

Amid the Burning Layers of Grace: Science as Prayer

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There are no unsacred places;
there are only sacred places
and desecrated places.

— Wendell Berry *How to Be a Poet*



“Prejudice should not have us criticize those who seek ecstasy in music or poetry. There is a subtle mystery in each of the movements and sounds of this world. The initiate will capture what is being said when the wind blows, the trees sway, water flows, flies buzz, doors creak, birds sing, or in the sound of strings or flutes, the sighs of the sick, the groans of the afflicted...”

— Ali al-Khawas quoted in
Laudato Si'

"By means of all created things, without exception, the divine assails us, penetrates us and moulds us. We imagined it as distant and inaccessible, whereas in fact **we live steeped in its burning layers.** *In eo vivimus.* As Jacob said, awakening from his dream, the world, this palpable world, which we were wont to treat with the boredom and disrespect with which we habitually regard places with no sacred association for us, is in truth a holy place, and we did not know it. *Venite, adoremus!*"

— Pierre Teilhard de Chardin, S.J.



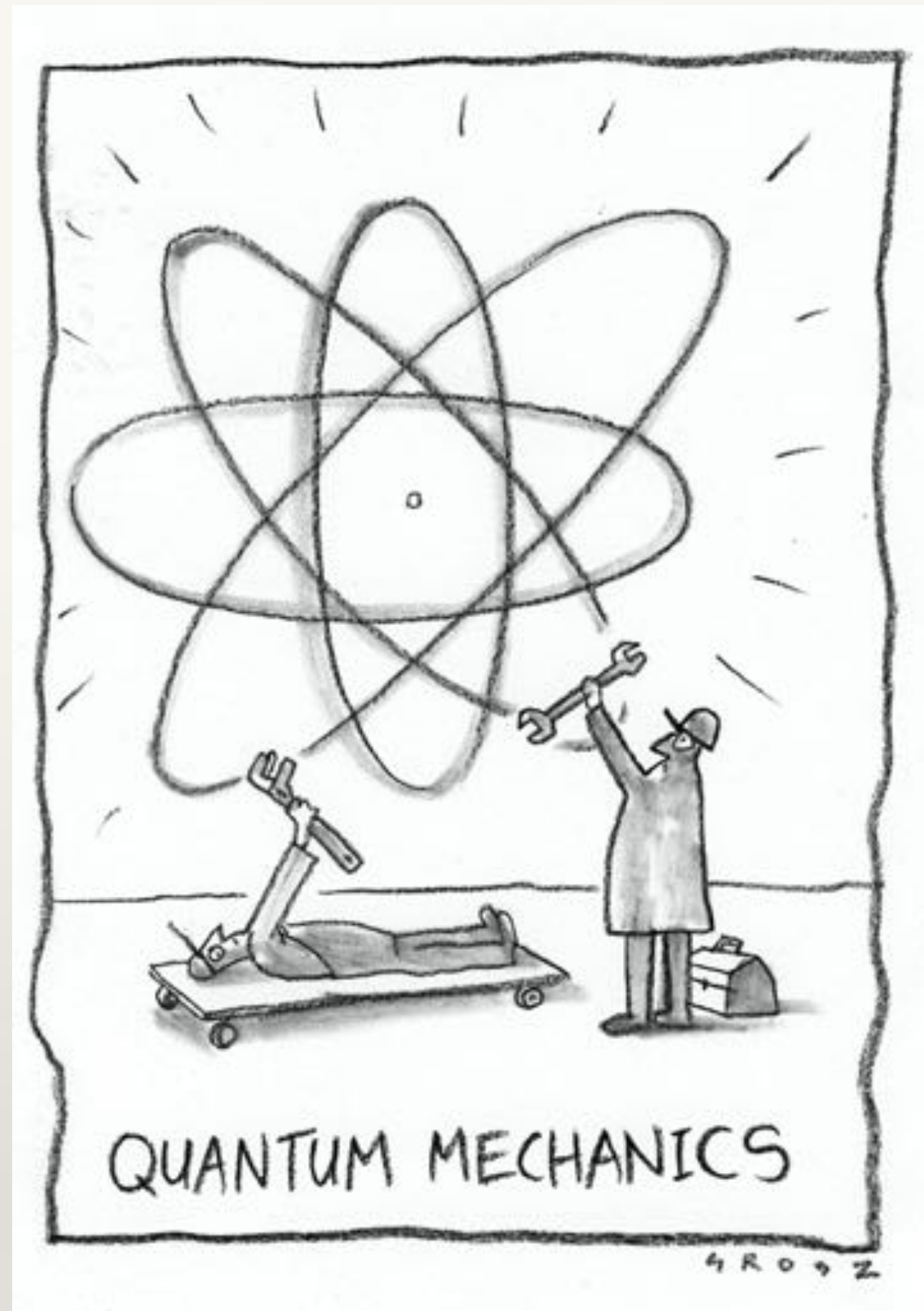
Natural science does not simply describe and explain nature; it is part of the interplay between nature and ourselves.

