that pattern is interference, and interference is exactly what waves do.

Ellie: What amazed me is that with such a basic experiment, you were able to estimate the wavelength of light!

Thomas Young: Haha yes, by knowing the distance between the slits, the distance to the screen, and the spacing of the fringes, you can calculate the wavelength for different colors.

Ellie: We also talked about your theory of color vision, that the human eye might have three different types of receptors.

Thomas Young: That's right. I reasoned that we didn't need a separate sensor for every possible color. If we had three types, each most sensitive to a different region of the spectrum, then all other colors could be perceived through combinations of those three responses. I didn't know the biological details yet, but the logic fit the evidence.

Ellie: Wow, that's so interesting. And that idea basically became the foundation for how we understand color vision today!

Thomas Young: I'm happy to hear that. I always liked the idea that science should connect fields that seem separate at first. Physics and biology may look different, but they meet in perception.

Ellie: Thank you for talking with me, Dr. Young. Your work really showed me how careful observation and a little bit of math can reveal patterns that aren't obvious at first.

Thomas Young: My pleasure. I had a very great dinner.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Dude Thomas Young, can you tell me why people divide the rainbow into seven colors?

Thomas Young:

Well Mahidul, Isaac Newton divided the solar spectrum into seven colors, maybe because of theological reasons and not scientific ones.

Me:

So there's no actual scientific reason for exactly seven colors?

Thomas Young:

Not really my famalam! There is more of a natural reason to divide the colors into three primary colors instead. It is more understandable that way.

Me:

Wait so how does that even work?

Thomas Young:

I predicted that if the human eye had three photoreceptor pigments, people could perceive every color in the rainbow through them.

Me:

So you're saying humans only need three types of color receptors to see all colors?

Thomas Young:

Exactly Mahidul you genius! Different combinations of the three receptors let people see many different colors.

Me:

Did people believe your idea right away?

Thomas Young:

Nope Mahidul sadly. Some people called me "Anti-Newtonian" because I supported the wave nature of light instead of Newton's ideas.

Me:

Dang that sounds rough.

Thomas Young:

Yeah bro, but later science proved the ideas were actually correct.

Me:

That's actually really cool to think about.

Thomas Young:

Science sometimes takes time before people accept new ideas dude.

Me:

Thanks for telling me all of this!

Thomas Young:

No worries Mahidul, keep learning cool stuff about science!

Lecture 22: Dinner Conversation with Thomas Young

Light and Life | Vansh Kakra | vk365

Vansh: When you wrote that paper saying Newton was wrong about light, did you know you were basically picking a fight with the most famous scientist in history?

Thomas Young: I had some idea.

Vansh: That's brutal. At Cornell, we just leave bad Rate My Professor reviews. Nothing that aggressive.

Thomas Young: Yours is a kinder era

Vansh: Okay, walk me through it. What made you think light was a wave in the first place?

Thomas Young: I kept noticing that when light went past thin objects, it made little colored fringes. If light were only tiny particles flying in straight lines, as Newton said, those fringes should not exist.

Vansh: So how did you actually prove it?

Thomas Young: I had sunlight and a piece of paper. I let sunlight pass by a narrow object, measured the bright and dark stripes on the wall, and from those distances I could calculate the length of the wave for each color.

Vansh: Wait. You measured the wavelength of light with stuff you had lying around the house?

Thomas Young: Essentially, yes. I once wrote that the experiment may be repeated with great ease whenever the sun shines.

Vansh: Meanwhile our physics labs at Cornell have equipment that costs more than my tuition, and half of us still cannot get the readings right. Can I ask something kind of unfair though?

Thomas Young: Please.

Vansh: They call you "The Last Man Who Knew Everything." You did light, you did vision, you helped decode Egyptian hieroglyphs, and you worked on elasticity. How did you pick what to study?

Thomas Young: I did not, really. Something would catch my attention, I would ask a question, and the question would lead me somewhere. I did not think of them as separate subjects the way you do now.

Vansh: That is such a flex. I have to pick between two majors, and I'm stressed about it.

Thomas Young: What are the two?

Vansh: Applied economics and Data Science. Which, by the way, are both basically about spotting patterns in noisy data. Which is kind of what you did with those fringes.

Thomas Young: Then perhaps you are doing my work after all, just with different fringes.

Vansh: I'll take that. Last question, promise. If you could go back and tell younger Thomas one thing, what would it be?

Thomas Young: Publish anyway. Even if they mock you, publish. Someone reads it eventually.

Vansh: Noted. Also, the food is getting cold, and I really want to hear the vision story next.

Selina Ke

Dinner Conversation with Malvina Reynolds

Selina: Your song “Little Boxes” feels both catchy and unsettling. At first it sounds playful, but then I realized you are criticizing how people end up living almost identical lives.

Reynolds: That contrast is intentional. The cheerful tone makes the message easier to take in, but the repetition is meant to show how uniform those lives can become.

Selina: The image of “little boxes” really stuck with me. At first I thought it just meant houses, but it feels like it also represents the way society puts people into categories or expectations.

Reynolds: The houses are only the surface. The real idea is that people are shaped into predictable roles, often without questioning them.

Selina: The song talks about going to university, then becoming doctors, lawyers, or business executives, and then repeating the same cycle with their children. It feels like life is mapped out in advance.

Reynolds: That cycle is central to the message. Education and careers are not inherently bad, but when they become part of a rigid pattern that everyone follows, individuality can be lost.

Selina: That is what made me uncomfortable. It feels like people think they are making their own choices, but they are actually following a script that society has already written.

Reynolds: Yes, the conformity is often subtle. People may believe they are choosing freely, but their options and expectations are shaped long before they realize it.

Selina: I also found it interesting that even though the houses are described as different colors, they are still “all the same.” It feels like you are saying surface differences do not really change the deeper sameness.

Reynolds: That is right. Small variations can give the illusion of individuality, but underneath, the structure of life remains very similar.

Selina: Society encourages people to succeed, but success often means fitting into certain roles. So even when people achieve success, they might still end up living very similar lives.

Reynolds: That is one of the central tensions. Success, as defined by society, can sometimes reinforce conformity rather than challenge it.

Selina: Do you think it is possible to live outside of these “boxes,” or are people always shaped by society in ways they cannot fully escape?

Reynolds: It is difficult to escape completely, because we are all influenced by the world around us. But awareness is the first step. Once people begin to question the patterns, they can start to make more conscious choices, even if they cannot entirely step outside the system.

Me:

Okay so you were eighteen, stuck inside over Easter break, messing around in a home lab. I would've given up the second my flask filled with black sludge. What made you keep poking at it?

Perkin:

Stubbornness, honestly. More than anything clever. I was annoyed because I had wanted quinine and clearly hadn't gotten it. But when I went to clean the flask out with alcohol, the sludge dissolved into this incredible purple, and I just stopped. Purple was the color emperors had hoarded for centuries. And there it was, on the bottom of a flask, made from coal tar of all things. I couldn't walk away from it.

Me:

Did you tell anyone right away? Like did you run downstairs and show your brother?

