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Science and Society: A Creative Reflection Centering Perspectives of Emerging Scientists

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Science and Society:
***A Creative Reflection Centering Perspectives of
Emerging Scientists***

By Kelly Melville

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Abstract

In a series of poems, I reflect on what it means to be a scientist in society today, focusing on the fields of environmental science and biology. My project challenges the conception that science functions separately from social processes and societal structures. Reflecting on articles, books, and interviews conducted with Western students, I explore ideas concerning how the sciences could become more democratic or just. The readings were recommended to me by my faculty advisor based on my inquiry interests. The interview subjects were students and recent graduates of Huxley and the Biology department at Western Washington University. I was careful to describe the interview subjects' stories in a way that did not allow for speculation about their identities to ensure they would not feel inhibited in their responses. The goal of the project was to examine my field of study and prospective career from a broader perspective. The following summary statement describes the purpose, process, and outcomes of the project in more detail.

Summary Statement

This project is an effort to try to reconcile some of the different kinds of knowledge I've learned the most from throughout my years as an undergraduate. One large body of knowledge I have become acquainted with is scientific knowledge about how the world works through my Environmental Science degree. This has been an eye-opening process full of astonishment, new insights about my place in the world, and new methods of approaching questions. Another life-changing learning experience has been exposure to new ways of conceptualizing the human social world. I've come to a deeper understanding of political tensions, social institutions, social justice, and responsibility. I find myself now with a deep desire to be a part of changes in the world that promote justice and equity.

This second category of learning happened in a context largely separate from the first: in social science and humanities classes as well as life outside of the classroom. I came into this project with the vague idea that I wanted to explore the connections between these two fields of learning, how science is related to society. In both of these categories of learning much of what I learned emphasized connections: we are ecologically connected with other species, we depend on and change the environment, social positioning affects every aspect of peoples' lives, and social institutions also shape our lives. Yet, because of the separate contexts, the connections between social processes and scientific processes seemed unclear. I had not anticipated the depth and breadth of connection I would find to exist.

I am certainly still a newcomer to the study of science through a social lens, but I hope that my project can inspire others to ask new questions, think of science (and society) in new ways, and start conversations. In particular, questions worth probing include: What does it mean to be a scientist in society today? How does elitism function in the sciences, and what can be done to make our studies and institutions less elitist? How can science become more just, equitable, objective, and in-line with democratic ideals? After diving into research, I came to the conclusion that it is not only necessary to find the connections between science and society,

but also to challenge the idea that they are such separate entities in the first place. I want to show that they are intimately intertwined.

People have a tendency to think of science as a category of processes that is totally separate from social processes. However, realistically, like many (or perhaps all) divisions that are sometimes conceptualized as dichotomies, this isn't true. Social processes influence scientific processes, and scientific processes influence social processes. Dichotomization is not inherently evil; it is a result of the categorization processes the human brain uses to sort information, which are essential to our development and ability to make decisions. However, I argue that dichotomization becomes problematic when it becomes institutionalized. The conceptual separation of science from society is so institutionalized that, for example, the idea of an anthropologist observing a scientific laboratory sounds absurd (Latour & Woolgar, 1979).

Dichotomization is even more problematic when it enables dominance and inequity. The sciences are not only thought of as totally separate from social processes, but more inherently true and believable. Separation from social processes is thought of as essential to the production of scientific truth, even though separation from social processes is simply not possible (Latour & Woolgar, 1979; Harding, 1992; Haraway, 1988). By claiming separation from social processes, scientists assert themselves as "omniscient" observers of truth (Haraway, 1988). This false conception leads to a technocratic society (Fischer, 2000), and it distorts our relationship with the conception of truth (Haraway, 1988; Harding, 1992). In my project, I explore the relationship between science and the social world, challenge the status quo, and explore ideas concerning what changes should be made to move toward a science with an improved relationship to truth, justice, and democracy.

I gathered information from readings, interviews, and reflections on my own experiences. First I read books and articles which addressed the questions I was seeking to explore. Some, especially the book *Citizens, Experts, and the Environment* by Fischer (2000), addressed how science functioned as an institution in society and what could be done to create a better

relationship between experts and the public. In other words, how can science function in a way that fits into our democratic ideals as a society (by "our society" I refer mostly to the U.S.)? Other readings, especially *Laboratory Life* by Latour and Woolgar (1979), explained how social processes function throughout all phases of the scientific process to create an end result (and indeed, science *is* a social process). In many stages, I found myself analyzing our societal relationship with the abstract concepts of truth, fact, and objectivity. Especially influential in this part of the analysis were Harding's *After the Neutrality Ideal: Science, Politics and 'Strong Objectivity'* (1992) and Haraway's *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective* (1988). Finally, I felt that I needed to leave this project with some concrete ideas for solutions, or at least specific steps in the right direction. Accordingly, I read a few articles focusing on ideas for change and success stories. Please refer to the last page to see a list of readings which inspired my work.

