Application of the Scientific Method to Elizabeth Bishop's "The Fish" and "The Monument"

Rachel Leann Hill

A thesis
submitted in partial fulfillment of the
requirements for the degree of

Master of Fine Arts

University of Washington
2020

Committee:
Linda Bierds
Richard Kenney

Program Authorized to Offer Degree:
English

University of Washington

Abstract

Application of the Scientific Method to Elizabeth Bishop's "The Fish" and "The Monument"

Rachel Leann Hill

Chair of the Supervisory Committee:
Linda Bierds
Department of English

This essay explores how the principles of the scientific method can be applied when thinking about poetry. Poets and scientists use similar patterns of inquiry, like those reflected in the scientific method, to develop an understanding of the natural world and of human experiences. This essay offers close readings of Elizabeth Bishop's "The Fish" and "The Monument" through the languages of poetic and scientific discourse. Poems with scientific craft or thematic concerns will not push a preconceived agenda, just as scientific experimentation cannot be performed with a prescribed conclusion. In the case of the noted poems, I am concerned with examining how Bishop's poems utilize scientific reasoning, specifically observation, to reveal non-scientific truths about their subjects.

TABLE OF CONTENTS

I. INTRODUCTION

"Without art, we should have no notion of the sacred; without science, we should always worship false gods." –W.H. Auden[1]

In every corner of science, within every minute movement of an experiment, there exists a poem.

As a young poet – young enough to not yet realize I was, indeed, a poet – I hunched my spine over in a backless chair in a biology laboratory and peered into a worn microscope. The faux leather peeled back from the chair cushion, exposing the spongey foam beneath.

I pinched a pipette, and as if through the grainy lens of an old film camera, the sperm cells penetrated the eggs of the saline, and the urchins I had artificially conceived bubbled like hydrogen peroxide.

Meanwhile, in the world of an Elizabeth Bishop poem, a fish is hooked. Five barbed rods curl out of the fish's swollen lip, but it is only one barb and one piece of thread that thinly connect the bodies of the fish and the speaker. The fish is half underwater and half ascended into the realm of the human. In a manner not dissimilar from how anticipation conjures the moment mitosis exponentially expands the urchin zygotes, the reader is hooked in the first four lines of "The Fish." The question begged does not pertain to *what* happens to the fish interrogated in Bishop's poem; rather, the reader is left to wonder what the consequences will be as a result of the first four lines.

Bishop's poem leaves the reader with a degree of uncertainty about the fish's fate – it was released into the water significantly injured, but the reader must infer a conclusion about the

[1] Auden 62

fish's mortality with the evidence provided. The urchins in the lab, however, existed in a more certain space. While I was not present for the death of the newly "born" urchins, I was assured of the humanity involved in the decision to kill them before their neurons could develop. In a lab, they were never in conditions conducive to thriving. Their brief flirtation with existence was for the purpose of demonstrating the rapid transformation that occurred after both half-cells joined into one. In the essay, "Modeling the Universe: Poetry, Science, and the Art of Metaphor," Simon Armitage says,

> "If different sides of the body are controlled by different areas of the brain, maybe I was opening up some parts of the grey matter that had previously been closed—like rooms in a mansion locked with a key on the inside, as Ted Hughes would say."[2]

The urchins lab, among other labs, resonated for years in my own grey matter, and I only found an ethical and lexical resolve for their existence through the affordances of poetic thinking. Poetry granted me a bifocal view of the experiments I performed in the name of education as an undergraduate. No longer were the experiments a simple matter of sacrifice of living creatures of the greater good of education – the urchins, the still-living frog whose sciatic nerve I dug from its thigh, the in vitro chick embryos whose incubator on-switches were forgotten – they all regained agency through the pattern-making properties of poetry.