— Werner Heisenberg



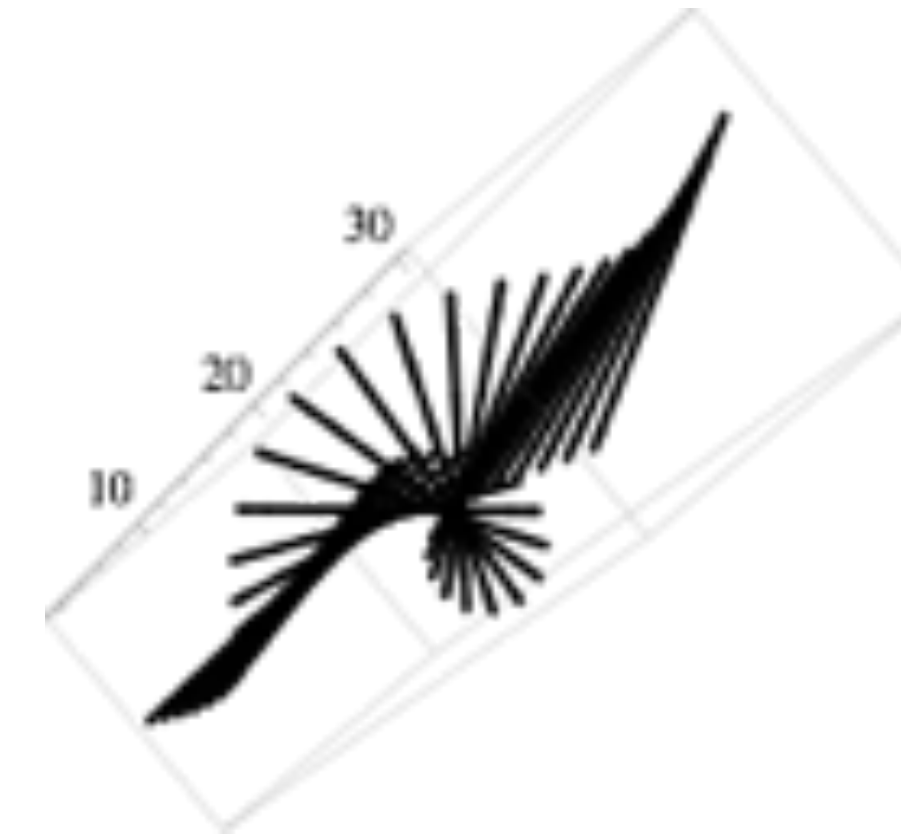
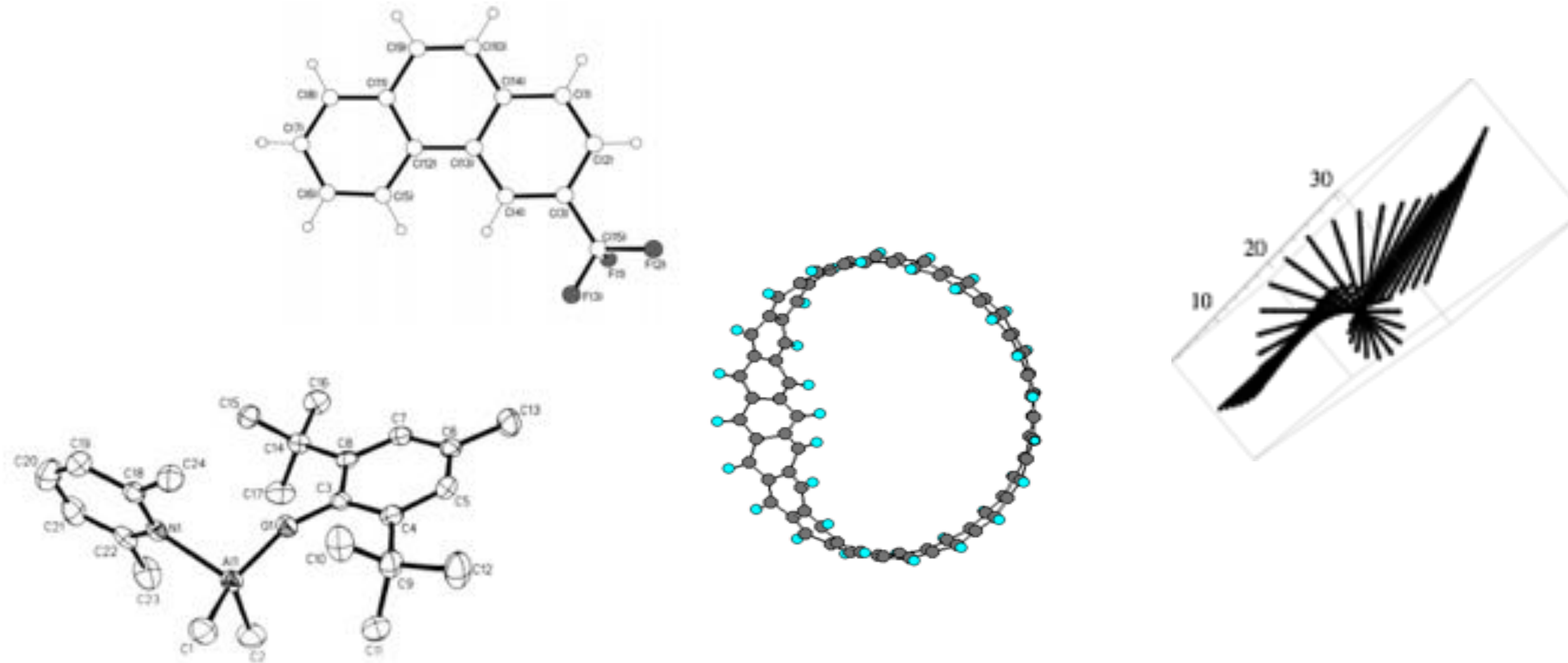


Self-reflection



“There are two kinds of taste in the appreciation of imaginative literature: the taste for emotions of surprise and the taste for emotions of recognition.”

— Henry James



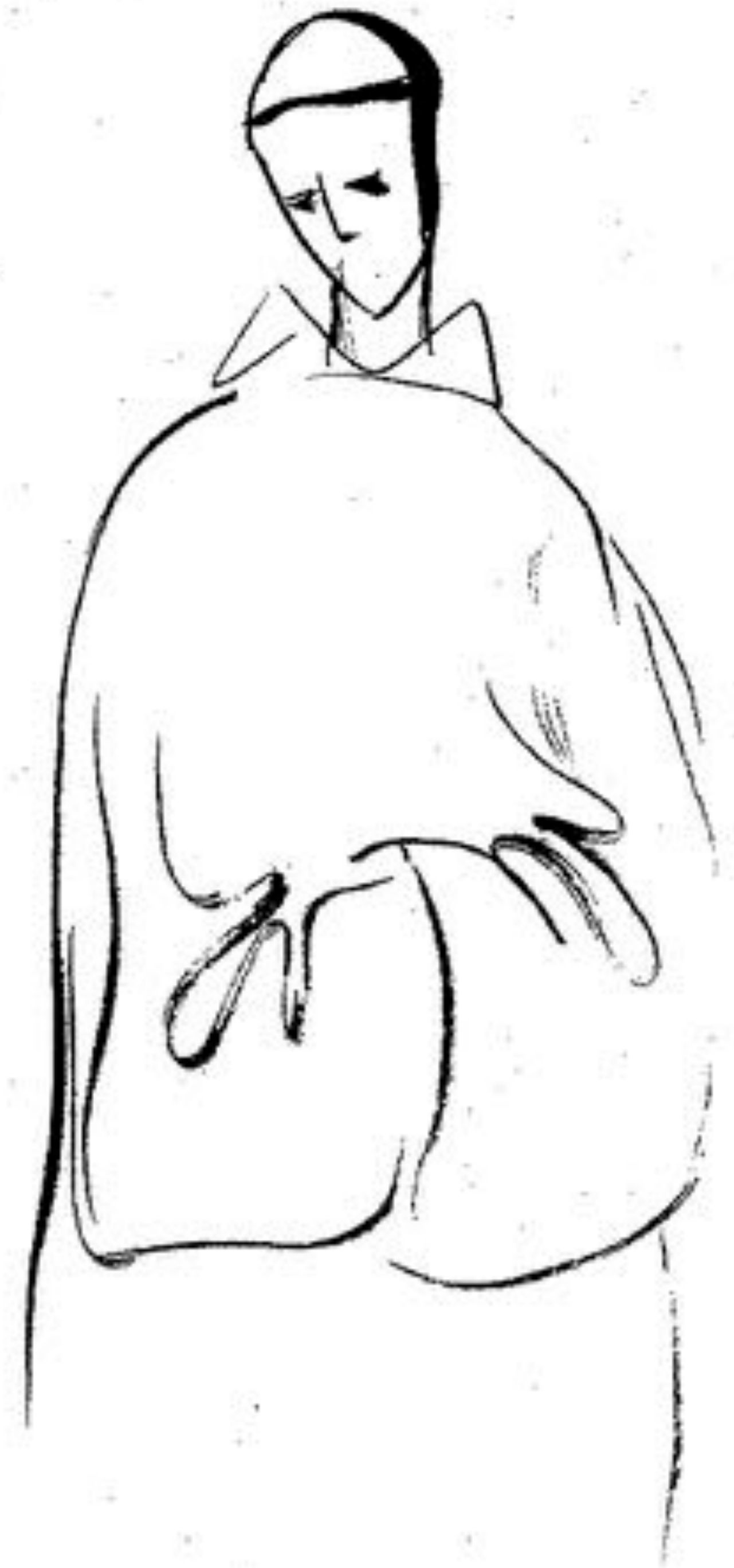
What I wear is pants. What I do is live.
How I pray is breathe.