The purpose of conducting interviews was to complement the perspectives presented through the readings with a variety of personal stories and perspectives from students involved in the biological and environmental sciences. I conducted three interviews total. One interview subject was a senior, one was a recent graduate, and one was a graduate student. The interviews were semi-structured. I brought a list of questions to spark conversation relevant to my study questions, but our conversations developed in a natural manner depending on the kinds of stories and perspectives the interview subjects chose to share. My interview protocol was approved by the Institutional Review Board at Western. Here is my list of basic questions, which were sometimes rephrased in various ways.

- What do you consider to be your first encounter or experience with science?
- How has your conception of science as a field or an institution changed since you first became acquainted with it?
- Do you have any stories relating to bias or elitism in science?
- Is science objective? Should it be?

- What do you think should be the relationship between science and the ideal society?

The emphases of our conversations varied considerably. One focused largely on personal reasons for pursuing science and the interview subject's particular field of study. We discussed how social position and circumstance shaped those choices along with other factors. Another interview centered around a specific experience with extreme elitism in science and the need for better communication between scientists, policy makers, and the public. The final interview subject offered new perspectives on many of the more academic and abstract ideas I have been grappling with. The interview subject described how these ideas played out in the real world and on an international level. There were several thoughts that all of the interview subjects expressed, which I have summarized to the best of my ability below.

- Science should be grounded in what society needs and asks for.
- The hard sciences' obsession with publication as the main way to obtain validity is frustrating and skewed.
- The difficulty of obtaining an education, and the high level of education necessary to become a recognized and respected scientist, is a major obstacle to diversification of science.
- It's frustrating that some fields within the sciences are more highly respected than others, especially because these values don't seem to align with the meaningful impacts of those fields.

These ideas cannot be said to be held in common by anyone other than the three students interviewed, but it was interesting to hear them repeated. These common ideas were generally supported by the readings, especially the first two assertions. The readings support the latter two articulations, but do not necessarily focus on the indicated problems specifically. Thus, in addition to reinforcing ideas that were thoroughly discussed in the readings, the interviews provided examples of specific phenomena related to elitism that were not as thoroughly discussed in the readings I chose.

Finally, I reflected on the information I had gathered by writing poetry. Why poetry and not a thesis paper? Writing a thesis paper felt contradictory with one of the main assertions of my project: that science should be more accessible and less elitist. The culture of writing in a specific kind of way that only specific people with specific training can comprehend opposes the ideal of democratic discussion with the community, and in my opinion, is one of the cornerstones of exclusion in science. Academic papers are not inherently evil, and I don't think we should do away with them completely. However, I believe that one of the main ways that science should change is in the way we communicate, and we should move away from specifically-formatted academic and scientific papers as the default and dominant form of communication. Especially because my project is meant to be more of a beginning of questioning and an exploration of new ideas than an end statement, creative writing is an appropriate format. My hope is that this format of expression will be accessible to a broad audience and reach people in an emotional and personal way. I also hope my project will inspire others in academia to explore new forms of communication.

Out of all forms of creative writing, why poetry specifically? I was drawn to poetry specifically, because poetry has been another context of learning I have grown through over the last four years, although this context has been separate from my academics until now. So in the end, my project involved connecting three subject areas I have learned the most from over the last four years: the "hard" sciences, sociological theory, and poetry. Writing poetry about a new subject matter offered a daunting but exciting challenge, as did writing about academic ideas in a new format. I am very glad I decided to take on this challenge, and I am excited to present my first collection of academic poetry about a subject that I believe is imperative to the future of humanity.

Although all of the poems inevitably incorporated information gathered from many of my sources, most had one or two main sources of inspiration. I have noted these sources below each poem, and the complete list of academic inspiration can be found at the end of the document. These are the same sources which are referred to throughout the summary statement.