During a conversation in a different classroom a few years later, my instructor, Richard Kenney, proposed that perhaps poems of science follow sets of rules not dissimilar from religion, or Christianity's Ten Commandments. If the scientific method is the gospel of sorts for thinking about scientific reasoning, ought a poem of science be supported at least in part by the weight of those same pillars? The scientific method is an algorithm through which someone may qualify thoughts or actions as scientific. By analyzing a poem through the steps of the scientific method,

[2] Armitage 117

a person can evaluate the poem's scientific attributes beyond surface-level (and sometimes red herring) markers such as technical language.

This essay investigates the characteristics of science that lend themselves to poetry, and an explanation of criteria to use when considering if a poem can be considered scientific – the lexicography and subject matter of the poem notwithstanding. The concepts discussed will be applied to dissect two Elizabeth Bishop poems, "The Fish" and "The Monument."

II. POETRY AND THE SCIENTIFIC METHOD

The range of what a science poem could be reaches far beyond the scope of what any molecular-level investigation of a poem's mechanisms might have to offer. Instead, the rationale behind the way scientists think offers insight into why some poems, regardless of their subject matter, make use of investigative modes that are the hallmarks of lab experimentation and observation.

The scientific method is a six-step system used to confirm or, most frequently, resist ideas about how some mechanism of the world works. The processes involved in the scientific method require the collection of empirical evidence with the end goal of achieving replicable results.

1. *Questions/Inquiry:*

While the exact order of the scientific method's steps may not exhibit parity between the poem composition and the poem reading processes, the first step of the scientific method is inquiry. At this point, a scientist might ask which question needs to be answered as a means of understanding why the experiment they would conduct matters. In the urchins experiment, a driving question might have been, "what observable characteristics surface when a male and female urchin gamete meet?" In a poem, the questioning process is reflective more of a poem's central concern, or its "heart," as Linda Bierds coins it. The question might emerge more along the lines of "what happens after the urchin zygote is no longer necessary for observation?" Scientific and poetic inquiry each start with a question that "hooks" onto the brain, and they both seek the means to find an answer.

2. *Research:*

The second step in the scientific method deals with research – a critical component of my own craft process. In a scientific setting, research is crucial for recognizing the histories, discourse, and sets of expectations surrounding avenues of study. While a scientist might choose to study a white lily because of the way it was pollinated by bees to eliminate or account for certain genetic traits, a poet might choose to study a white lily through language to introduce implicit histories, in this case, of loss or mourning. The research phase is where, in both science and poetry, the poet or scientist recognizes the lineage of meaning that precedes the new understanding they attempt to gain from the rest of the experiment or composition process.

3. *Hypothesis Formation:*

In step three, a hypothesis is expected to be formed. For both a scientist and a poet, hypothesis formation is at the core of the imaginative process. A scientist and a poet form hypotheses based on an educated guess from information, whether it be acquired through perception, experience, books, or some knowledge with enough credence that it can be prodded at with sterile instruments or language.

Metaphor and metonymy lie well within the bounds of hypothetical thinking. The processes of imagination necessary to deduce that two unlike things share like characteristics are essential to both the comprehension of experimental work and to the emotions poetry seeks to imbue in people through image creation. Pertaining to education and imagination specifically, in the study "Creative Expression of Science through Poetry and Other Media can Enrich Medical and Science Education," Sherry-Ann Brown claims,

> "…the creativity of a scientist draws on imagination, originality, and ingenuity, emerging from a poetic sense of freedom. Boxenbaum mentions "creative worrying," in which the scientist carries around thoughts of his research in the conscious and

> unconscious realms until a uniquely gratifying association is realized and is communicated to others in the form of a new insight."[3]

An enzyme and a substrate are not only the mechanisms necessary to create a cascade of chemical reactions; they are a lock and key to understanding the way bodies function on a molecular level.

4. *Experiment:*

In both scientific and poetic contexts, the experimental phase is the act of performing the thing. In my undergraduate lab, the experiment ranged from pulling the microscope out of a dusty cabinet to the moment where I artificially inseminated the urchins and peered through the lens as the gametes united. In a poem, the experiment is the act of *writing* the poem. When constructing poems, poets are riddled with choices regarding form, sound, sentence arrangements, and syntax. Enjambed lines can coax multiple meanings out of syntactically straightforward sentences.