— Thomas Merton

Because he bends down to listen,
I will pray as long as I have breath.

— Psalm 116:2

...in or out of the lab





Science and faith

Prayer

What perspectives might contemplatives have to offer scientists?

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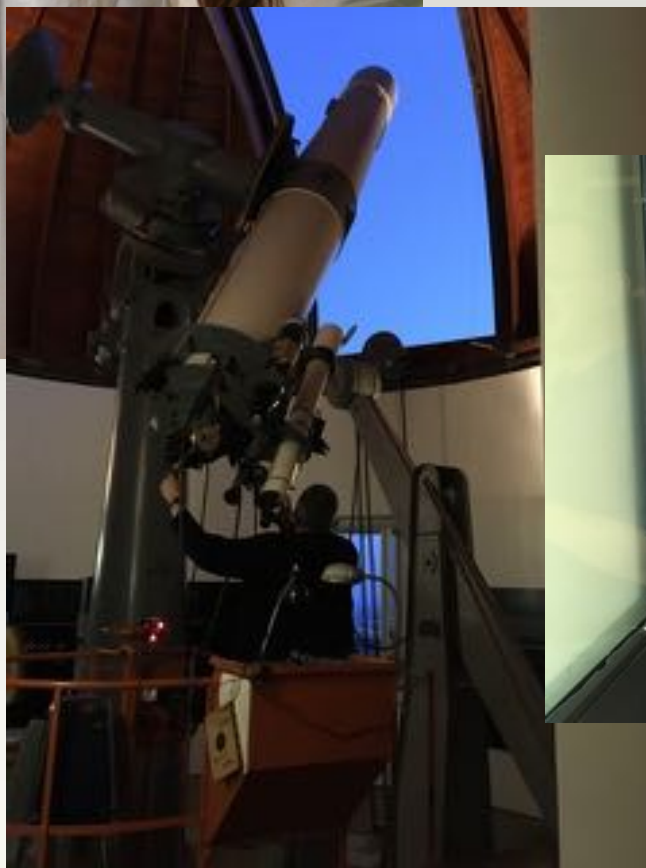
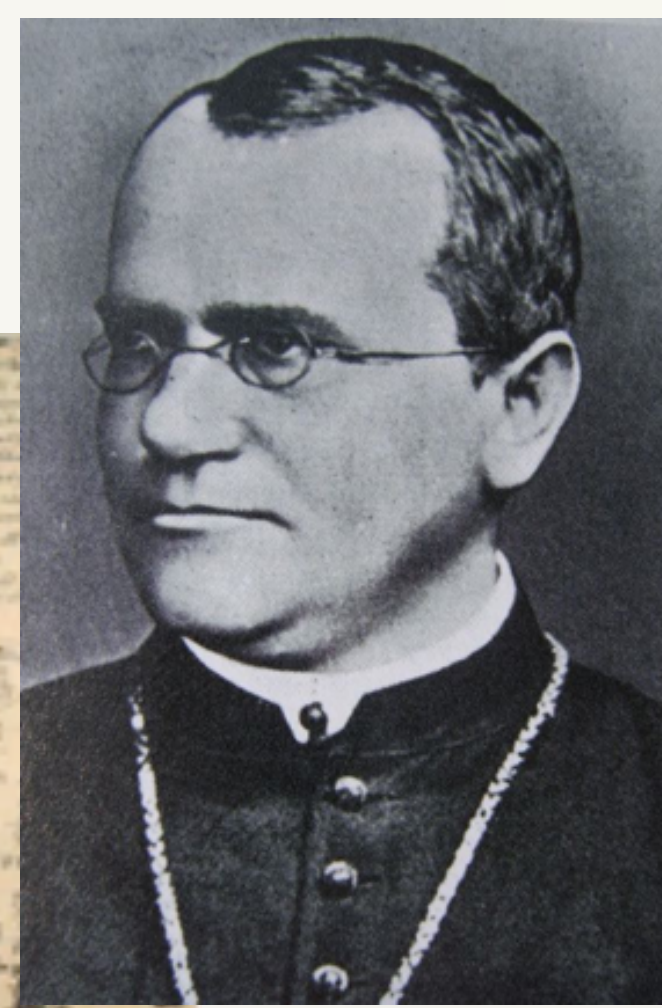


Science and Faith



*Quapropter bono christiano, sive
mathematici, sive quilibet impie
divinantium... cavendi sunt, ne consortio
daemoniorum irretiant.*

Therefore, a good Christian should beware
mathematicians, and any others who
prophecy irreverently... lest they be
ensnared by demons. — St. Augustine




Because all of us here, bishops and Fathers of the council, are on the lookout for truth... Hence our paths could not fail to cross. Your road is ours. Your paths are never foreign to ours. We are the friends of your vocation as searchers, companions in your fatigues, admirers of your successes and, if necessary, consolers in your discouragement and your failures.

For this purpose, without troubling your efforts, without dazzling brilliance, we come to offer you the light of our mysterious lamp which is faith.

Paul VI
Closing of Vatican II
1965





Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes.

Pope John Paul II
1988 letter to Fr. George Coyne, SJ, then
the director of the Vatican Observatory



Even a non-Christian knows something about the earth, the heavens and the other elements of this world...it is a disgraceful and dangerous thing for an unbeliever to hear a Christian, presumably given the meaning of Holy Scripture, taking nonsense about these things.

—St. Augustine

The truth of our faith becomes a matter of ridicule among the infidels if any Catholic, not gifted with the necessary scientific learning, presents as dogma what scientific scrutiny shows to be false.

—St. Thomas Aquinas , De potentia 4,1



Prayer

"Prayer is the raising of one's mind and heart to God or the requesting of good things from God." — St. John of Damascus, CCC 2559

Whether prayer is expressed in words or gestures, **it is the whole person who prays.**

But in naming the source of prayer, Scripture speaks sometimes of the soul or the spirit, but most often of the heart (more than a thousand times).

According to Scripture, it is the heart that prays....

The heart is the place of decision, deeper than our psychic drives.

It is the place of **truth**, where we choose life or death.

It is the place of **encounter**, because as image of God we live in relation:

it is the place of covenant. [See CCC 2562-2563]

Christian prayer is ... is the action of God and of humankind, **springing forth from both the Holy Spirit and ourselves**, wholly directed to the Father, in union with the human will of the Son of God made man. [See CCC 2564]

Petition

Thanksgiving

Vocal Prayer

Psalmody

Intercession

Lectio divina

Meditation

Praise

Vocal Prayer

Sung Prayer

Blessing

Contemplative prayer



...a long loving look at
the real.

— Walter Burghardt, SJ

For me, prayer is a surge of the heart;
it is a simple look toward heaven,
it is a cry of recognition and of love,
embracing both trial and joy.

—St. Therese of Lisieux



The whole earth is a
living icon of the face of
God. — St. John of Damascus

Anyway, for those who have attentive ears and open eyes, creation is like a first revelation that has its own eloquent language: it is almost another sacred book whose letters are represented by the multitude of created things present in the universe. St John Chrysostom says: "The silence of the heavens is a voice that resounds louder than a trumpet blast: this voice cries out to our eyes and not to our ears, the greatness of Him who made them" (PG 49, 105). And St Athanasius says: "The firmament with its magnificence, its beauty, its order, is an admirable preacher of its Maker, whose eloquence fills the universe" (PG 27, 124).