Science: A Complicated Love Affair

It started out with

Questions

The mystery of the ocean, space, the human brain

I liked systems, mechanisms, and

Trying to make sense of it all

There's so much unknown about the ocean

When I got bigger

They called it science and math

My brain, it works in a certain way

I was good at something

So I kept going

I found my first questions in long walks through the jungle

And holes dug on the beach

I found myself

Falling in love with something bigger

I started reading, learning

That trillions of piles of trash accumulate

Into something called the Great Pacific Garbage Patch

That was the saddest thing I'd ever heard

And I decided to do something about it

Science

Then came the scientific method

The way truth is cut and dry

Between facts and things that aren't true

Next I learned

Science isn't cut and dry

The deeper in I go
Being a scientist means
Accepting uncertainty

Now I wonder
How am I supposed to explain my job
To someone who only learned the cut and dry?

I spent two years reading journals
Before my week-long experiment
The experiment was
Not enough supplies
One jar got more air than the other
And then everything died
At the conference they said
“Yeah, that makes sense”
“And mistakes, that’s just fine”

Now I think uncertainty means
You need more time to develop
Culminating becomes preliminary
Learn to build settlement plates differently
Design a tighter lid

It’s not always good to have definitive results
If it leads to a definitive plan
Science is useful like a telescope
But there are people around you on the ground
You shouldn’t ignore
And it’s not always good to say it straight
We’re not always straight

We are full of maybes but
That doesn't mean our telescopes don't mean anything
Now I want to focus on
What do I produce?
How do I impact society?

There's pressure to choose something established
And you've got to work your way up
Start out cleaning tanks
But why I came here is
My professor was studying these creatures
And I like them too
And they're important to our survival
And there's so much unknown about the ocean

It started out with questions
And then, things got complicated
Complications are what you get when you ask questions

Complications like
Large research universities think
The only valid career path is
PhD then big research institution
While only about 8% of PhD students find research jobs
Complications like
Universities intentionally not hiring women because
They're going to start families in a couple years
And then that will be their whole lives

And if you're not cut out
To work 60 hours a week
Have your parents send you groceries when you don't have time
Not speak back
And not put your name on work you've done before your PhD

If you don't have specific qualifications like these
You shouldn't be a scientist

There's a certain process to becoming a scientist
It's called weeding out

I know I could make it
Get a PhD, study what I want
Become someone as respected
As the asshole I interned for

I know I could break through
The glass of the upper class
Of scientists who don't think
Anyone else is worth talking to
But I'm so disenchanting with the whole system

It started out with questions
And then things got complicated

But why I came here is
There's so much unknown about the ocean

Inspiration/References: This poem was inspired mostly by one interview in particular, but it incorporates aspects of two different interviews to embody a combination of these two interview subjects' experiences and perspectives.

Technocrat

Google: "Technocrat: A member of a technically skilled elite"

Google: "Elite: A select part of a group that is superior to the rest in terms of abilities or qualities"

We know elites aren't really better than anyone else

Or do we?

Google: "Superior:

1. Higher in rank, status, or quality
2. Further above or out; higher in position"

So according to google, Elites are Higher but not always Better

I googled Better for spite

But

I already know what it's like to

Get lost in a stream of

Terminology I don't want to admit I googled.

These are words

We have heard all our lives

But we're not always grounded

In meaning when we utter

People ask: What do you mean by "elitism in science"?

I don't want to admit that I googled:

"Elitism:

1. The advocacy or existence of an elite as a dominating element in a system or society
2. The attitude or existence of a person or group who regard themselves as belonging to an elite"

I've been thinking lately

Of the strands connecting definitions 1 through infinity,

I think that's what I mean when they ask

Those strands are not just the fractions between.
I would like to draw their slivers
The connection between our attitudes, our existence
And the "advocacy"
Of the system
Our existence and
Existence of elite as dominant

Of course
The word Elite can't exist without Dominant
It is one of those linguistic circles
That becomes invisible
With the moving fingers
Of those addicted to Google

I know
Scientists don't think of themselves as elites
Or if they do
It's elite as in wealthy
Or white or man or abled or straight,
These elites in science are
Important but not the whole picture
I'm talking about elite as in technocrat

Let's go back to the start
Google: "Technocracy: The government or control of society or
industry by an elite of technical experts"
The question: Is this democracy?
Isn't so often uttered from our throats
As are statistical certainties and measures of diversity

Can elitism be part of democracy?

It depends what you mean

Google: "Democracy: A system of government by the whole population or all the eligible members of a state, typically through elected representatives"

Or also "control of an organization or group by the majority of its members"

I don't think the majority

Is always right or just but

Democracy is a good place to start

Especially at its roots

"Rule by the People".

The antithesis of "the people"

is "only some people"

More than Democracy I'm for equity

Voice is one of the goods to be shared

In science, is voice something that's shared?