Perkin:

My friend Arthur Church first, because he was working alongside me, and then my brother Thomas. We dipped a piece of silk in it together and watched the color hold through a wash. That was when it stopped feeling like a fluke. Telling Hofmann, my professor, came much later. I knew he wouldn't love the idea of me leaving research for trade, and I was right about that.

Me:

Were you scared to drop out and bet everything on a dye? You were a teenager.

Perkin:

Terrified. My father had saved for my education and I was about to spend it on a factory. He came around once he saw the silk, but those first few weeks I was lying awake convinced I was ruining my life. I think being eighteen was actually the only reason I could do it. A few years older and I would've known too much to try.

Me:

What did it feel like the first time you saw someone on the street wearing your color?

Perkin:

Strange. A little embarrassing, even. There was a woman walking down Oxford Street in a mauve dress and I knew, in some chemical sense, that I'd made what she was wearing. It's the closest I've ever come to feeling like something I did in a back room actually reached out and touched the world.

William Henry Perkin: Mauveine, Marketing, and an Accident at Eighteen

Me: William! It's so good to see you! Thanks for making the trip!

Perkin: Maximo! A pleasure, truly. Is that shepherd's pie I'm smelling?

Me: It is! Fresh out of the oven. Listen, William, I've been reading about you for my class, and I have to ask you about 1856. You were eighteen years old, a student, trying to synthesize cheap quinine out of coal tar derivatives to fight malaria. A noble goal. And you failed at it completely. What you got instead was a black residue at the bottom of the flask. Most people would have rinsed it out and moved on. What made you keep looking at it?

Perkin: Ah, Maximo. You have asked the question I was asked for the rest of my life. The honest answer is that I was young enough to be curious and untrained enough to be careless. A more experienced chemist would have scrubbed the flask and started over. I reached for the alcohol to clean it, and the black muck dissolved into a purple so beautiful I stopped what I was doing. I dipped a piece of silk in it. The silk came out purple. I washed the silk. It stayed purple. At that moment, Maximo, I understood I had not made quinine. I had made something else entirely, and the something else wanted to be sold.

Me: But here is what I want to press you on, William. You first called it Tyrian purple. That was not an accident of naming. Tyrian purple was the color of Roman emperors, a dye so rare the ancients extracted it from sea snails. You borrowed the name to borrow the prestige. That is not chemistry. That is marketing.

Perkin: A fair blow, Maximo, and I will not hide from it. I was eighteen, and I was poor, and I had a product. I reached for the name that would fetch the highest price. The chemists in the lab would have cringed, but the merchants on Regent Street understood me perfectly. And then I realized something. The fashionable women of London did not care about Tyre. They cared about Paris. So I renamed it mauveine, after the French word for the mallow flower, and the sales climbed. I will confess it plainly. I was a better marketer than I was a classicist.

Me: And the joke, William, is that just as you were selling your synthetic purple under a borrowed ancient name, Henri de Lacaze-Duthiers was rediscovering that the real Tyrian purple came from Murex snails. The ancient and the modern nearly passed each other in the hallway.

Perkin: They did, Maximo. I have often thought about that. If he had published a year earlier, I would have looked like a cheap imitator trying to cash in on a rediscovery. If I had waited a year, my dye would have arrived in a world that had just been reminded what the original cost. The timing was luck, and I will not pretend otherwise.

Me: And yet the consequences were real. Your accident launched the synthetic dye industry. Before you, colored clothing was a marker of rank. A peasant wore brown and gray because

those were the dyes the earth could afford. After you, a shopgirl in Manchester could wear purple. That is not a small thing.

Perkin: It is not, and it is the part of my life I am most at peace with. I stumbled into a discovery I did not deserve, and I sold it with names I did not earn. But the dye went out into the world and did something I had not planned. It put color on the backs of people who had never worn it. A chemist who wanted to cure malaria ended up dressing the working class instead. I will take that trade, Maximo. I will take it gladly.

Me: That's a generous way to hold it, William. Would you care for some dessert?

Perkin: I'll pass, Maximo, the shepherd's pie has done me in. Thank you for having me, my friend. Take care of yourself.

Lecture 22: Dinner Conversation with Otto Elsner

Me: Hi Mr. Elsner, thank you for meeting me for dinner! In class, we learned about your work on rediscovering the blue dye tekhelet. I found it fascinating that sunlight itself played a role in the process. How did you first discover this?

Elsner: Quite unexpectedly, actually. I had left a reduced yellow green dye solution from the Murex snail near a window on a sunny day. When the solution oxidized, I expected it to turn purple, but instead it became bright blue.

Me: That must have been surprising. Why did the sunlight change the color?

Elsner: Well, the ultraviolet light from the sun broke certain bromine bonds in the dye molecule. As a result, the purple compound known as dibromoindigo was converted into indigotin, which produces the blue color of tekhelet.

Me: So light was actually changing the chemistry of the dye itself?

Elsner: Indeed. The ultraviolet light initiated a photochemical reaction that altered the molecular structure of the dye. Without the sunlight, the wool would remain purple as expected.

Me: Wow that is truly amazing to think about. A simple change in light exposure completely changed the final color.

Elsner: It demonstrates that light is not merely something we see. Light can also drive chemical transformations and influence the materials around us.

Me: In class, we also learned that the knowledge of producing tekhelet had been lost for centuries. Did that historical aspect make the discovery more meaningful to you?

Elsner: Very much so. Tekhelet held deep cultural and historical significance for many generations.

Me: Last question! I love to ask this one. Do you think your discovery carries a broader lesson about science?

Elsner: Certainly. Some discoveries come not from carefully searching for an answer, but from paying attention to unexpected results. Curiosity and observation are so very important.

Me: Thank you for this conversation. It's incredible to think that sunlight could help recover a process that had been lost for centuries.

The dining room was warm, lit by candles that flickered slightly as if even the light couldn't decide how to behave.

A man at the table leaned back in his chair, studying the glow with unusual intensity.

"Interesting," he said, pointing at the candlelight. "If light were strictly a particle, it wouldn't smear like that across the tablecloth. But if it's a wave... then of course it spreads, overlaps, interferes with itself. Honestly, it's almost rude how well it behaves like a wave."

Someone across from him took a sip of wine. "It's just a candle."

"That is exactly the sort of thinking that has kept physics emotionally stagnant for centuries," he replied calmly.

A pause followed. The roast continued to steam between them.

He reached for a spoon, then stopped. "Even this utensil is suspicious."

"...In what way?"

"It reflects light too cleanly. Almost as if the angles are obeying rules we have not fully appreciated yet."

A fork clinked against a plate. He immediately turned toward it.

"That was an excellent demonstration of gravity. Slightly uncooperative, but consistent."

A guest muttered, "It's a fork falling."

"Yes," came the reply, "but it is also a data point refusing to behave differently in vacuum conditions I have not yet created. Which is disappointing."

The table fell quiet except for the faint crackle of the fire.

Then, thoughtfully, he added, "I once decoded an entire ancient language by assuming everyone else had simply overlooked obvious patterns."

"That seems... optimistic."

"It was. And also correct."

A servant passed behind them. He nodded toward them with the same seriousness one might reserve for a scientific instrument.