— Pope John Paul II, General Audience 30 January 2002



My book is the nature of created things, and as often as I have mind to read the words of God, they are at my hand.

— St Anthony the Great



Know that even when you are in the
kitchen, our Lord moves amidst the
laboratory kitchen, our Lord moves
pots and pans, and pans beakers and
amidst the pots and pans beakers and
flasks. — St. Teresa of Avila



Let us go forth to see ourselves in
Your beauty,
To the mountain and the hill,
Where the pure water flows:
Let us enter into the heart of the thicket

— St. John of the Cross

Practical advice from
the impractical

Awareness of multiple
dimensions

Non-judgmental view

An unforced pace





Multiple readings



Thank you for these tiny
particles of ocean salt,
pearl-necklace viruses,
winged protozoans:
for the infinite,
intricate shapes
of submicroscopic
living things.

— Marilyn Nelson from *Dusting*

GLASS MICROMETEORITES



73



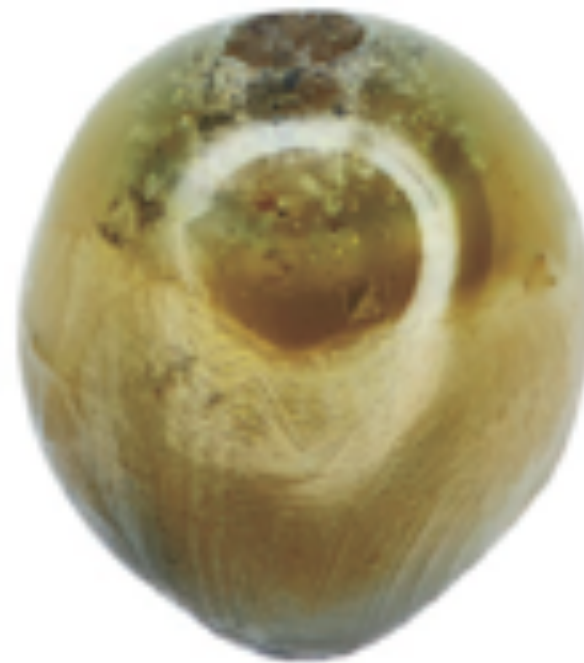
440



319



401



375



380

“If there is any path at all on which I can approach You, it must lead through the middle of my very ordinary daily life.”

Karl Rahner, SJ





Simply to see



“If you would be a poet, write living newspapers. Be a reporter from outer space, filing dispatches to some supreme managing editor who believes in full disclosure and has a low tolerance for bullshit.”

— Lawrence Ferlinghetti
Poetry as Insurgent Art



Our goal is not to amass information or to satisfy curiosity, but rather to become painfully aware, to dare to turn what is happening to the world into our own personal suffering and thus to discover what each of us can do about it.

Francis I
Laudato Si'



An unforced pace



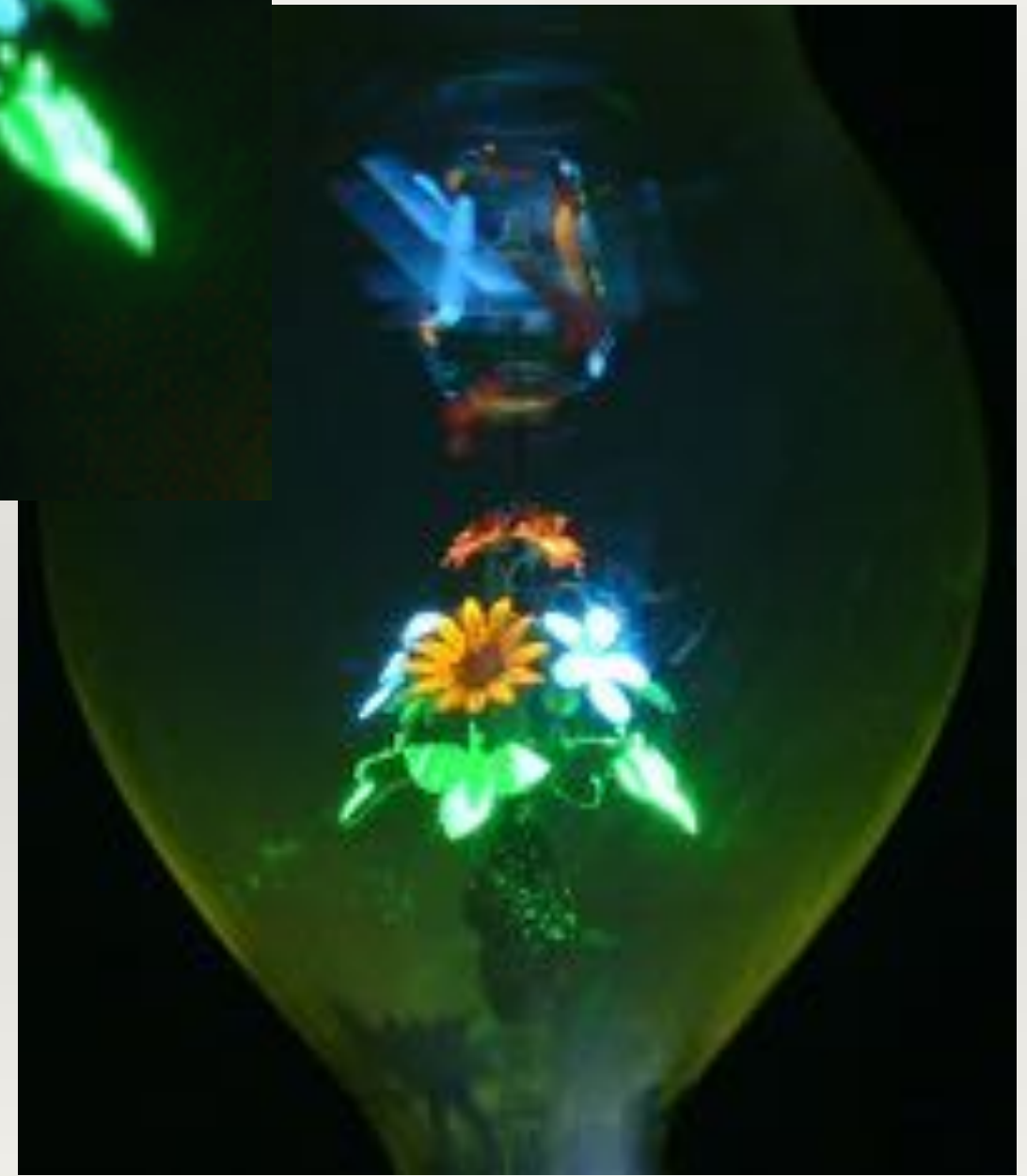
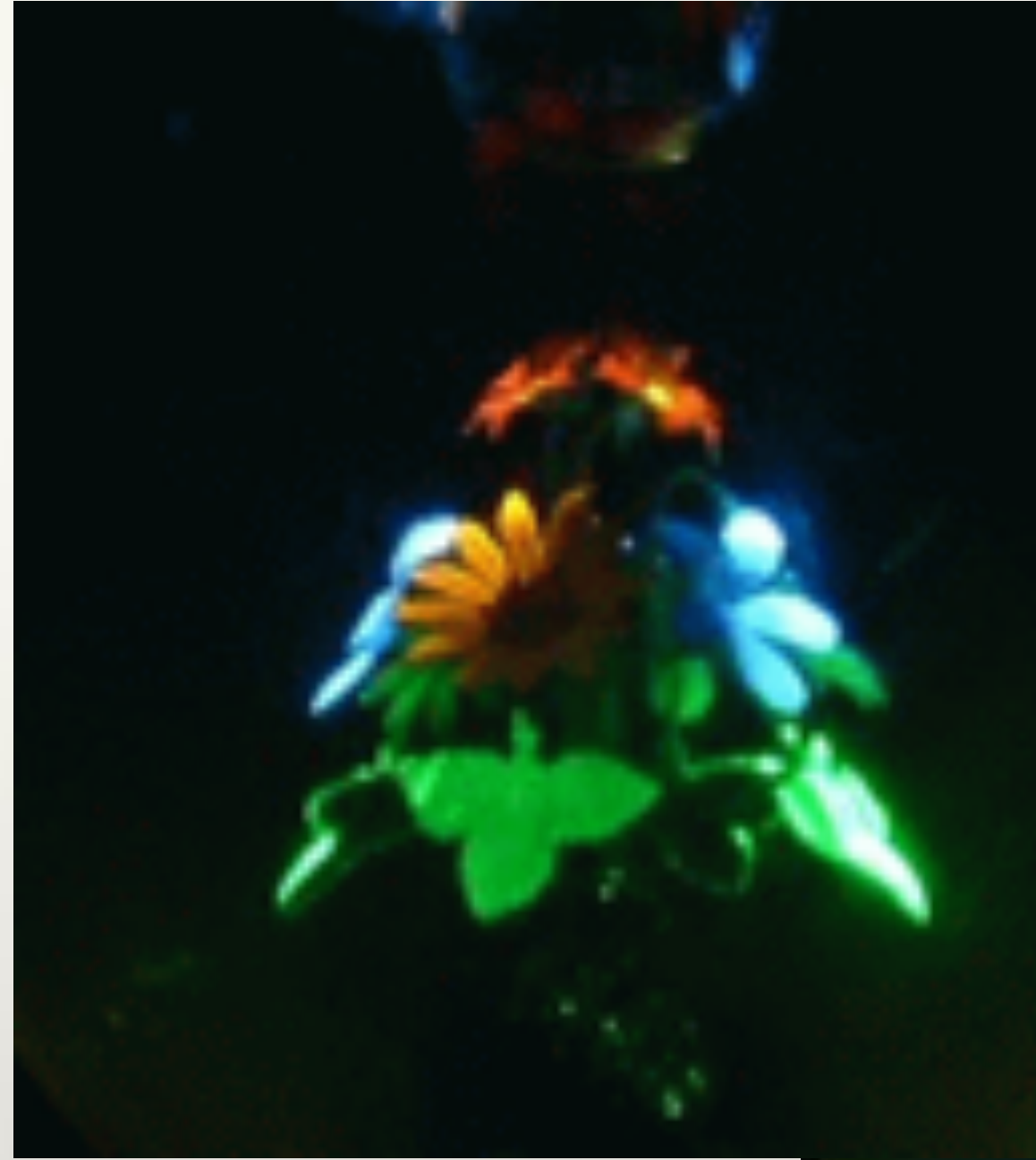