How can it be when we need experts

To tell us the risks in our own lives?

To tell us if our water is safe to drink

How much sea level will rise

What food is safe to eat

If our planet will survive

It's hard to hear meaning

Through all the expert noise

How do you know who to believe?

You need a special education to do that

You need to go to school

Take expert classes and become one of them

Then you will know who to believe

See what I mean?
Honestly, that's why I'm here
But I don't have a Master's Degree
So what do I know

Listen,
It isn't wrong to be an expert
To devote your life with intensity
To a focused knowledge
Is admirable and
Maybe what we need,
But it's time to ask
What knowledge do we value?

We have to recognize
There isn't just one kind
The world isn't all formulas and values of P
Not all rules of ecosystem function and biodiversity indices.

There's also, for example,
The kind of knowledge that
You feel your heart rooted to, knowing
The exact smell of fall in your town
How your grandma will respond to the news
How it feels to be you at a particular time

All that isn't the point.
The point is,
If science is to become untangled
From the treetops of technocracy
We need a root system
Normal life roots to remind us
We're all only specialized citizens

To remind us how
Our heart strings are related to our beakers
Because right now
We're too often connected by dollars bills
And not by the blood pumping from our people

That's how we built the atom bomb
A system connected by dollar bills
Cut off from the lines of scared children
We cannot pretend we aren't of the political
While brushing bombshell dust off our lab coats

I need Google for linguistics but
Pretending to be above social processes
Seems to me
Synonymous with elitism

I want to wash that from the depth
Of my throat before
Ever calling myself a scientist.

Inspiration/References: This one is inspired mostly by Part One of Fischer's book, and it also describes many of the thoughts and feelings I confronted while starting my project. The definitions were retrieved from Google Dictionary.

Wynne vs. Beck

Have citizens ever trusted experts?
Or is distrust inert?

Ambivalence may be expressed
But what of suppressed
Lack of dissent
Doesn't equal consent
Doesn't equal trust
Nor even nonplussed
Dependency often leaves
One who disbelieves
Silent

Experts act as though
God directs the flow
Of advancement of knowledge
Our allegiance we pledge
They say this isn't a decision
But omniscient vision

But this is constructed
And as we're instructed
Citizen risk calculation
Is of multiplication
Chemicals in our lives
Times risk of expert lies
Plus social risk of opinion
Makes a difficult decision

Inspiration/References: This poem is based off of a section in Part 1 of Fischer's book which describes the two opposing analyses of the relationship between citizens and experts. The poem attempts to embody Brian Wynne's objections to the analysis presented by the German sociologist Ulrich Beck.

Environmental Science and Scalpels

When I say Environmental Science
People think
You're saving us or
You're trying to join the political mess
Without saying so.
Neither is true

But I want to go back
And remember
Environmental and Science
Weren't always friends
Still don't see eye-to-eye always

The early environmental movement preached against
Science and technology, creators of problems
Does science now spend the same energy studying its creations?

It isn't that simple
But it's important to remember
Where we come from, remember
Both Science and Environmental Movement
Have been called exclusive, destructive

Anyway,
In the 80s, the EPA started depending on
Risk-Benefit, Cost-Benefit analysis
This required a few more experts in offices
And there were fewer people demanding in the streets
But the ones who did
Pointed at the experts holding the same scalpel
As the one that carved the damage

The experts said "It's not the same"
But the edges looked familiar
And it came from the same factory

This scalpel will find the answers
The real answers
Out-yell special interests
Out-yell the yellers in the streets

Out-yell, meaning
To talk very quietly behind closed doors
To publish papers soaked in specialized vocabulary
Engineered to resist the yelling
Resist social feelings
Resist the politics they drag along

Politics make everything fuzzy
Shape analysis less sharp
Like a dull scalpel,
Less power to the hand holding it

And the people say
Thank God we have scalpels
To save us

Inspiration/References: This poem is inspired chiefly by Part
Two of Fischer's book.

Political Science

How did we get here?
Global warming conspiring
Debates on the news
Websites “debunking” the myth
Scientific counterevidence
March for Science,
I believe in science
One of the most political statements

I believe in science
But I have often wondered
How it became so... political

And when did the becoming begin?
Does a becoming exist or just an “always been”?
Always been but different now...

Once upon a time
Policy people turned to science
To de-politicize their processes

The thing is
To scientists
Science is laden with maybe
Uncertainty is every day
There exists at least enough humility
To say we’re not yet sure,
De-bunked hypotheses are exciting, meaning
There’s so much more to learn.