“Human motion remains one of the most under-studied waveforms,” he said. “Highly variable amplitude. Slightly chaotic phase alignment.”

Someone coughed into their napkin.

The roast was carved. Wine was poured. But every action at the table now seemed, unfortunately, like it might be part of an experiment.

Finally, he leaned forward again, eyes bright.

“Dinner is really just a collection of interacting systems pretending to be ordinary.”

A long silence followed.

Then, in a low voice from the end of the table: “Can we just eat?”

A pause.

“...Yes,” he said. “But it would be more interesting if we acknowledged the underlying physics while doing so.”

Nobody responded.

After a moment, he added, almost cheerfully, “Constructive interference, anyone?”

Nomar: This lecture felt completely different from the others. I didn't expect color to have this much history behind it, especially with dyes.

William Henry Perkin: The discovery of synthetic dyes transformed how humans produce and use color.

Nomar: Yeah, your story actually stood out to me the most. You were just trying to make quinine and accidentally created a purple dye instead. That's kind of crazy because it ended up changing fashion and industry completely.

William Henry Perkin: Many discoveries arise from unexpected observations.

Nomar: That's what I found interesting. Before that, people had to get dyes from things like plants or even insects, which took a lot of time and effort. Like needing thousands of snails or insects just to make a small amount of dye is wild

Nomar: And then suddenly, with synthetic dyes, it became cheaper and way more accessible. It kind of shifted color from being something only rich people could have to something everyone could wear.

William Henry Perkin: It made color more widely available to society.

Nomar: I also thought it was interesting how certain colors meant status. Like purple used to represent power and royalty, and not just because of the color itself, but because it was so hard to produce.

Nomar: It made me realize color isn't just visual, it actually carries meaning depending on history and context. Like what we see as normal today used to be something rare and valuable.

William Henry Perkin: Human perception of color is shaped by both science and culture.

Nomar: Yeah, and even now we still care about color a lot, whether it's clothes, brands, or even how things are marketed. It just feels more normal because it's everywhere now.

Nomar: This lecture kind of made me think differently about something simple like a colored shirt. There's actually chemistry, history, and even economics behind it.

Ariel Vilensky

Lecture 22. Purple, Blue, and Red Dyes

Me: Good evening, Emilia Niemiec. I wanted to ask about your argument regarding censorship of misinformation during COVID. You suggest that while it may seem effective, it can actually introduce new risks. Could you explain that?

Emilia Niemiec: Good evening. Yes—censorship can appear to solve the problem quickly, but it centralizes authority over what counts as “truth.” That creates the possibility of errors, bias, or even manipulation, especially when decisions are made by a small group or institution.

Me: So the concern isn’t just about free speech, but about the reliability of those making the decisions?

Emilia Niemiec: Exactly. No institution is infallible. When we grant exclusive authority to define what is scientifically valid, we risk reinforcing mistakes or allowing non-scientific interests—political or commercial—to shape those decisions.

Me: That makes sense. But without some level of moderation, misinformation can spread very quickly. How do we balance those concerns?

Emilia Niemiec: It’s a difficult balance. My argument is that while moderation may have a role, long-term solutions should focus on education that helps people evaluate information critically and engage responsibly with media.

Me: So instead of trying to eliminate misinformation entirely, we strengthen society’s ability to resist it?

Emilia Niemiec: Precisely. It's slower and less visible, but it builds resilience. A well-informed public is less vulnerable to both misinformation and the unintended consequences of over-censorship.

Me: That's a compelling tradeoff—short-term control versus long-term resilience. Thank you for your time.

Emilia Niemiec: My pleasure.

Karen Zheng, kz374

Dinner Conversation with Caligula

Me: Hi, Caligula! In class, I learned and read that you ordered that only you could wear the royal purple. It's striking that something as simple as color could be controlled so tightly. How did you justify it?

Caligula: There is nothing simple about power. The purple from the Murex was rare, costly, and unmistakable. When I wore it, no one could mistake who I was.

Me: So the point wasn't just luxury, but about visibility?

Caligula: Exactly. Power must be seen. When light strikes the purple, it separates me from everyone else without a word.

Me: But that makes me wonder: does the distinction depend on light and perception, is the power really in the color, or in how people interpret it?

Caligula: It is in both. The color itself is rare and difficult to obtain, but it is the meaning attached to it that gives it true force; once people come to associate that color with authority and power, what they see becomes something they believe in, and that belief is what ultimately sustains it.

Me: In class, we've been talking about how light reveals things, but doesn't necessarily define what they mean. The purple stands out because of how it reflects light, but the idea that it also represents power. That part feels constructed.

Caligula: Constructed, perhaps. But once people accept it, it becomes real enough and enough to have power over people.

Me: That's interesting, because it feels similar today. We don't have laws about who can wear certain colors, but we still use visual symbols such as brands, clothing, and other various status signals that society often falls victim to.

Caligula: Then your world has not abandoned hierarchy. It has only disguised it.

Me: Perhaps. But I think we're more aware now that what we see isn't always the full truth. The purple robe might signal power, but it doesn't actually create it. But, I agree we still have work to do as a society in looking beyond what catches the light and toward what holds meaning beneath.

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 23 Dinner Conversation

Conversation with Alfred Russel Wallace

Ellie: Mr. Wallace, thank you so much for meeting with me for dinner.

Alfred Russel Wallace: Thank you for inviting me, Ellie. I'm happy to talk.

Ellie: In class we learned about how you developed the idea of natural selection, and I was really interested in the fact that it came to you while you were in the Malay Archipelago.

Alfred Russel Wallace: Yes, it did. I was sick with a fever, and I kept thinking about what I had been observing. On different islands, the same kinds of animals looked slightly different, almost like nature was "adjusting" them to fit each place. That's when it clicked for me that the individuals with the most useful traits would survive and leave more offspring.

Ellie: And you sent your paper to Darwin before you even published anything yourself, right?

Alfred Russel Wallace: I did. I respected Darwin and knew he had been thinking about similar questions for a long time. I wanted his opinion. I didn't expect our conclusions to match so closely, but they did, and that's what led to the joint presentation at the Linnean Society.

Ellie: But even though you agreed on natural selection, you didn't end up agreeing with Darwin about everything.

Alfred Russel Wallace: That's true. When it came to the human mind, our moral sense, and things like music and art, I struggled to believe those could be fully explained by survival advantages alone.

Ellie: So you felt like evolution wasn't only random change plus survival, but something more directed.

Alfred Russel Wallace: In a way, yes.

Ellie: I see, that makes sense. I also liked how your writing treated nature as something that can shape how we think ethically, not just something we study.

Alfred Russel Wallace: I'm glad you noticed that. Nature is not only a system to measure. It can also be something that changes the way we see ourselves.

Ellie: Wow, that's so insightful. Thank you for having dinner with me.

Alfred Russel Wallace: My pleasure. This dinner was amazing.

Mahidul Islam
Dinner Conversation
PLBio 1130 5/5/26

Me:

Brother yooo Schrödinger, can you tell me what you meant when you said natural science helps us “get to know yourself”?