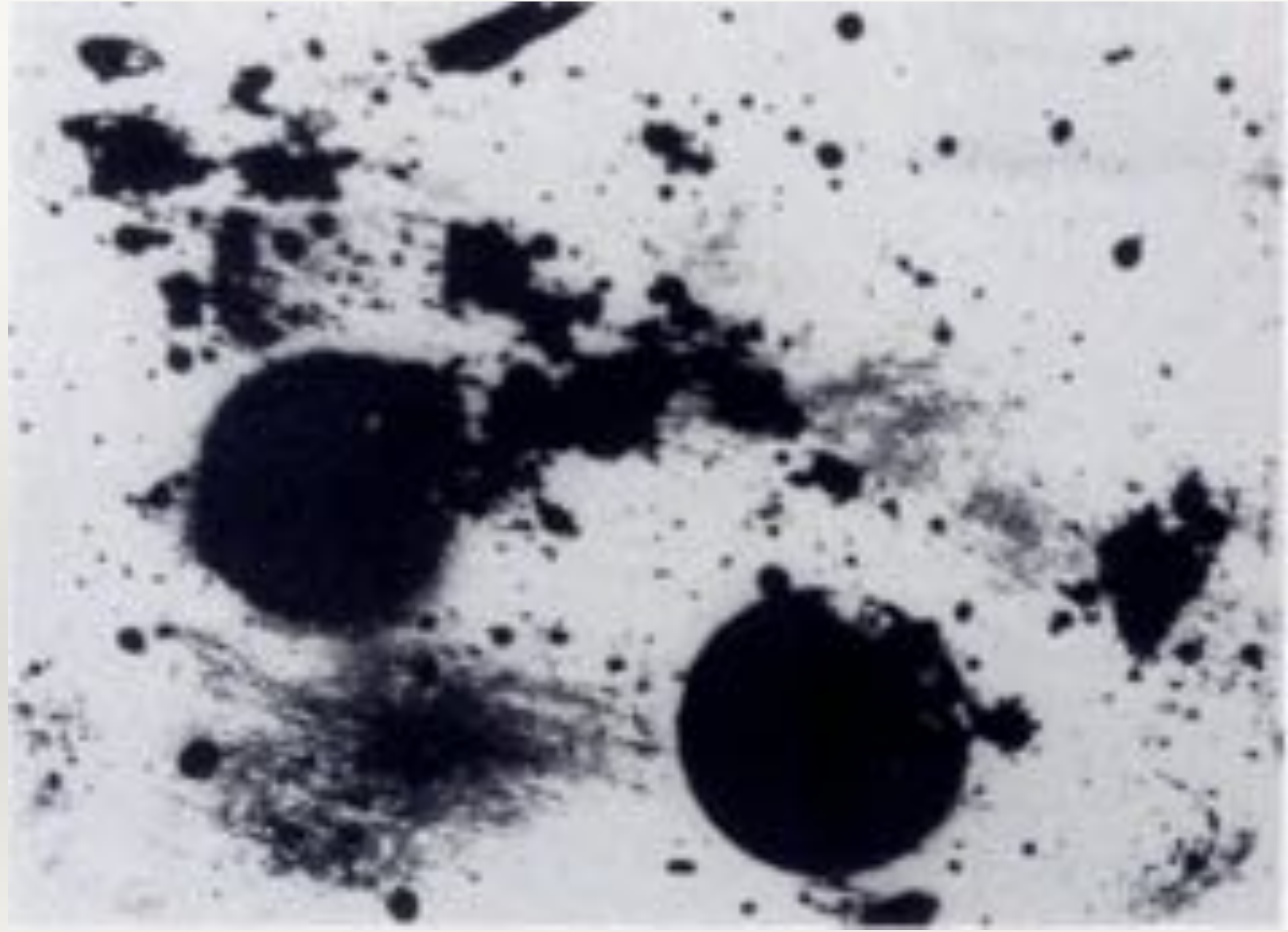
Albion, August 1869

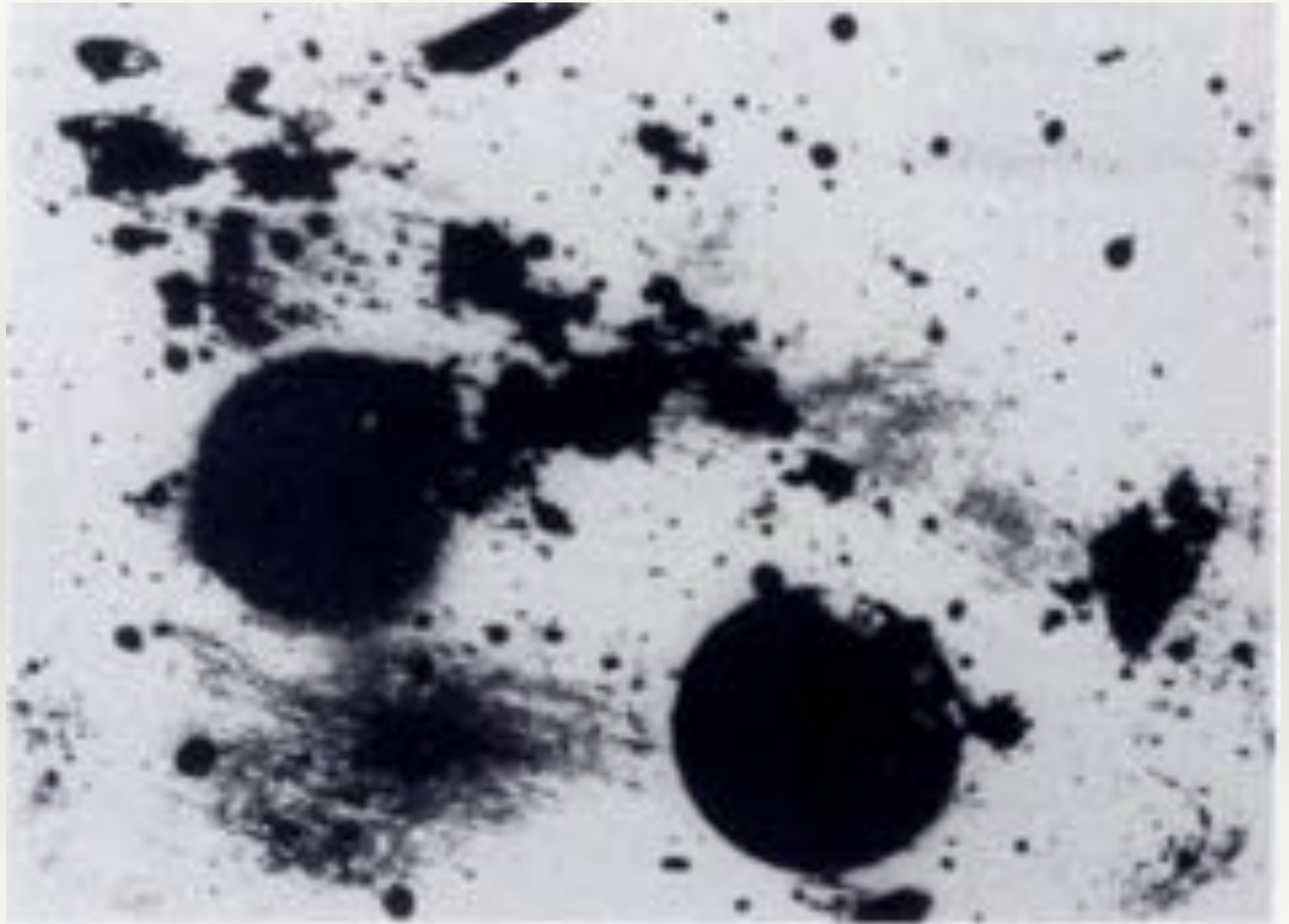


Exposure on Prof. Weber
July 73











“Out of a human population on earth of four and half billion, perhaps twenty people can write a serious book in a year. Some people lift cars. Some people enter week long dog sled races, go over Niagara Falls in barrels, fly planes through the Arc de Triomphe. ... There is no call to take human extremes as norms.”

Annie Dillard
The Writing Life

“God passes through the thicket of the world, and wherever
His glance falls He turns all things to beauty.”