But science is also perhaps
Another creature
Found in textbooks filled to brim
With “Hard Facts”
Theories with capital T that
Make test-taking students anxious

Performance is different than résumé,
Science didn’t make policy less political

Ever-expanding uncertainty
Isn’t so exciting when
Asked to make decisions

Power fractures uncertainty
Into multi-dimensional realities like
Partisan politics.

Uncertainty does not look good in power
Looks like Red and Blue
But more evidence needed versus it’s enough

Now people whisper in their sleep
Science isn’t good enough for us

The whispering isn’t new
But different now
More like red and blue

I want to say that science is good enough
But I know, it’s not all we need
It’s a beautiful questioning
But it’s not the answer
And maybe the problem is

We want it to be the answer
Too badly
Now here we are in war
Questions and answers
Shoot through high-tech rocket launchers and antique canons
And the question is
Where do we go from here?

Inspiration/References: This poem is inspired chiefly by Part Two of Fischer's book.

The Mysterious Creation of Facts

Sometimes definitions are more complicated than they seem
 Trying to boil an idea down to a short phrase
 Is no easy task

Fact: A thing that is indisputably the case
 Indisputable: Unable to be challenged or denied
 I have always imagined that facts exist to be discovered
 But maybe the search is what creates them
 The search: the process of boiling something down to a meaning

The boiling process cannot be separated from what we consider
 social
 Words like reputation and validity can't be scoffed at
 Did you observe a tree falling in the forest?
 Or did you just think you did?
 You hadn't slept in a week
 So how are we to know the truth?

But gravity, you can feel it,
 We all can
 Since Isaac Newton discovered it
 Was it a fact before or after?
 Now we have The Theory of Gravity
 More than a fact now
 And before it was less, a hypothesis
 Before that, nothing?

It's not a fact that there's life on other planets
 But it might be true
 I think it is

"True: in accordance with fact or reality"
 But that can't be right
 Truth, I think is at the root of everything
 But not as tangible as our words
 And reality is more than a list of indisputable truths

Fact is what we do with truth
Or what we think it is
We hope we're right when we think we understand
Eventually, hope metamorphoses into believe
And facts are constructed by human minds

If a fact is something indisputable
Unable to be challenged or denied
Then facts don't exist
Anything can be denied
Just maybe not with validity
But what is validity?
If it's popularity
Climate change might not be real
Not a fact anyways

If you were to go back 5000 years
This land would be here
But America wouldn't exist
Didn't exist before it was "discovered"

Maybe if you were
Donald Trump
Climate change wouldn't exist
But you'd still be expected to clean up the mess from the
hurricanes
Apples still fell before gravity

My climate change professor told me someone else told him
"All models are wrong, but some are useful."
I'm pretty sure I think about that more than anything else from
that class

Whenever I wonder why we continue to categorize our lives into
boxes
Like it's our job, or human nature

I know that our boxes are models
And some models are useful
But all are wrong
And when they're not useful anymore
They're just wrong

But I think climate change models could be put to good use.

Have you ever thought about how much of your life you spend
trying to create order?
There's nothing wrong with that

When I tell you the story of my life
It's only a model of what really happened
Because what really happened is too
Huge and messy and I don't even remember
To be worth listening to
I often say I'm a disorganized person
But my messy room still stresses me out sometimes
And my thoughts
They are sorted meticulously

Science is a creative process
It's not about discovery
It's about creating something useful
Something that makes sense out of the mess

Inspiration/References: This poem is inspired chiefly by
Laboratory Life. I also used definitions from Google
Dictionary.

Value-Neutral Science

Politics *on* science shapes
What type of research
How it's interpreted
It is sometimes called
Politicizing Science
Done by outside special interest groups

But politics of science can also be
Politics *through* science
Through our institutions
Through the things we think about in our sleep
Our priorities based on
The way our hearts are shaped

I mean, the hearts in our brains
We think through our heads
But every scientist knows
What I mean by "our hearts"
They're in there too
Our background prunes the pathways
Where our priorities, language, and mannerisms grow

I used to want to be a neuroscientist
What I learned was
It's messy
We cannot pretend anything
That happens in our heads is
A clear process
I mean, we cannot pretend
It's disconnected
From anything else

Say, when the Nazis searched for medical explanations
For what makes an outcast an outcast
What makes poor, criminal, different
Did they politicize or depoliticize the sciences?

Did you know tuberculosis
Is caused by a bacteria
And also poverty?

Do you think they knew they were monsters?
The Nazis I mean
I mean know they would
Go down in history like that

Did you learn this in history class?
In sociology or psychology?
Do you feel like you escape when
You go to BIO 243 and learn about cells?