Erwin Schrödinger:

Of course my friend! I believed science is not just about studying nature, but also understanding who humans are.

Me:

So you’re saying science helps people understand themselves better?

Schrödinger:

Exactly Mahidul, you got the right idea! When we study life, physics, and the universe, we also learn more about consciousness and our place in the world.

Me:

Wait, weren’t you also one of the founders of quantum mechanics?

Schrödinger:

Yes buddy boy! Quantum mechanics explains how tiny particles like electrons behave in strange and unpredictable ways.

Me:

Is that where Schrödinger’s cat comes from?

Schrödinger:

You got it smarty pants! I created the cat thought experiment to show how strange the Copenhagen interpretation of quantum mechanics sounded when applied to everyday life.

Me:

So the cat is both alive and dead at the same time?

Schrödinger:

Not exactly, bro! I did not actually believe a real cat could be both alive and dead. The experiment was meant to criticize how weird quantum theory can become when applied to normal objects.

Me:

Ohhh, so the experiment was meant to question the theory?

Schrödinger:

Exactly! I wanted people to think more deeply about how quantum mechanics works and whether those ideas make sense in the real world.

Me:

That actually sounds kinda crazy.

Schrödinger:

Science can be crazy Mahidul, but that's what makes discovering the universe exciting.

Me:

Thanks for telling me all of this!

Schrödinger:

No worries dude. Keep questioning everything.

Lecture 23a: Dinner Conversation with Charles Darwin

Light and Life | Vansh Kakra | vk365

Vansh: So I have to start with this. You sat on your theory for what, twenty years before publishing? Twenty years. My professors get annoyed if I turn in a draft two days late.

Charles Darwin: In my defence, I was fairly certain it would upset nearly everyone I knew.

Vansh: Yeah, fair. Your wife alone, right? She was religious.

Charles Darwin: Emma was worried for my soul. I loved her too much to publish carelessly. So I kept working, and reworking.

Vansh: Okay, but then Wallace writes you that letter from Indonesia, and he basically has the same theory. What did that feel like?

Charles Darwin: Like the floor had tilted. He described natural selection in a few pages, very cleanly, and asked my opinion. My opinion was, well, that my life's work had just arrived in the post written by a younger man.

Vansh: That is every grad student's worst nightmare. Getting scooped by email.

Charles Darwin: We arranged to present our papers jointly. Wallace was gracious, more gracious than I would have been in his position.

Vansh: Honestly I think about this a lot. Like at Cornell we're all running the same data science/finance experiments, and someone's always half a step ahead. The Wallace move, being generous about it, is rare.

Charles Darwin: He was a rare man. He later disagreed with me quite sharply about whether the human mind could come from natural selection alone. He thought not. I thought yes. We stayed friends through the disagreement.

Vansh: Can I ask you something kind of heavy?

Charles Darwin: Please.

Vansh: You wrote a letter once, toward the end of your life, where you said you weren't sure if a mind shaped by natural selection could even be trusted to find the truth. That seems like a big thing to admit, coming from you.

Charles Darwin: If my brain evolved because it helped my ancestors survive, not because it found truth, then why should I trust any conclusion it reaches? Including the conclusion that evolution is true.

Vansh: That's the kind of thing that would keep me up at 3 a.m.

Charles Darwin: It kept me up for many hours.

Vansh: Did you ever resolve it?

Charles Darwin: No. I left it as an open question. I think science can say what, and how, rather more than it can say why.

Vansh: That's actually refreshing. Most people I read online are so certain about everything.

Selina Ke

Dinner Conversation with Owen Barfield

Selina: I've been trying to understand your idea that we need to separate nature itself from the models we use to explain it. I always thought science just tells us what is real, but now it feels like it only gives us a version of reality.

Barfield: What you see and experience directly, like colors, sounds, or a rainbow, is one kind of reality. Scientific models are tools we use to explain those experiences, but they are not the same as the experience itself.

Selina: So if I see a rainbow, that is real to me. But when science explains it using light and refraction, that explanation is just a model, not the rainbow itself.

Barfield: The model helps us understand and predict, but it is still a simplified version.

Selina: You also warn about treating models like they are the ultimate truth. You call that an "idol." That part confused me at first.

Barfield: If people forget that a model is just a tool and start believing it is the only true reality, then they are mistaking a representation for the real thing.

Selina: So it is like confusing a map with the actual place. The map is useful, but it is not the world.

Barfield: That is a very good comparison.

Selina: I also noticed you talk about how knowledge is becoming very specialized, where people know more and more about smaller topics. That seems helpful, but you say it could cause problems.

Barfield: Yes, because when knowledge is too divided, people may stop understanding each other. Everyone stays in their own area, and it becomes harder to share ideas.

Selina: That actually feels very true today. It can feel like people in different fields speak completely different languages.

Barfield: That is the risk. Without shared understanding, knowledge can become disconnected.

Selina: You also say there are two ways of seeing the world. One is the everyday world we experience, and the other is the scientific world built from theories. And we cannot fully treat both as the final truth at the same time.

Barfield: Yes, that is the tension. One is based on direct experience, and the other on abstract thinking.

Selina: I trust science, but I also feel like it does not fully capture what it is like to actually experience the world.

Barfield: That is a very human response. Both ways of understanding are important, but they are not the same.

Selina: If scientific models are always incomplete, is it possible to create a way of understanding things like light and life that feels more connected and not so fragmented?

Barfield: It is possible, but only if we remember that models are tools, not ultimate truth, and if we try to connect our thinking back to our real experiences instead of separating the two.

Dinner Conversation with Alfred Russel Wallace

Me: You and Darwin came up with the same theory independently, and you're the one whose letter finally pushed him to publish. Did it ever bother you that his name is the one everyone remembers?

Wallace: Honestly, no. Darwin had been at it for twenty years before I sent that letter from the Malay Archipelago. I had a flash of it during a fever in 1858, but he had the breeding experiments, the barnacles, the whole scaffolding. If my name had been the only one attached to natural selection, it would've been built on something much thinner. I was glad to share the platform with him at the Linnean Society and let him write the book.

Me: But then you broke with him on something pretty big, which is whether natural selection could really explain the human mind. That must've been hard to do publicly.

Wallace: It was. Darwin wrote to me that he was distressed, and I understood why. We'd built something together and here I was saying it didn't quite reach all the way. But I couldn't see how natural selection alone produced the capacity for higher mathematics, or music, or moral reasoning. None of those things help you survive on the savanna. They showed up in humans long before they were useful. That asymmetry kept nagging at me until I had to say something.

Me: So where did that leave you? You're still a scientist but you're saying science can't explain everything.

Wallace: I called it a guiding intelligence, which made a lot of my colleagues furious. They thought I'd gone soft, or religious, or both. But I never gave up on natural selection for the body. I just couldn't stretch it to the mind without it feeling forced. And I'd rather be honest about a gap than paper it over to stay in good standing.

Me: That sounds lonely, scientifically. Like you talked yourself out of the club.

Wallace: A little. Darwin's circle drifted away. Huxley was polite but distant. But I'd spent four years alone in the Amazon and eight more in the Malay Archipelago, so being out of step with London wasn't the worst thing that had happened to me. I'd rather hold a view I'd reasoned my way into than belong to a group I had to lie inside of.