The steps required of a scientific experiment also propel the scientist closer to an idea, or at least the knowledge that their idea was not correct. When writing about scientific subject matter, poetry adds a tone to scientific reasoning through the delivery methods available to the poet. When expressing information about a scientific subject, poetry allows an emotional dimension otherwise unavailable to straightforward scientific literature.

5. *Observations:*

When imagining a scientist in an observational mode, it might be most productive to picture a person clad in a lab coat. The person is squatting down to eye level with a buret and

[3] Brown 3

moving the stopcock in increments so microscopic they are nearly imperceptible. At the moment the correct amount of liquid base solution drops into the blue acid contained within an Erlenmeyer flask, the solution turns purple, and the scientist scrambles to close the valve and record the precise number of milliliters of base necessary to render the solution neutral (used to calculate the acid's potency). The type of fastidious devotion to recording a subject accurately and truthfully is a hallmark of both scientific and poetic notetaking. In *The Dyer's Hand*, W.H. Auden says,

> "Whatever its actual content and overt interest, every poem is rooted in imaginative awe. Poetry can do a hundred and one things, delight, sadden, disturb, amuse, instruct—it may express every possible shade of emotion, and describe every conceivable kind of event, but there is only one thing that all poetry must do; it must praise all it can for being and for happening."[4]

The observational mode of poetry aims to document discoveries in ways that celebrate their emotional resonances. Poems that are scientific will share unprejudiced observations; the observations, especially in the form of images, will appear without outside interpretation.

6. Results/Conclusion

While listening to talks at the Friday Harbor Poetry and Science Symposium this past November, I heard Ian Boyden claim during his talk entitled "Vocalization of Lightning" that "scientific writing is writing to a known conclusion; poetry is writing to an unknown conclusion."[5] While Boyden's claim caused me to think further about the end results of a poem invested in science, I ultimately decided that I do not precisely agree with his assertion. While writing to the unknown is an ambition seemingly non-negotiable to a substantial number of poets, I would also assert that the same line of reasoning extends to scientists.

[4] Auden 60
[5] Boyden

Science, like poetry, is an active and ongoing process of discovery; discoveries in science occur because of a gap in knowledge, and the scientific method exists to facilitate navigation of the unknown. Poems of science will be grounded in acute observation, and they will be harbingers of the truth of a situation rather than expressions of an author's preconceived agenda. When composing a scientific poem, the poet reaches a conclusion that reveals a truth pertinent to the poem's situation; likewise, in writing the conclusion to a scientific experiment, a scientist gains greater insight about a truth of the world.

III. “THE FISH”

Elizabeth Bishop’s “The Fish,” begins with a speaker who is inspecting a fish they just caught. Readers are eventually able to see how the fish was snagged by four hooks before the speaker’s eyes, and in the final line, the speaker chooses to release the fish back into the water. Upon beginning the poem, our attention is immediately drawn to the fish’s state of being half out of water. Bishop’s choice to situate the fish in an in-between place where it exists in both a habitable and inhospitable environment foregrounds the poem’s question, or central concern: will the fish survive?

“The Fish” is a 76-line narrative poem comprised of just one stanza. It is written in free verse, with no formal or consistent pattern of rhyme. Though it seems many of her poems also sprawl across the page, “The Fish” stays compact throughout, with an invisible three-inch margin that the lines cannot penetrate.

“The Fish,” while being a narration of the situation the speaker and the fish in question occupy, is concerned with being a lens, drawing closer and more intimately into the moment recalled on the page through the observational mode of the scientific method. Bishop’s close examination of the fish, clinical but without use of the scientific lexicon, is what ultimately provides the reader with a window of empathy to connect with and feel for the fish’s plight in the no-win situation where “he” is either captured or released, but with considerable injury. The poem’s form, or body, is long and reminiscent of the strips of wallpaper Bishop likens the fish’s skin to. The form prevents a reader from physically scanning the poem for the ending, or the poem’s conclusion. Throughout the poem, the reader must face the same tension the fish ought to face, half out of water, holding its breath.