What I am learning is
You can never escape
We cannot do science without
Racism, classism, imperialism
Our history books breathing down our necks
They are always there
Just more invisible sometimes

You know, social Darwinism
Existed before Darwin's theory
But when Darwin read the former he said
It makes sense.
Was the mirror there before
Or after he wrote the theory?

Of course, evolution exists,
But do you think if
The theory was written by
A socialist
We would still learn about
Competition
Before mutualism?

Institutional politics
Is the kind that is just there
Like the building we work in
The building is called value-neutral
It is called Our History Books
Images of white men
On every page

This is normalcy
We must have standards to adhere
To normalcy
So our science doesn't become
Skewed
Or political

Does losing value-neutral mean losing
any reminiscence of structure?
Will objectivity disappear?
And then truth?

Some questioning is scary but
Often we are not losing as much as we feel
What of
Fairness, honesty, perhaps "detachment"
They mustn't fall with neutrality

What of
Seeing another perspective
Common sense
Discarding wishful thinking
Un-neutral is not un-critical nor non-objective

Perhaps neutral is less critical
It doesn't critique normalcy
Which it names "the obvious"
Un-neutral says
Agreement doesn't equal truth
And lack of questioning doesn't mean
There's nothing to question.

If common sense is the new standard
We must ensure it is not simply
Feelings of agreement within "the community"
Who wrote the books,
This agreement is another shade of neutral

Yes, methods for objectivity exist
But methods are just one section
Of every research paper.
The problem with peer review
Is the "peer" part
Because sometimes the peers are all the same
The ones who wrote the books
Or read them over and over
With little else to see

You see, I'm not just talking about diversity
I'm talking about the normalizing routine
That teaches what not to question

Social location, priorities, the root of the questions
And the assumptions not detected
Are the most powerful

We can't assimilate news
That doesn't arrive
And we can't look from anyone else's shoes
If we don't see them as shoes
Don't even know they exist

Neutrality has fallen but
We are still living in its shadow
We are pacing back and forth
Between this is the only way and what's the point anyway.
This is not an either/or check box
We are not forced to relativism by rejecting absolutism

Is it so hard to believe
We can have truth from bottom up
Or sideways,
That we find truth in our buildings
But also in the fall

Inspiration/References: This poem was inspired largely by Haraway's *After the Neutrality Ideal: Science, Politics, and "Strong Objectivity"*. It also draws heavily from anecdotes my advisor, Dr. Mark Neff, shared with me in a casual setting over the course of the quarter.

Colors from my Younger Self

When I was little
I came up with a theory
That colors look different to everyone
Though we were using the same names,
That my red is different than yours

I remember my friend told me
The same thing like a fact
And I said
I thought *I* told you that
She said, no *I* told you
Anyway, we all agreed it must be true
It's not a novel idea to children
That there could be more than one reality

When I was a little older
I wrote another theory and
I never really told anyone
Except maybe my mom

It said, how could there only be one right perspective
When there are more than a billion to choose from?
Wouldn't God give us better odds at finding truth?
So all perspectives must be right in their own way
I just have to choose what feels right on my feet

Years later, I heard the same idea
Echoed in a college classroom attached to the name *relativism*
By then, I had already discarded the idea because
I decided being a good person and finding truth
Couldn't mean whatever you feel like.
I knew truth was complicated, but
I could feel there was such a thing as reality.

But I still believe
People see colors differently
Including not at all
And, the answer to a lot of questions is
It depends.

So what constitutes truth?
Are all knowledge claims power moves?
How do we commit to the pursuit of real truth
While acknowledging colors
Are different for everyone

What if I told you
Some contradictions are necessary
The foundations of the universe are paradoxical
And sometimes our models don't make sense
So we need another metaphor

Some battles aren't worth their bullets
Like Truth with a capital T versus no truth at all
When 12 year old me wrote my own theory of relativism
I wasn't looking for knowledge
What I was looking for was something like
the ground

Do you ever feel out of your own body?
Sometimes when I'm calculating statistics
And I get the answer right
I feel like it's been dropped down
From somewhere bigger like
The heavens
But I know the answers are constructed by my own hands and
Though the methods come from a bigger field
Statistics is just
A bigger body of humans than me

Statistics come from some
Place, some body
Or some *bodies*
like mine but different

We don't use the word *I* in scientific papers
And usually not *team*
Have you ever thought about why
We use the passive voice here
And not anywhere else?
Microsoft Word corrects me

Microsoft Word isn't always my friend
But sometimes it's got a point
And it's asking me
Who did it?
Who collected the data,
Determined the statistical parameters,
Determined what it means?
I say *It doesn't matter*
Science does it okay?