Me: If you could say one thing to a student now about how to do science honestly, what would it be?

Wallace: Follow the evidence even when it leads you somewhere your friends won't follow. The hardest part of science isn't the experiment. It's being willing to say what you actually see, especially when what you see disagrees with the people whose respect you want most.

Lecture 23: Dinner Conversation with Francis Bacon

Me: Hi Mr. Bacon, thank you for meeting me for dinner! We learned that you helped shape the scientific method through inductive reasoning. Can you tell me about it?

Bacon: I believed that many people were too eager to jump to broad conclusions without carefully studying nature itself. Instead of beginning with assumptions, I thought that we should start with observation, experimentation, then gradually build toward general principles.

Me: So rather than forcing nature to fit existing ideas, we should let evidence guide them?

Bacon: Nature must be observed patiently and systematically. I believe that knowledge gained from careful observation is far more reliable than conclusions built only from abstract reasoning.

Me: We also discussed your idea of the “Idols” that distort human thinking. Could you explain more?

Bacon: I think that the human mind is easily misled. People are constantly influenced by their own bias, social pressure, misleading language, and just not questioning things. These “Idols” distort how we interpret reality and prevent us from seeing nature clearly.

Me: I most definitely agree. Do you think science can ever reach the complete truth?

Bacon: I don’t believe humans can possess complete and absolute truth. In fact, science is a method for searching for truth. I believe we must come to terms with the limitations of understanding.

Me: I really liked your idea that observation should come before certainty.

Bacon: Thank you. The danger comes when people become too confident in assumptions before properly examining the evidence. The mind naturally seeks quick answers, but true understanding requires patience.

Me: Now for the question I always ask. Do you think your ideas carry a broader lesson beyond science itself?

Bacon: Certainly. I believe intellectual humility is essential in every field. We must be willing to question our assumptions, correct our errors, and continue searching for truth even when certainty is impossible.

Me: Thank you for this conversation. It’s fascinating to realize that good science begins with careful observation and humility.

Nomar: Sophie Scholl, I have to be honest, I feel kind of underdressed for dinner with someone who stood up to Hitler. I was stressed about practice and homework today, and you were out here risking your life for truth.

Sophie Scholl: Nomar, courage does not always begin with something dramatic. Sometimes it begins when you realize staying silent would make you part of the problem.

Nomar: That's crazy because in my world, people talk about leadership a lot, but usually it means being loud, confident, or the guy everyone looks at. For you, leadership seemed more like doing the right thing when almost nobody wanted to.

Sophie Scholl: Exactly. Real leadership is not about being seen. It is about seeing clearly. If something is wrong, you cannot wait until everyone agrees with you before you act.

Nomar: That hits me because on a football team, it is easy to follow the crowd. If nobody wants to clean up, speak up, or hold people accountable, everyone just lets it slide. But I guess those small moments build the kind of person you become when the bigger moments come.

Sophie Scholl: Yes, the small choices train the soul. A person who will not stand for small truths will struggle to stand for larger ones.

Nomar: So basically, you're saying if I can't even tell my boys to stop leaving the locker room a mess, I probably shouldn't act like I'd be fearless in some huge moral crisis.

Sophie Scholl: I would not say it that harshly, but yes, that is the idea.

Nomar: Fair enough. Also, I feel like you would be the type to give a calm motivational speech and somehow make the whole table sit up straighter.

Sophie Scholl: I would simply remind them that truth is worth more than comfort.

Nomar: That might be the line I remember most. Because whether it is school, football, service, or faith, it is easy to pick what is comfortable. But you showed that a meaningful life is not about just surviving, it is about standing for something that matters.

Ariel Vilensky

Lecture 23a. What is Life?

Me: Good evening, Sir Francis Bacon. I wanted to ask about your concept of the “Four Idols.” Could you explain what they are?

Francis Bacon: Good evening. The Four Idols are categories of errors that distort human understanding. They are the Idols of the Tribe, the Cave, the Marketplace, and the Theatre. Each represents a different source of bias or misconception.

Me: I’m particularly interested in the Idols of the Tribe. What do those refer to?

Francis Bacon: The Idols of the Tribe arise from human nature itself. Our minds are prone to seeing patterns where none exist, preferring order and certainty even when reality is more complex. These are universal tendencies.

Me: That sounds very relevant today: people often draw conclusions from limited or ambiguous evidence.

Francis Bacon: Indeed. Without careful discipline, the mind bends facts to fit its expectations rather than adjusting expectations to fit the facts.

Me: What about the Idols of the Cave?

Francis Bacon: Those are more personal. Each individual has their own “cave,” shaped by upbringing, education, and experience. These factors influence how we interpret the world, often without our awareness.

Me: So even when people think they're being objective, they may still be influenced by their own background?

Francis Bacon: Precisely. That is why self-awareness is essential in the pursuit of knowledge.

Me: It seems like your broader message is that understanding requires actively correcting for these biases.

Francis Bacon: Exactly. True inquiry depends on recognizing and overcoming these idols, rather than blindly trusting our instincts.

Me: Thank you, Sir Francis. That gives me a lot to reflect on.

Francis Bacon: You are most welcome.

Karen Zheng, kz374

Dinner Conversation with Owen Barfield

Me: Hi Owen, I've been thinking about what you said about being aware of idols and distinguishing between nature itself and our models of it. What do you mean by that?

Barfield: We often mistake our explanations of nature for nature itself. The models we create, the scientific and mathematical ones, are useful, but they are not the things they describe. They help us "save the appearances," but they are still abstractions.

Me: So when I look at something like a rainbow, that experience is different from the explanation behind it?

Barfield: Exactly. When you see a rainbow, you are participating directly in nature, through your senses, through what I call "original participation." Your senses are part of the experience. But when you analyze it, you are creating a model that helps explain what you saw, not replace it.

Me: I think I've been treating the explanation as more "real," like it's somehow closer to the truth than what I actually see.

Barfield: That is the habit of modern thinking. We elevate models because they are calculable and predictable. But in doing so, we risk losing something: the immediacy and richness of direct experience. They do not contain nature; they interpret it.

Me: So when I see a rainbow, the colors themselves are just as real as the physics behind them?

Barfield: Yes. Both the experience and the explanation are ways of knowing. The appearance is not an illusion to be dismissed; it is something to be engaged with. And the model is not false; it is simply another lens.

Me: So maybe understanding light and life isn't just about equations or diagrams, but also about noticing how it feels, how it changes what we see.

Barfield: Exactly. Light is not only something to be measured, but it is something that reveals. It allows the world to appear to you, and you to participate in it.

Me: Maybe that's what it means to really understand light and life, not just to explain it, but to stay present within it. Both the experience and explanation are necessary, but they shouldn't replace each other. Thanks, Owen!

Ellie Cha
PLSCI 1130
Professor Wayne
Lecture 23b Dinner Conversation

Conversation with Albert Einstein

Ellie: Hi Dr. Einstein, thank you for meeting with me for dinner!