— St. John of the Cross



Beauty in the strange

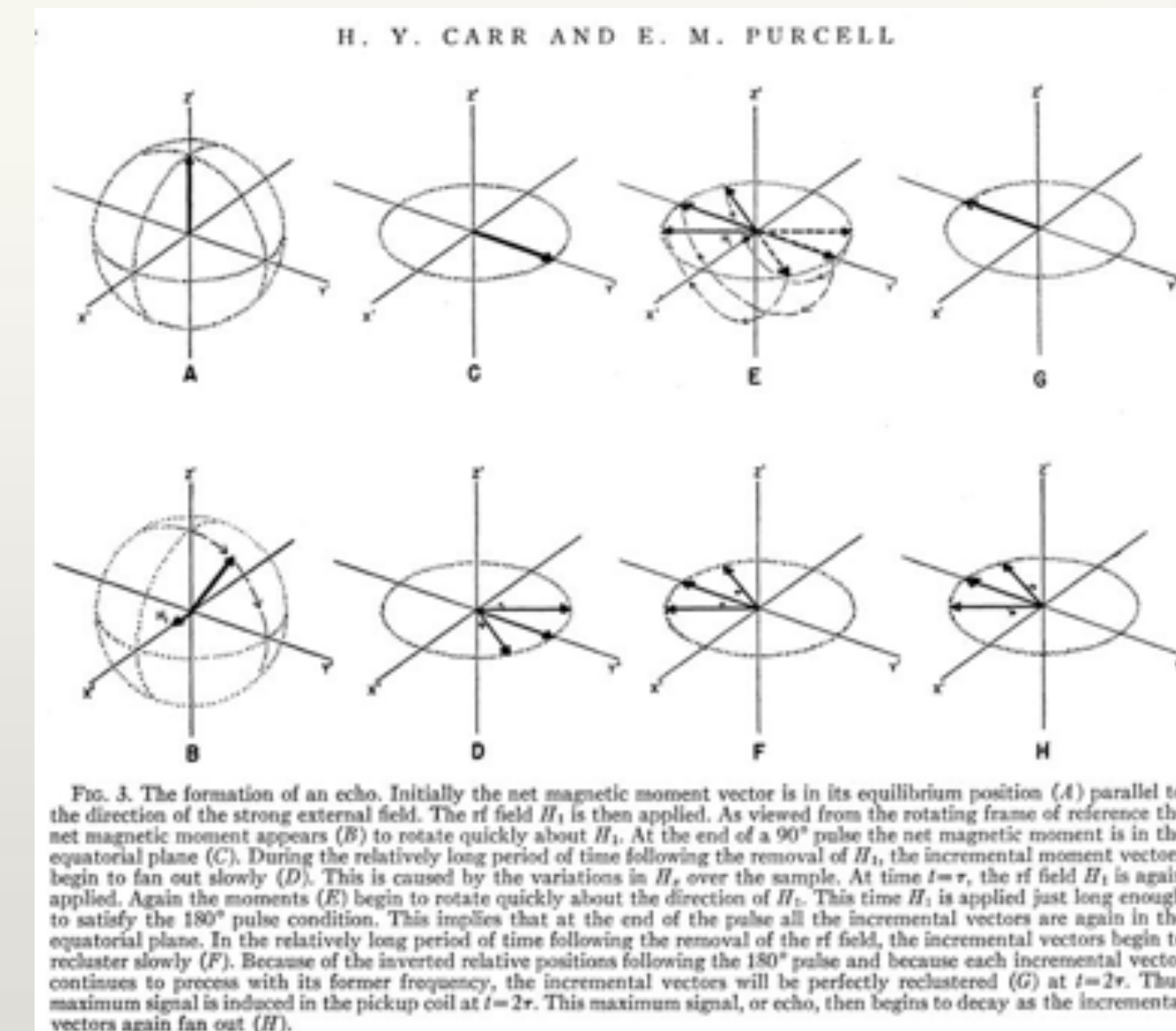
Doubt is not the enemy

Live with uncertainty



“I have not yet lost a feeling of wonder, and of delight, that this delicate motion should reside in all the ordinary things around us, revealing itself only to him who looks for it. I remember, in the winter of our first experiments, just seven years ago, looking on snow with new eyes. There the snow lay around my doorstep — great heaps of protons quietly precessing in the earth’s magnetic field. To see the world for a moment as something rich and strange is the private reward of many a discovery.”

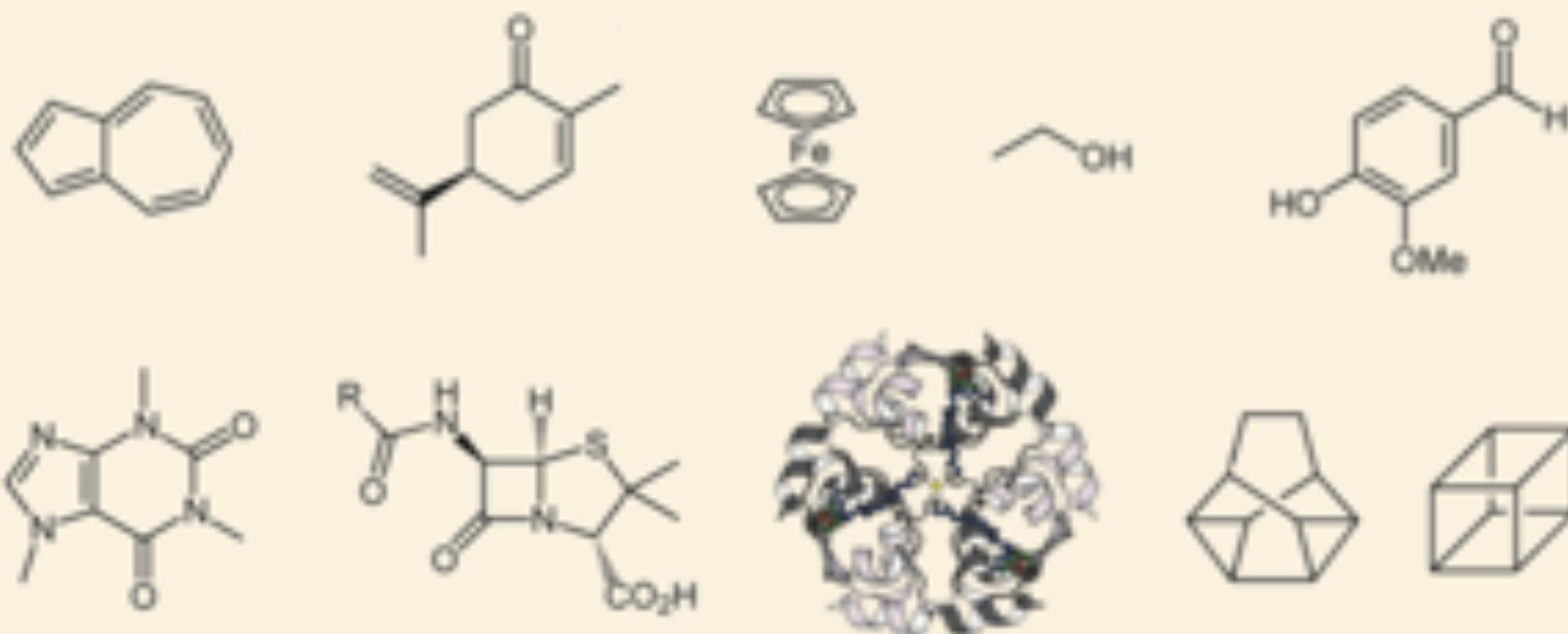
— Edward Purcell, Nobel Prize in Physics 1952



“God passes through the thicket of the world, and wherever His glance falls He turns all things to beauty.”

– St. John of the Cross

Box 1 | Michelle's top ten beautiful molecules.



Top row, left to right: azulene, (*R*)-(-)-carvone (the one that smells of spearmint), ferrocene, ethanol and vanillin. Bottom row, left to right: caffeine, the core structure of penicillin, an insulin hexamer, snoutane and cubane. Insulin image reproduced from ref. 15, © 2002 NPG.



Doubt and mystery



Thomas, called Didymus, one of the Twelve, was not with them when Jesus came.

So the other disciples said to him, "We have seen the Lord." But he said to them, "Unless I see the mark of the nails in his hands and put my finger into the nailmarks and put my hand into his side, I will not believe."

Now a week later his disciples were again inside and Thomas was with them. Jesus came, although the doors were locked, and stood in their midst and said, "Peace be with you."

Then he said to Thomas, "Put your finger here and see my hands, and bring your hand and put it into my side, and do not be unbelieving, but believe."

Thomas answered and said to him, "My Lord and my God!"

Jesus said to him, "Have you come to believe because you have seen me?r Blessed are those who have not seen and have believed."

Jn 20:24-29



Is there enough money in your pocket for a gelato?



Doubt is not the opposite of faith; it is one element of faith.

Paul Tillich



Uncertainty

At home with
the
Heisenbergs

I can't
find my
car keys.

You probably know too much
about their momentum.





Theological formation is the gradual and often painful discovery of God's incomprehensibility. You can be competent in many things, but you cannot be competent in God.