To begin thinking about the poem from a holistic sense, and about where the scientific method fits into each part of the poem, I'll talk about the first six lines – the ones that function as a description of the situation the poem intends to meditate upon. The first line of "The Fish" does a considerable amount of work for the reader in spite of only being made up of five words, "I caught a tremendous fish." The first line answers the question of who the speaker is, addresses and distinguishes the fish the poem interrogates as extraordinary, and situates the reader in the poem's setting and thematic concerns all at once. As mentioned, line three, "half out of water, with my hook," the speaker foreshadows the space that the poem will exist in: the fish is neither firmly alive or firmly dead in the poem, actively dying, but still alive. This subsection also contains two of the three sentences fully contained within their lines: "He didn't fight." and "He hadn't fought at all." Both of these lines work by conveying the seriousness of the fish's situation early in the poem.

The second section, between lines seven and thirty-three, focuses more on description of the specific fish. Beginning with the lines,

> "He hung a grunting weight,
> battered and venerable
> and homely…"

the speaker provides a description of the fish reminiscent of how someone might describe a member of the military after returning from a tour – size or physique noteworthy, having seen some days, worthy of respect or reverence, and being something (or someone) reminiscent of feelings associated with home. The close attention to an observational mode allows the speaker to quickly establish sympathy for the fish's plight (assuming that sympathy was not earned from the moment the reader learns of the fish's condition alone). These three lines also mark what could be considered as a version of the poem's hypothesis – this fish is an experienced veteran

who toiled through wars with other fishing line, and even at the point of total exhaustion, he wears his wounds like medals. The speaker continues, beginning halfway through line 9,

> "Here and there
> his brown skin hung in strips
> like ancient wallpaper,
> and its pattern of darker brown
> was like wallpaper:
> shapes like full-blown roses
> stained and lost through age."

Bishop emphasizes the wallpaper element through repetition, creating a sense of old wallpaper peeling away from a room's drywall – in this instance, skin peeling away from the fish's body. Bishop then compares the fish's appearance to a rose, the first of the flower comparisons (the second comes at the end of this subsection). Bishop then describes some of the less flowery, more gritty aspects of the fish's appearance:

> "He was speckled with barnacles,
> fine rosettes of lime,
> and infested
> with tiny white sea-lice,
> and underneath two or three
> rags of green weed hung down."

Here, Bishop both describes more explicitly how the fish, in his in-between state, has already become a home for other creatures while also projecting the human onto the fish, comparing the seaweed to rags. Much of Bishop's poem continues to operate in this close examination of the fish within the observational mode. The next lines,

> "While his gills were breathing in
> the terrible oxygen"

begin with the fish's state, sounding a tad ironic because the fish is anthropomorphized some throughout the poem and air is necessary for humans to live, before the speaker's own positionality cuts into the thought,

"– the frightening gills,
fresh and crisp with blood,
that can cut so badly –".

From there, Bishop details fish anatomy with scientific precision. Though the speaker references the internal, "the frightening gills," the referent is grounded in close observation of the fish's actual condition. The speaker's internal response to the fish is in response to the fish's condition rather than an interpretation of the fish's own interior state.

The speaker then enters the realm of hypothetical thinking by likening the flesh to feathers, detailing the "shiny entrails" as being "dramatic reds and blacks" and by again using the flower simile, "and the pink swim-bladder / like a big peony."

Rather than focusing on just (or mostly) the fish or the speaker, the third section, which spans lines thirty-four through fifty-five, details the speaker's internal impressions about the interaction with the fish, starting with,

"I looked into his eyes
which were far bigger than mine
but shallower, and yellowed
the irises backed and packed
with tarnished tinfoil
seen through the lenses
of old scratched isinglass."