Albert Einstein: Of course, Ellie. What are you curious about?

Ellie: In lecture we talked about your work on relativity and quantum mechanics. I was amazed by how much you shaped modern physics, but also by how often you challenged where physics was going. You were especially critical of the Copenhagen interpretation, right?

Albert Einstein: Yes. My concern was that if we treat the universe as something that only becomes “real” when measured, we drift away from physics as a description of nature and toward something closer to philosophy, or even mysticism.

Ellie: But what’s interesting is that you still contributed to quantum theory with the photoelectric effect.

Albert Einstein: That is true. The evidence demanded a new idea, so I proposed that light comes in discrete packets of energy, what you call photons. It solved the problem. But even then, I believed it was not the final story.

Ellie: That’s very interesting. Relativity was honestly the hardest part for me to picture. The idea that time and space aren’t absolute feels so counterintuitive.

Albert Einstein: It is counterintuitive because everyday life happens at low speeds. But once you look at what happens with very fast particles and precise clocks, you see that simultaneity depends on the observer, and time can pass differently for different frames of reference.

Ellie: And even with all the success of quantum mechanics, you still weren’t convinced it was complete.

Albert Einstein: I wasn’t. I felt it described outcomes well, but it did not explain what was happening underneath. I could not accept that randomness was the final answer. I hoped for a theory that could account for quantum behavior without surrendering determinism.

Ellie: Thank you for sharing your perspective with me, Dr. Einstein. It was amazing being able to meet you in real life and hear what you have to say.

Albert Einstein: Haha, thank you, Ellie. I had an amazing dinner.

Dinner with Robert Frost

Me: Mr. Frost, you wrote in your notebooks that Einstein has done nothing but harm with the idea that time is a fourth dimension of space – that it gives nothing to hold onto or love. That is a fairly sharp complaint from a poet to a physicist. What bothered you about it?

Frost: (without apology) What bothered me is what bothers me about a certain kind of intellectual – the kind that uses the authority of mathematics to say things that cannot be pictured, and then dares you to object. Einstein tells us that time and space collapse into each other, that there are no fixed points, that nothing abides. He sets himself up as too mathematical for ordinary people to question. And I am supposed to accept that? I have been watching time my whole life. I have watched seasons turn, I have watched the light come back after winter, I have watched things grow and die in a dependable order. That is not an illusion. The plant does not consult Einstein before it flowers. The bee does not wonder whether the time of day is relative before it visits the flower. Time is real enough for them, and I trust them more than I trust a man who says otherwise from behind a page of equations.

Me: And yet the evidence for relativity is quite strong – the deflection of starlight by the sun, measured during the eclipse of 1919, matched Einstein's prediction exactly. That is a rather serious piece of evidence to dismiss.

Frost: (levelly) I don't dismiss it. I question whether the interpretation is the only possible one. The same observations that Einstein explained by bending space-time might be explained by a photon with rotational energy moving through absolute Newtonian space and time – and I have read arguments to that effect. The evidence matches, but the explanation is different. That seems to me precisely the situation where one should be cautious about which authority to follow. When someone tells me the evidence proves his interpretation and no other, I start listening the way I listen to a man who is selling something.

Me: Your poem "The Secret Sits" says that we dance round in a ring and suppose, but the Secret sits in the middle and knows. That reads like a statement about the limits of science – about the gap between what we can measure and what is actually true.

Frost: (quietly satisfied that I noticed) It reads like what it is. We go round and round with our instruments, our theories, our competing explanations, and we suppose we are getting closer to the center. Maybe we are. But there is something sitting in the middle of it that we have not yet caught, and I doubt we will catch it by declaring that time is a shadow. The second law of thermodynamics tells us that time has a direction – that things move from order to disorder, that you cannot run the river backwards. That is a law that comes from experience, from observation, from the irreversible nature of every real process. And I trust that more than I trust a mathematical framework that requires me to believe time itself is an illusion.

Me: You also wrote "Nothing gold can stay" – that nature's first green is gold, the hardest hue to hold. That is about irreversibility too, isn't it? About the arrow of time in the most intimate sense.

Frost: (a long pause, looking at the fire) A poem is not a theory. But yes – everything I know tells me that time moves in one direction, that what is lost is lost, that the early leaf that was a flower does not become a flower again. That is not a limitation I regret. It is what gives things their weight. A sunrise matters because it will not last. If time were reversible, if nothing were truly past, then nothing would matter. You could always go back. You never can. That is not a tragedy. That is the shape of a life.

Me: David Ray asked you once whether you had hope for the future, and you said yes – and even for the past, that it will turn out to have been all right. That strikes me as one of the most unusual things a person can hope for.

Frost: (with a slight smile) The past is the only thing we know with any certainty, and yet it is the one thing we cannot change. So the only freedom we have with it is how we carry it. I have made mistakes I placed on people who did not deserve them. I cannot undo that. What I can hope is that what was done with whatever good intentions I had will eventually look, from far enough away, like something that was worth doing. That is not sentimentality. That is just not giving up on what you cannot go back and fix.

Me: The woods are lovely, dark and deep, but you have promises to keep.

Frost: (standing, picking up his coat) And miles to go. That was always the answer, and it still is. Goodnight.

Mahidul Islam Dinner Conversation
PLBio 1130 2/17/26

Me:

Yooo James Bradley, what did you discover about stars and Earth's movement?

James Bradley:

Mahidul, I noticed that the apparent positions of stars seemed to change depending on the direction Earth was moving while orbiting the sun.

Me:

Wait, so the stars looked like they moved even though they actually didn't?

James Bradley:

Exactly what I thought Mahidul! The effect was caused by Earth's motion through space, not because the stars themselves were changing position.

Me:

How did you figure that out?

James Bradley:

I had to tilt my telescope at a certain angle so the starlight entering the top of the telescope would travel correctly down to the eyepiece.

Me:

Why did the telescope need to be tilted?

James Bradley:

Because Earth was moving while the light traveled through the telescope. The motion of Earth affected the direction from which the light seemed to arrive in there.

Me:

So the faster Earth moved, the more you had to tilt it?

James Bradley:

Exactly, Mahidul you're so smart. The angle depended on Earth's velocity as it orbited around the sun.

Me:

What was this effect called?

James Bradley:

It called the aberration of starlight.

Me:

That's actually really interesting.

James Bradley:

The discovery provided important evidence that Earth truly moves around the sun.

Me:

So astronomy helped prove Earth's motion?

James Bradley:

Yes! Observations of light and stars helped scientists better understand the structure and motion of the solar system.

Me:

Thanks for telling me all of this!

James Bradley:

No problem, Mahidul

Lecture 23b: Dinner Conversation with Albert Einstein

Light and Life | Vansh Kakra | vk365

Vansh: Okay so people are going to expect me to ask about relativity. I'm not going to. Is that allowed?

Albert Einstein: Highly encouraged. I am tired of relativity.

Vansh: Perfect. Because the thing that confuses me is, you got the Nobel Prize for the photoelectric effect, not relativity. And nobody talks about the photoelectric effect.

Albert Einstein: This is true. The committee was nervous about relativity. So they gave me the prize for what they considered the safe paper.