But science doesn't do science
People do science
And colors look different
To different people
Grounded in different bodies
And type of vision ability

And shadows look at you differently
Depending where you stand
And the stars can seem to rearrange
After a long plane ride
Instead of saying *it doesn't matter*
Let's learn to read maps

Say *this* is where I am
This photo of the truth
Is from a here not everyone can be

Understanding can't be felt outside a body
At least while we're alive
Even our scientific methods
Are not Gods

Satellites float above us
Like haze
And robot cameras spy
But they were built by hands
Made of flesh and bone

Knowledge is always situated
In a brain somewhere
Created, not discovered
And knowledge and truth
Are different words for a reason

I'm 22 years old now
And I'm saying
It still doesn't make sense
To search for the one right answer
There's such a thing as wrong but
Truth's more like a rainbow
Or a beautiful sunset
We can only ever photograph

Inspiration/References: This poem was inspired chiefly by Haraway's *Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective*. Clearly, it also draws heavily from my own life experiences.

Robot the Asshole Scientist

I know this guy
He's kind of like a robot
He short circuits sometimes
He's brilliant, obviously
But the biggest asshole I've ever met

Robots are very particular
About the kinds of people they'll let do specific things
To write your name on a paper
You have to have a PhD
PhD is the only programmed code for ambition
No, even if you spent ten years
Doing everything in the lab
Coming in on the weekends
Working more than you were paid for
You won't meet the requirements
Without those three letters

It requires a certain kind of education
To be respected by a robot
And it requires a certain kind of person
To be given the time of day

Forget going into the robot business
If you talk back to authority
If you're shy
If you don't know how to stoke an ego
If you can't show your intellect just enough
To be valuable
But not so much to be rude

There's something in the manual
About having an advantage
If you're a tall blonde female
At least you've got a higher chance
To meet this robot in the first place
Perhaps be called a favorite
Although, when it comes to making decisions
Man is code for agency

This robot guy
When I met him I found out
I have the qualifications
But the robot business is not for me

I got tired
He didn't comprehend what I said
I guess robots don't know how to listen
Only categorize

Robots are high maintenance
Require twelve hour days
And all you get is numbers to announce
Calculated away from sight

You don't learn anything from staring at a robot
You get tired of being told you're wrong
With no explanation
I know, he's not the only robot
He's kind of an extreme case
So I shouldn't judge them all equally
And some scientists are less robotic than others

But when I came back some professors told me
That's totally normal
I don't understand the problem
If you don't like that robot
You're not cut out for the business

Most robots seem to be particular
About access codes like PhD
Following user guides word for word
And they won't say anything useful
For the sake of being useful

Robots are not grounded in anything human

There are other things to pursue in life
Besides pleasing robots

Inspiration/References: This poem was inspired by an interview. The first-person narrative is meant to embody the interview subject's experiences with elitism in science, and with one character in particular, in a humorous manner.

Scientific Humility

Human uncertainty is inevitable
Untie your stubbornness to yes or no
Make new frames with ethics
Illuminating when limitations are reached
Light needn't only come from analysis
If you know how to
Treat the disease
You can accomplish a lot in the darkness

Inspiration/References: Inspired by Jasanoff's *Technologies of Humility*.

Practical Alternatives

Some days we need toxic chemicals to exist

But the problem is the need

Not the chemicals' existence

Why do we need to know

The exact toxicity

When we can find an alternative?

I would never use a car

If I could go so fast on my bike

Or apparate

I'll probably never apparate

But non-toxic replacements

Decreased trichloroethylene by 90%

Inspiration/References: This was inspired chiefly by Sarewitz's *World view: A tale of two sciences*.

Thoughts on Tangible Solutions

I don't know how to write poetry about solutions.
My poetry is abstract
And I want to be part of the solutions
Specific, local, tangible solutions
But I only know how to write poetry.

But solutions exist
Are formulating, being spun constantly
Maps are drawn, redrawn again and again
Just because you don't see them
Doesn't mean they don't exist
Just because I can't describe them beautifully
Doesn't mean I can't imagine them.

For example
Sir Albert Howard derived many of his ideas about agroecology
From peasant farmers in India
Whom he referred to as professors,
And now consensus conferences allow normal people
To deliberate on issues in the scientific fields
At least give recommendations,
And non-toxic replacements
Decreased trichloroethylene by 90%,
And community-based participatory research
Allows all kinds of people without a title
To be part of science
And incorporates reflection and relevant action.