As an example of how research was subtly and organically worked into the poem, the image of isinglass might conjure a thought of simple scratched glass primarily due the image; however, isinglass is a gelatin made from fish air bladders. It is used in glue and some other adhesives, which creates the sense of the eyes being unstable or gelatin-like. Here the speaker offers clues that the fish could have cataracts due to age rather than glassy, scratched up eyes that are still rounded like a billiard ball. Lines forty and forty-one support a reading of the fish's blindness:

"They shifted a little, but not
to return my stare."

Lines forty-two through fifty-five deal with disruptions, but instead of the dashes cutting into the thoughts as in subsection two, the dashes work by kneading themselves into previous thoughts that they briefly interrupt.

"—It was more like the tipping
of an object toward the light.
I admired his sullen face,
the mechanism of his jaw,
and then I saw
that from his lower lip
--if you could call it a lip--
grim, wet, weaponlike"

These interjections ground the speaker's presence in the poem as they learn the horrifying information about the fish, as well as the "weaponlike" simile returning the reader to the fish as a war veteran –

"hung five old pieces of fish-line,
or four and a wire leader
with the swivel still attached,
with all their five big hooks
grown firmly in his mouth."

Bishop, throughout the poem, uses description not just to situate the reader in the poem's setting, but to entrench the reader in its emotional climate, from the sea lice to the oft-caught fish that somehow got away numerous times. These lines are the key to understanding the beginning two self-contained lines because they explain why the fish did not fight.

In the space between the speaker's discovery of the previous times the fish had been hooked and the ending is a sense of hesitation. What the morally informed course of action would be? The reader is eased into the poem's central questions or "heart:" when do we

recognize the fish suffered enough, and how ought we acknowledge it? The speaker details the way the fish was visibly hooked and mingles the action with the expected labor of doing so:

> "A green line, frayed at the end
> where he broke it, two heavier lines,
> and a fine black thread
> still crimped from the strain and snap
> when it broke and got away."

The speaker returns with military comparisons in the lines to follow,

> "Like medals with their ribbons
> frayed and wavering,
> a five-haired beard of wisdom
> trailing from his aching jaw."

The line "I stared and stared" shows best the Hemingway-like approach Bishop takes to convey only the tip of the iceberg that is the speaker's inner thoughts. The line conveys a passage of time as the speaker stares at the fish while also expressing that the fish does not return the stare. The shortness of the line compounded with the repetition of "stared" creates a feeling of infinity. From there, Bishop writes,

> "and victory filled up
> the little rented boat,"

without any declaration (yet) of who the victor is, before also writing, in anticipation of the ending,

> "from the pool of bilge
> where oil had spread a rainbow
> around the rusted engine
> to the bailer rusted orange,
> the sun-cracked thwarts,
> the oarlocks on their strings
> the gunnels—until everything
> was rainbow, rainbow, rainbow!"

While I find the primary purpose for these lines to be for momentum, to move the reader toward the last line without building to it in a linear way, they can also be a commentary on

environmental guilt – a theme that can be derived from much of the poem, especially once the reader is confronted with a fish that experiences pain ("an aching jaw") because it has been hooked five times.

I leave the last line as its own section because it is so distinct from the rest of the poem: "And I let the fish go." One possible reaction to this poem is that reader might see the end as fully anticipated by the narrative progression of the poem, moving from a simple action to guilt and respect profound enough to release the fish. It can also be seen as a twist ending, or at least one that wasn't completely anticipated, perhaps because the last line is the third line comprised of just one sentence. The section that precedes this line deals with hesitation before coming to this resolution of releasing the fish; it isn't just what the lines say, but the space they occupy between revelation/discovery and the action that must follow it. The hesitation could stem from the eco-consciousness that pervades the poem – wondering what the morally correct decision is, if the action of the speaker is indeed the best course of action under the known circumstances.

"The Fish" additionally exemplifies how a poem situated in the natural world can be invested in the principles of science without attempting to posit through scientific terminology that it is a poem concerned with scientific thinking. The principles of the scientific method are scattered throughout the poem without abiding by an empirical order.

IV. "THE MONUMENT"

In many ways, "The Fish" and "The Monument" appear in contrast to each other; "The Fish" offers a speaker's internal dilemma set against the backdrop of the natural world, but in "The Monument," the manmade object, and how it occupies space, is central to the poem's concerns.