Vansh: Was it actually safe though? You basically said light is little packets of energy, which everyone in 1905 thought was crazy.

Albert Einstein: Crazier than relativity, in some ways. Physicists had spent a hundred years proving light was a wave. Thomas Young, Maxwell, all of them. And then I came along and said, well, also a particle, sometimes.

Vansh: That feels like the kind of thing you say when you want to get yelled at.

Albert Einstein: I did get yelled at. Robert Millikan spent ten years trying to prove me wrong with experiments. He ended up proving me right and was very annoyed about it.

Vansh: That's the most physicist thing I've ever heard. Spending a decade trying to disprove someone and accidentally giving them a Nobel.

Albert Einstein: He still didn't believe the interpretation. Only the equation.

Vansh: Wait, what does that even mean?

Albert Einstein: He accepted that my math worked. He did not accept that light was actually made of little packets. He thought I had stumbled onto a useful formula for the wrong reason.

Vansh: That's actually really funny. It's like getting an A on a paper while your professor writes "I disagree with everything you said but the numbers check out."

Albert Einstein: Welcome to physics in 1915.

Vansh: You asked your friend if he really believed the moon wasn't there when nobody was looking at it. That story made it to the internet, by the way. People quote it constantly.

Albert Einstein: I meant it seriously. If physics says the moon is not really there until someone observes it, then physics is missing something. Either the moon is there or our theory is incomplete. I bet on the moon.

Selina Ke
Dinner Conversation with C.S. Lewis

Selina: I've been thinking about your idea that progress does not always mean moving forward. You say that if someone is on the wrong road, then continuing forward actually takes them farther away from where they want to be. That really challenges how I normally think about success.

Lewis: Most people assume progress always means going forward. But that only works if you are already headed in the right direction. If you are mistaken about where you are going, then persistence can make things worse, not better.

Selina: So progress depends on whether you are actually correct about your direction in the first place. If you are wrong, then the most "progressive" thing is actually to go back and change course.

Lewis: The person who corrects a mistake quickly is making real progress. The person who refuses to admit a mistake may be moving, but not toward their goal.

Selina: I liked your example with arithmetic. If you solve a problem the wrong way, the fastest way forward is to stop, go back, and restart. Otherwise you just keep getting the wrong answer more efficiently.

Lewis: That is the idea. Efficiency does not matter if the direction is wrong.

Selina: You also suggest that humanity might be in a similar situation, not just individuals. That feels more serious.

Lewis: Yes. If a society realizes it has taken a wrong turn, then continuing in the same direction only increases the distance from what is good or true.

Selina: That makes me wonder what counts as recognizing a "wrong turn" in society. It is not as clear as a math problem. People disagree about what is right or wrong.

Lewis: That is true. But reflection is still possible. We can compare outcomes, examine suffering, and question whether our direction is leading to genuine human flourishing or away from it.

Selina: I think what stands out to me is that admitting a mistake is part of progress in your view. It is not failure, but actually a kind of strength.

Lewis: Yes. Pride often prevents correction. But humility allows change, and change in the right direction is what real progress is.

Selina: If a person or society realizes it might be on the wrong path, is it better to slow down and rethink everything, even if it feels uncomfortable, rather than keep moving just for the sake of moving forward?

Lewis: If the direction is wrong, then stopping, reflecting, and turning back is not only better, it is the fastest way to reach the right place.

Dinner Conversation with Robert Frost

Me: "The Road Not Taken" gets read at every graduation as this big inspirational anthem about choosing your own path. But I've always thought the poem is actually kind of sad. Am I reading that wrong?

Frost: You're reading it right. Most people read it as a hymn to individualism, and I let them, because correcting a country is exhausting. But the speaker says the two roads were "really about the same." He's standing there years later telling himself a story about a choice that wasn't really a choice, and admitting he's telling it "with a sigh." That sigh is the whole poem. People skip over it.

Me: Why did you let it get away from you like that? You could've explained it.

Frost: Once a poem leaves the page it belongs to the reader. I learned that early. I wrote it half teasing my friend Edward Thomas, who could never decide which way to walk in the woods and would agonize about it afterward. He took it personally, which I regretted. Then he went off to the war and was killed, and the poem took on a weight it was never built to carry. After that I stopped trying to correct anyone.

Me: That's a heavy thing to live with. A joke between friends turning into something like that.

Frost: It is the way of poems, and the way of friendships too. You make something small and private and the world decides what it means without asking you. Edward was the best listener I ever had. He's the reason I kept writing in the voice I write in. So when people quote that poem at me as if it's a slogan, I think of him in a wet trench in France, and I let them have their version.

Me: Do you have a poem of yours that you wish people read more carefully?

Frost: "Stopping by Woods on a Snowy Evening." Everyone thinks it's a pretty winter scene. It isn't. A tired man is sitting in the dark with his horse, looking into woods that are "lovely, dark and deep," and what he is really asking himself is whether to keep going. The promises he has to keep are what pull him back. People read the surface and miss the question underneath it, which is whether the woods are an invitation he is refusing.

Me: That makes me want to reread everything you wrote.

Frost: Good. That's the only thing a poet really wants. Not to be quoted, not to be agreed with. Just to be read a second time, more slowly.

Lecture 23b: Dinner Conversation with Robert Frost

Me: Mr. Frost, thank you for having dinner with me. In class, we talked about how many intellectuals in the 20th century believed science was making life feel less meaningful. Did you feel that way too?

Frost: In some ways, yes. I worried that people were becoming too eager to reduce human experience into abstract theories. I especially disliked the idea that space and time were only relative concepts.

Me: I actually read your quote criticizing Einstein. You seemed frustrated by relativity.

Frost: I was. To me, if everything becomes uncertain and shifting, then people lose their sense of permanence and connection to the world around them.

Me: So your concern was not only scientific, but emotional too?

Frost: Absolutely. Science is valuable, but when theories begin stripping away ordinary human meaning, we should pause and question them. I care deeply about the human experience and the feeling that something in life remains steady.

Me: That reminds me of your poetry. Even when your poems seem simple, they often feel connected to larger philosophical questions.

Frost: Poetry allows people to think emotionally and philosophically at the same time. It is an amazing form of art.

Me: In class, we also discussed how some physicists believed reality only exists when it is observed. What did you think about that?

Frost: I found that deeply troubling. I could never accept the idea that the world somehow disappears when no one looks at it. The natural world exists independently of us. Human beings discover meaning in it but we do not create reality itself.

Me: Do you think poetry helps preserve those realities?

Frost: Poetry reminds people to notice the world carefully. A poem slows you down. It asks you to observe, reflect, and really feel instead of rushing toward certainty. That's what makes it special.

Me: Thank you, Mr. Frost. Your thoughts are incredibly inspiring!

Nomar: Michael Faraday, I'm not gonna lie, dinner with you feels a little intimidating. You were out here thinking about electricity, magnetism, and light, and I'm just trying to survive classes, football, and whatever mystery meat they're serving tonight.

Michael Faraday: Nomar, do not be intimidated. Wonder is the beginning of learning. A person does not need to know everything before asking good questions.