– Henry Nouwen

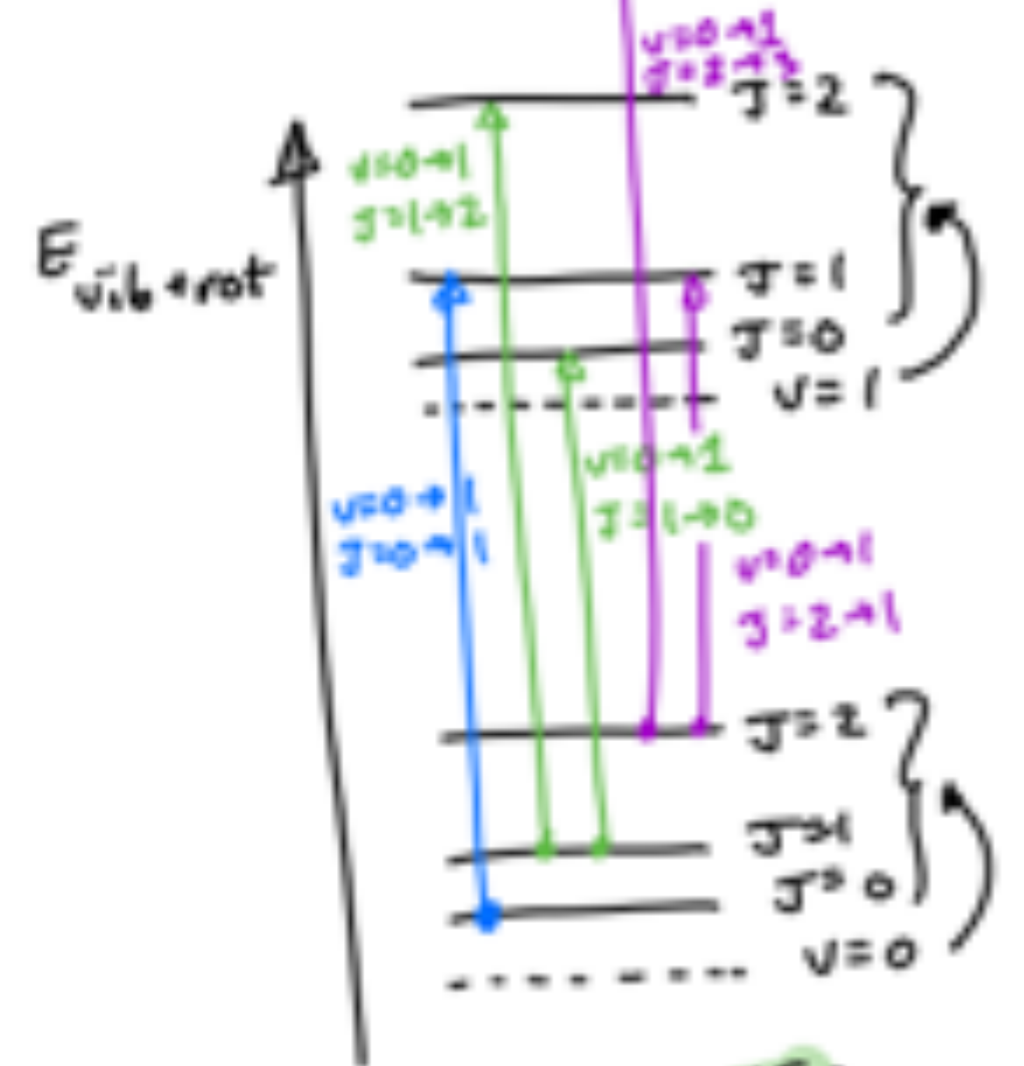


What can contemplatives learn from scientists?

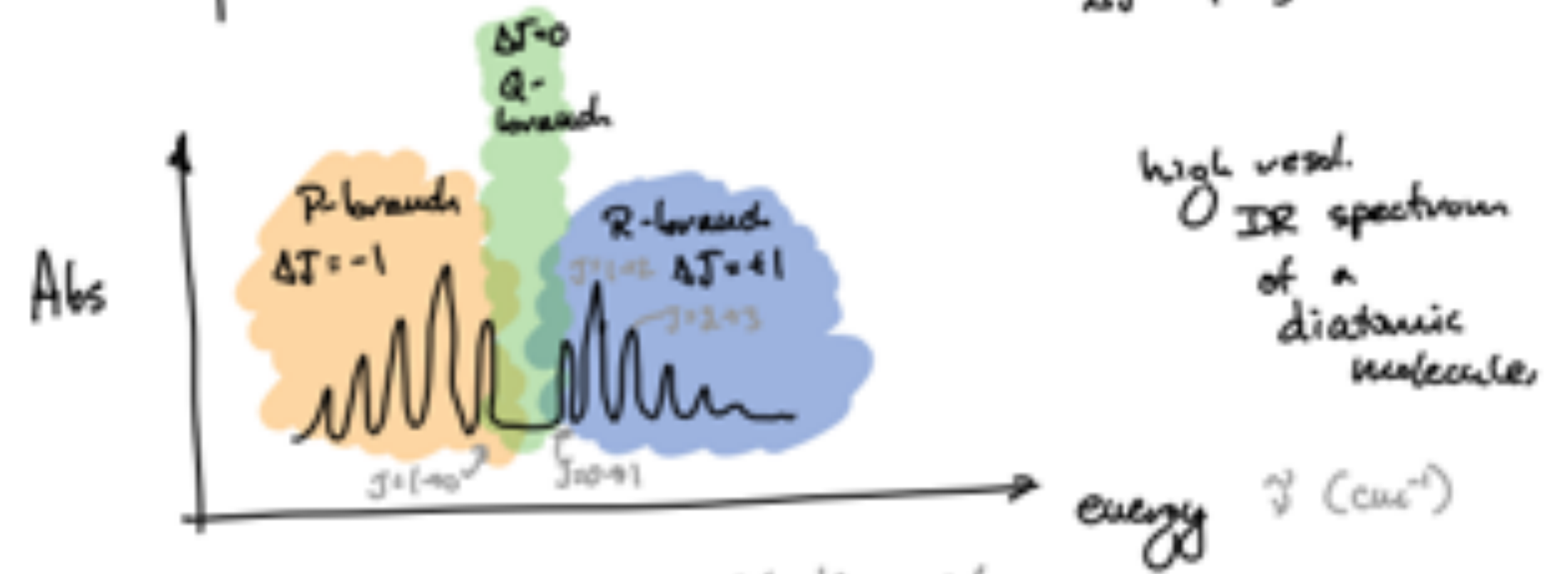
- Find beauty in the difficult
- Comfort with doubt
- Uncertainty

you can't always
 selection rules
 for vibration allowed transitions $\uparrow \& \downarrow$
 are $\Delta v = \pm 1$
 rotational allowed transitions $\uparrow \& \downarrow$
 are $\Delta J = \pm 1$

Consequences
 If I excite vibrationally - I have to excite rotationally



what transitions are possible?
 2 sets of lines
 $\Delta J = +1$
 $\Delta J = -1$ } all $v=0 \rightarrow 1$



assign spectrum, match lines w/ transitions

“To be able to stammer about God is after all more important than to speak exactly about the world.”

— Karl Rahner, SJ



Somewhere, out at the edges, the night
Is turning and the waves of darkness
Begin to brighten the shore of dawn.

The heavy dark falls back to earth
And the freed air goes wild with light,
The heart fills with fresh, bright breath
And thoughts stir to give birth to colour.

— John O'Donohue
Matins

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Center for the Contemplative Mind
in Society
Specola Vaticana

Clowes Fund for Science
& Public Policy
NSF

Bishop Daniel Thomas
Matthew Gambino
Mary Stommes
Sabrina Vourvoulis
Amy Ekeh

Guy Consolmagno SJ
Paul Mueller SJ



Questions to ponder:

Do you agree doubt is a feature — not a bug — of faith? How has doubt worked (or not) in your faith life? Do you think you are more or less comfortable with doubt because of your work as a scientist?

Is the unknowable, the limitlessness of God, an invitation or a source of frustration for you?

Where do you find the infinite in the infinitesimal? beauty in the strange or difficult? In your research?