The poem is comprised of two stanzas. The first stanza contains fifty-eight – nearly three quarters – of the poem's lines while the second stanza contains twenty-two lines. The poem is written in free verse, with sprawling sentences that primarily use description to understand the poem's subject: the monument. The line lengths appear mostly uniform throughout, and occasionally short lines at the beginnings or endings of sentences deviate from the norm.

Though the poems' concerns differ, the poems also share similar modes of observation. In "The Fish," close observation is used to explore the speaker's inner experience, but in "The Monument," close observation creates an external sense of grandeur. Both poems describe their subjects, the fish and the monument, at the molecular level. Like a scientist, Bishop uses the smallest parts of each entity to construct an understanding of the larger entity on physical and emotional levels. Lines one through seven are as follows:

> "Now can you see the monument? It is of wood
> built somewhat like a box. No. Built
> like several boxes in descending sizes
> one above the other.
> Each is turned half-way round so that
> its corners point toward the sides
> of the one below and the angles alternate."

The poem immediately begins with inquiry akin to the scientific method: can the addressee of the poem, the second-person "you," *see* the monument? Given the commitment to close observation the poem exhibits, it is possible to deduce that the speaker's inquiry about

"seeing" the monument is unlike trying to point a person toward seeing clouds in a particular shape. The monument is present in front of the speaker and the poem's addressee, and the speaker is guiding the "you" toward a view of the monument through its inalienable qualities.

The speaker enforces their commitment to accurately describing the monument through the correction that occurs with the word "No" in line two. The description of the monument's build is made more specific than a box – it is like numerous boxes stacked in a particular configuration. Bishop establishes in this poem more quickly in "The Fish" an important question to guide the reader, and that the poem will rely closely on hypothetical reasoning to make deft observations about its physical appearance.

In lines eight through eleven,

> "Then on the topmost cube is set
> a sort of fleur-de-lys of weathered wood,
> long petals of board, pierced with odd holes,
> four-sided, stiff, ecclesiastical."

Outside information emerges, and the poem continues to operate in an observational mode. Whether it be the product of research or not, applying outside research to this moment in the poem yields associative significance otherwise lost. A fleur-de-lys is a stylized lily frequently used for decorative purposes. The "petals" of board harken to the natural world in which the monument is situated. The description of the topmost cube of the monument becomes more specific with each comma, and the lineation creates a sense of "ecclesiastical" grandeur unavailable without verse.

In lines twelve through nineteen:

> "From it four thin, warped poles spring out,
> (slanted like fishing-poles or flag-poles)
> and from them jig-saw work hangs down,
> four lines of vaguely whittled ornament

over the edges of the boxes
to the ground.
The monument is one-third set against
a sea; two-thirds against a sky."

The parallels between "The Monument" and the "The Fish" become more evident. The fish is half in and out of the water, straddled between life and death. The battered monument, unimpressive to the unobservant mind, is set against the sea and the sky, ground-level and the ethereal. Like in "The Fish," at the point where we are introduced to the fishing pole, the reader is hooked; on the level of inquiry, a reader might ask what the significance of these observations are. To that question, Bishop answers that some details have no practical function, that they are ornamental or aesthetic decisions. Scientific reasoning posits that the observable universe does not have preconceived meanings or goals. An organism cannot try to evolve toward a goal, just as not all the details of the monument will serve a specific purpose.

While acknowledging that not all details of the monument must necessarily have meaning, Bishop remains committed to dutifully transcribing all the monument's attributes. Still, the poem is framed in lines thirteen through twenty in the way a painter or photographer would block a visual frame or the way a scientist would narrowly focus their study to yield more precise results– a move that carries through to the poem's conclusion.

In lines twenty through twenty-three,

"The view is geared
(that is, the view's perspective)
so low there is no "far away,"
and we are far away within the view."

the parentheses interrupt the main narrative to provide clarifying information. The reader is also introduced to a skeptical second speaker, but the reader does yet realize that the quotation marks are directed toward the second speaker – the quotations appear in the abstract.