These systems are not perfect but
They're something
And something's a whole lot more than
Business as usual
Change is something.

I have a dream that someday my poetry will grow legs or hands
Will become something tangible in many ways

I don't know the path to make it there
But Andean potato farmers might know what to plant better
Than agriculture scientists
And indigenous trackers in South Africa
Can track better than trained specialists
Without the radios, helicopters, and computers
And some are finally allowed to and paid
They should be in the first place
But some things change and
Intuition can go a long ways

Our map doesn't need to be perfectly drawn
To start building something

There are people doing things
There are maps for change
And my poetry is dark but
Isn't that beautiful?
Isn't that something to hold like hope?

Does it make your feet want to move,
Your hands want to grasp at change,
Your mouth speak brave,
Or your fingers type messages?
Does your body want to shuffle into action?
I hope so.

Inspiration/References: This poem was inspired by multiple different sources, with specific examples taken from Fischer and Sarewitz. Jasanoff and Guston's articles also played an important role in the inspiration of this poem.

Telephone

Have you ever tried to count
Everything you never think about?
Yeah, that's a rhetorical question
But I wonder if the length of that list
Would equal carefree-ness or privilege
I wonder if there's limited space
Or if the list keeps getting longer
With isolation like
Staying in our home towns
Or a specific scientific community

Some things you never think about
Are pillars other people have to work their thoughts around
Their lives around
Like I never think about
How much more likely I am to be published in English
Or how much scientific-ness depends on
Being published internationally
Or the U.S. stamp of approval

When I first read about community-based participatory research
I didn't think too much about where it came from
Or how many rounds of the game "telephone"
Its Brazilian founders might have felt like they had to play
Before finally hearing it uttered aloud
How different it felt from
What came from their mouths in the first place
First but not allowed to be as loud

Some things always get lost in translation
Like how did "community" come to mean industry
Or how did emancipatory tradition for liberation and consciousness-rising
Become so well-fitted into capitalism

How did the questions
“Who is our knowledge serving?”
“And why are we studying that?”
Become erased?

Replaced with
Unintentional exploration and curiosity
And the skipping record of
Unbiased, unbiased, unbiased

Some things I used to never think about
I spend a lot of time lost in now
Maybe that’s some kind of hope
I don’t want anyone’s truths to be invisible
And maybe my lost means
We can find a switch

I know I’ll never see everything
Or everyone
But when there are walls separating us so
The pillars to the lives of millions of people
Never enter the minds of another million
I think that’s part of the heart
Of everything wrong with our world

Especially considering
There’s only one in who knows how many
At the end of any game of telephone
At that last line, the loud one
Feels like everything

Have you ever thought about
How much your thoughts are controlled by the setting
Or how you feel like they should be?
Social justice is for student movement meetings
Cell mechanics is for biology class

Writing poetry is for free time
They always taught us to look for parallels
But we're afraid to write them down
Because rational scientific legitimate
We learn mean something very specific

But I can't count how many times
I've thought about my love life or lunch or social justice
During biology class
And I bet you've done it too
So here I am writing poetry about
Social justice for biologists

After the March for Science
People wondered how scientists somehow failed
To bring in more people from outside
Of academia
They thought maybe that's something new to discover
Maybe something they'd never thought about before
But some people had written thousands of words about that
Saying you can't just convince people science is amazing
When you're not hearing back what they want

All telephone lines should go both ways

In the light of alternative facts
We reflex to halt any kind of deconstruction
To cut off the lines questioning our institutions
And inciting chaos
But the distrust, the bad connection
Is exactly the problem in the first place

We've got to learn to be citizens
And not only scientists
And even a two-way telephone line isn't good enough
If it's only at the end of the day

When the decisions have already been made
We have to listen all day long
And discussion about logistics isn't enough
It's time to discuss values

It's funny how easy it is
To stop thinking about something
Especially without
Well-functioning telephone lines

Like where the equation came from
Like how did we get here in the first place?
And what values are guiding my work?
How does this serve society?
And is it really what society wants?
What might we not be thinking about?

I don't like being lost
And some things aren't pleasant to think about
But some things I used to never think about
I spend a lot of time lost in now

But maybe that's some kind of hope
That here we are in the chaos
Crossing things off the list
Of things we never think about

Inspiration/References: This poem was inspired by an interview. Unlike in the other poems based off interviews, the first person "I"-statements embody my own perspective and reaction to the interview.

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