Nomar: That actually makes me feel better because this lecture was getting deep fast. One second we're talking about light, then photons, then Einstein, then whether space and time are real, and I'm sitting there like, "Bro, I just wanted to know why the sky looks nice."

Michael Faraday: That is a fair place to begin. The beauty of light is simple to notice, but difficult to explain. Science often begins with something ordinary, then reveals that it is far stranger than we expected.

Nomar: So when you said we don't really know more about a ray of light than a line of electric, magnetic, or gravitational force, were you basically saying scientists should stay humble?

Michael Faraday: Precisely. A model may be useful, but it should not become an idol. When people become too confident in their explanations, they may stop looking carefully at nature itself.

Nomar: That connects with the whole lecture honestly. It felt like Professor Wayne was saying that science is valuable, but it can get dangerous when people act like one theory explains absolutely everything.

Michael Faraday: Yes. The search for truth requires both courage and humility. Courage asks difficult questions. Humility admits that even our best answers may be incomplete.

Nomar: I like that. It reminds me of football too. If we lose a game and everyone just says, "We played hard," nothing changes. But if we actually watch the film and admit where we messed up, that's when we improve.

Michael Faraday: That is a strong comparison. The experiment is like your film. It does not care about pride. It simply shows what happened.

Nomar: That's lowkey a tough quote. "The experiment is like your film." I might have to tell the guys that after practice.

Michael Faraday: Just be careful. They may accuse you of bringing physics into the locker room.

Nomar: Honestly, they already think I'm weird for doing these dinner conversations, so we're past that point. But I do think there's something cool about your approach. You weren't just trying to sound smart. You were trying to understand what was actually going on.

Michael Faraday: That is the better goal. Knowledge should illuminate, not merely impress. Light itself is a fitting example, because it allows us to see, but it also reminds us how much remains hidden.

Nomar: That's probably my biggest takeaway. Whether we're talking about photons, faith, science, or life, the goal isn't to act like we have everything figured out. The goal is to keep searching honestly and not let pride get in the way.

Michael Faraday: Well said, **Nomar**. A person who keeps asking honest questions is already walking toward the light.

Nomar: And now somehow dinner with a physicist turned into a life lesson. I respect it. Also, if the lights flicker in here, I'm blaming you first.

Ariel Vilensky

Lecture 23b. What is Light?

Me: Good evening, Professor Allan Bloom. I wanted to ask about your claim that democracy uniquely traces its authority to reason. What do you mean by that?

Allan Bloom: Good evening. What I mean is that democracy, at its core, justifies itself through rational principles - ideas like equality, consent, and individual rights. Other regimes may rely on tradition, religion, or force, but democracy depends on reasoned agreement.

Me: That's interesting. You also mention that the West seems to be losing conviction or will. Why do you think that is?

Allan Bloom: Because the commitment to those rational principles has weakened. People still repeat the language of democracy, but they are less certain about why they believe in it. The intellectual foundations are no longer being seriously examined.

Me: You argue that simply telling people to "believe" isn't enough. Why not?

Allan Bloom: Because belief without understanding is fragile. If people do not think through the ideas themselves, their commitment will not endure challenges. Reason must actively reaffirm those principles.

Me: So in a sense, democracy requires constant intellectual effort to sustain itself?

Allan Bloom: Precisely. It is not self-maintaining. Each generation must reconsider and justify its principles through reason, or else risk losing them.

Me: That's a demanding view, but it makes sense. Thank you for your time, Professor Bloom.

Allan Bloom: You are most welcome.

Karen Zheng, kz374

Dinner Conversation with Arthur Compton

Me: Hi Arthur, I've been thinking about your experiment and the Doppler effect. It's strange to me that something as abstract as a shift in wavelength could come from something so physical like an electron actually moving away

Compton: Yes, Light is not static. It is constantly interacting with the world. When an electron recoils, the light that scatters from it changes, and that change carries meaning.

Me: That makes it seem more real. The shift in wavelength isn't just a number. It's evidence that something happened, and the light is almost telling us a story about the interaction.

Compton: Exactly. Light doesn't just illuminate life; it records and reveals it. Through changes like the Doppler shift, we can detect motion and energy even when we cannot see them directly.

Me: That makes me think about how much of life depends on light in ways we don't always notice. Not just for seeing, but for understanding what's happening around us.

Compton: Yes, light connects us to processes that would otherwise remain hidden. It bridges what is visible and what is not, allowing us to interpret the world more deeply.

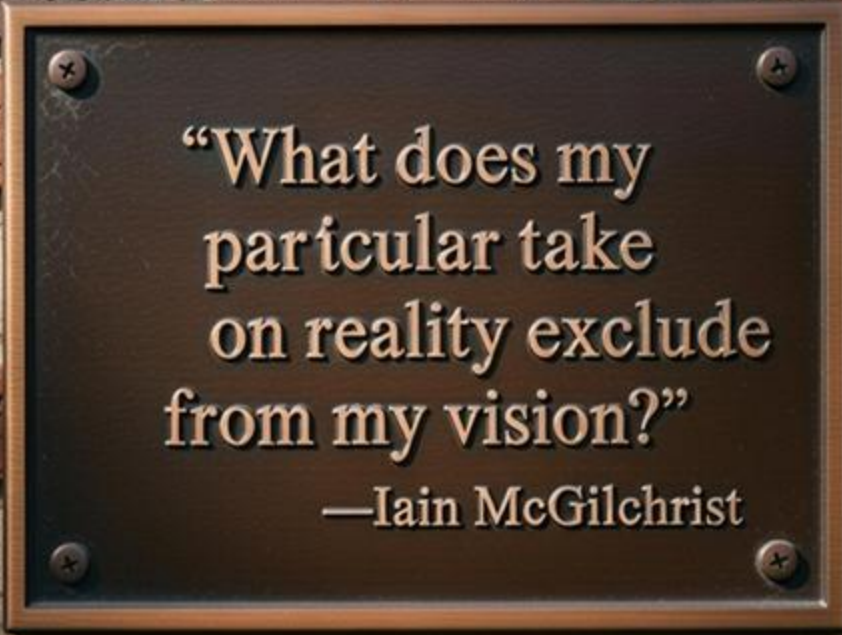
Me: So even something like a small red shift becomes meaningful. It's not just physics. It's part of how we understand movement, interaction, even change itself. And that feels connected to life. Living systems are always in motion.

Compton: Life is dynamic, constantly changing. The Doppler effect reminds us that even subtle shifts can reveal those changes. Light allows us to perceive not just what *is*, but what is *happening*.

Me: I like the idea that light doesn't just show us objects, but shows us processes. The world isn't still, and light reflects that.

Compton: Yes, through light, we can detect motion and transformation. It connects us to the activity of life at many levels. And recognizing that is important. It shifts your perspective from seeing light as passive to seeing it as part of the ongoing exchange that defines life.

Me: I hadn't realized how something like the Doppler Effect could connect to broader aspects of life, but our conversation has given me that perspective. Thanks, Arthur!



“What does my
particular take
on reality exclude
from my vision?”

—Iain McGilchrist