This shift is followed by lines twenty-four through thirty-four:

> “A sea of narrow, horizontal boards
> lies out behind our lonely monument,
> its long grains alternating right and left
> like floor-boards--spotted, swarming-still,
> and motionless. A sky runs parallel,
> and it is palings, coarser than the sea's:
> splintery sunlight and long-fibred clouds.
> "Why does the strange sea make no sound?
> Is it because we're far away?
> Where are we? Are we in Asia Minor,
> or in Mongolia?""

The speaker continues to closely observe the monument and meet its existence on its own terms rather than affixing a meaning to its existence. The reader realizes through the use of the second-person “our” that the monument is a shared object between the addressee of the poem, and later in beginning in line thirty-two, the second speaker, rather than a shine of purely personal significance.

In line thirty-two when the second quoted speaker is formally introduced, the second speaker begins to question the significance of the monument. The skepticism introduced through the second speaker is essential to the narrator’s detailed account of the monument: in order to understand why the monument matters, the narrator interrogates the terms on which it exists.

The speaker responds to the second speaker in lines thirty-five through thirty-nine, saying,

> “An ancient promontory,
> an ancient principality whose artist-prince
> might have wanted to build a monument
> to mark a tomb or boundary, or make
> a melancholy or romantic scene of it...”

The speaker’s rebuttal motions toward the monument may have functioned or had personal significance. Though the speaker offers a hypothesis for what its function may have been

historically, the speaker does not evaluate whether the monument is meaningful. In response, the second speaker questions the monument's significance further in lines forty through forty-six:

> “"But that queer sea looks made of wood,
> half-shining, like a driftwood, sea.
> And the sky looks wooden, grained with cloud.
> It's like a stage-set; it is all so flat!
> Those clouds are full of glistening splinters!
> What is that?"
> It is the monument.”

Bishop uses repetition of wood imagery, splinters, and reinforce why the second speaker might find the monument unimpressive. The punctuation present, such as the exclamation points, further emphasizes the second speaker's lack of neutrality. The second speaker is a symbolic representation of the questions that arise during an experiment that do not factor into the methodical process by which the experiment is performed. The inquiries are more directed to the monument's purpose than the technical details.

In lines forty-seven through fifty-eight,

> “"It's piled-up boxes,
> outlined with shoddy fret-work, half-fallen off,
> cracked and unpainted. It looks old."
> --The strong sunlight, the wind from the sea,
> all the conditions of its existence,
> may have flaked off the paint, if ever it was painted,
> and made it homelier than it was.
> "Why did you bring me here to see it?
> A temple of crates in cramped and crated scenery,
> what can it prove?
> I am tired of breathing this eroded air,
> this dryness in which the monument is cracking."”

the speaker returns to the close observational mode that started at the poem's outset. Specific images from the poem's first lines are brought to the forefront in summary, as if the speaker is reiterating an argument. Lines fifty-four and fifty-five highlight one of the poem's driving questions: why is this homely monument something we should care about?

The first stanza establishes through close study of the monument that it is worth caring about. The speaker demonstrates commitment to representing the monument accurately, without attempting to sway the second speaker into understanding its significance through abstract, non-empirical codes of value. Stanza two seeks to resolve questions about the monument's significance by reflecting on how its history is represented in its deterioration. In "The Fish," the fish was not just revered because it was a living creature; it was a creature that experienced considerable hardships, some known and some unknown to the speaker.

In the second stanza, beginning with lines fifty-nine through sixty-seven,

> "It is an artifact
> of wood. Wood holds together better
> than sea or cloud or and could by itself,
> much better than real sea or sand or cloud.
> It chose that way to grow and not to move.
> The monument's an object, yet those decorations,
> carelessly nailed, looking like nothing at all,
> give it away as having life, and wishing;
> wanting to be a monument, to cherish something."

The speaker reiterates the monument's physical qualities through repetition – the monument is made of wood, and wood grows without the will of an outside force. In an interrogation of the monument's importance, I think back to visiting the necropolis of Cerveteri in Lazio, Italy, where the surviving structures were the stone graves meant to resemble a city for the dead while the wooden structures of the living Etruscans had decomposed. The wood represents that there is a continued significance to the monument, but if the monument were made of stone, the significance would be static.

In lines sixty-eight through seventy-seven,

> "The crudest scroll-work says "commemorate,"
> while once each day the light goes around it
> like a prowling animal,
> or the rain falls on it, or the wind blows into it."

It may be solid, may be hollow.
The bones of the artist-prince may be inside
or far away on even drier soil.
But roughly but adequately it can shelter
what is within (which after all
cannot have been intended to be seen)."

The lines simultaneously use information the speaker has gathered through observation—what is physically known about the monument and its environment—and uses that information to make informed guesses about its unseen characteristics, both physical and hypothetical. "The Monument" can be read as a poem that instructs readers and artists on how to consume and construct art, by taking known information to make reasonable inferences, just as the scientific method allows for scientists to take observable information and find truth through replicable results.

The poem's final three lines, lines seventy-eight through eighty, are as follows:

"It is the beginning of a painting,
a piece of sculpture, or poem, or monument,
and all of wood. Watch it closely."

The poem's conclusion, especially in final sentence "Watch it closely", echoes the goal of a scientific project: to learn something uninhibited by prejudice. Instead of being a mirror of scientific experiment itself, "The Monument" demonstrates the values brought forth during scientific experimentation and embodied by the scientific method: close observation, neutrality, and the skepticism necessary to avoid making judgments before gathering evidence.

V. CONCLUSION

Though the scientific method is one way of examining whether or not a poem's craft or thematic concerns are scientific, there are surely other ways to consider which principles are essential to considering if poems fit within the realm of scientific reasoning. This essay is intended to highlight just one lens through which people can determine if scientific reasoning is present in poetry.

Relative to my own poetry, Elizabeth Bishop's thematic endeavors and commitment to close, microscopic investigation of a topic demonstrate how it is possible to write a poem on scientific terms without using scientific terminology. Bishop does not use language that would be typically considered bioscientific in "The Fish" or in "The Monument;" yet, the poems suggest commitment to observation without prejudice. The poems encourage readers to take information on its own terms, and to seek truth through reasonable approximations.

Poetry and science are not mutually exclusive practices. Poetry benefits from the patterns of inquisition, observation, and craft experimentation that science depends on to remain scientific. Likewise, science benefits from the creativity poetry affords—curiosity about truth in the world, problem-solving through novel means, and writing about experiments in a way that makes the findings meaningful.

If poetry represents beauty, and science represents the pursuit of truth, the final lines from John Keats's "Ode on a Grecian Urn" are apt:

> "Beauty is truth, truth beauty,—that is all
> Ye know on earth, and all ye need to know."[6]

[6] Keats 346

Works cited

Armitage, Simon. “Modeling the Universe: Poetry, Science, and the Art of Metaphor.” *Contemporary Poetry and Contemporary Science.* Ed. Robert Crawford. New York: Oxford University Press, 2006. 111-122.

Auden, W.H. *The Dyer’s Hand, and Other Essays*. [need edition information]. 2-62. "The Virgin & The Dynamo", p. 62 - The Dyer's Hand, and Other Essays (1962)

Boyden, Ian. “Vocalization of Lightning.” Lecture. Friday Harbor Poetry and Science Symposium, Friday Harbor, WA, 9 November 2019.

Brown, Sherry-Ann. “Creative Expression of Science through Poetry and Other Media can Enrich Medical and Science Education.” Frontiers in neurology, vol. 6. no. 3, 2015. 10.3389/fneur.2015.00003.

Keats, John. *The Collected Poems*. New York, Penguin, 1977. 346.

Midgley, Mary. *Science and Poetry*. Routledge, 2001.

Rose, Steven. *Lifelines: Biology, Freedom, Determinism*. London, Penguin, 1997. 120.