

# Michael Clarage: Questioning Our Understanding of DNA – The Electrical Shaping of Biology

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*“The story of DNA that we grew up with—and still teach our children—is not only wrong, it’s harmful to our spirit because it gives us a false understanding of ourselves and our relationship to the universe.”*

*TCTL editor’s note:*

*Below you will find a lecture (parts 1 and 2) given by [Michael Clarage of The Thunderbolts Project](#), as found at [Thunderbolts youtube channel](#).*

*With all the questions out there related to the toxic mRNA vaccines as well as work in gene-editing, etc., it feels important to take a step back and question what we really know.*

*Most who read this website fully understand that we have been lied to since birth – held captive within belief systems that involve collaboration between established science, religion, governments, education, etc. We are learning that we know little about the real history of this planet, much less our own countries.*

*Michael Clarage is not alone in questioning what we know about DNA. Biology itself is certainly not what we’ve been told it is.*

*Below the videos, you will find transcripts. At this site, we create transcripts for selected videos because written word is powerful and easier to reference than a video. To set ourselves free from the straight-jacket paradigms, we have to look around us and ask “Is this really true?” about every “established fact”, belief and dogma out there. The more we question and explore, the freer become. ~ Kathleen*

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*“On a more personal note, the Levin lab results are terrifying to me because, here we are again stumbling into areas we do not understand with tools too powerful for us to wield with wisdom.*

*“Has this new technology allowed us to add beauty to the world? Not so far.*

*“To date, we are only making grotesque monsters with legs growing out of their heads. The poor creatures live, somehow, and it turns my stomach to imagine that.*

*“I’m afraid we are right back where we were with the DNA story.*

*“We knew that mucking with the DNA will cause monsters. And now we know that mucking with the electric fields will cause monsters.”*

*~ Michael Clarage*

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## Michael Clarage: Electrical Shaping of Biology

In this first episode of a two-part presentation, we begin with an open question in biology—how do the shapes of creatures come about?

How does a certain frog species obtain its particular shape and not some other?

How do its legs and toes and claws always get their particular shape and not some other?

We repeat the 70 year-old idea that DNA alone somehow determines everything, though there is surprisingly little evidence.

The story of DNA that we grew up with—and still teach our children—is not only wrong, it's harmful to our spirit because it gives us a false understanding of ourselves and our relationship to the universe.

Astrophysicist and Lead Scientist of The SAFIRE Project Michael Clarage, PhD, highlights some of the evidence for the role of electricity in how plant and animal shapes come to be, and the role of electric fields in how inorganic objects obtain their shapes.



### [Michael Clarage: Electrical Form and Function](#)

We examine three fundamental questions in the second episode of this two-part presentation.

Is matter even capable of organizing itself?

Where do form and shape come from?

Can form exist without matter?

Researching the origin of forms in Nature for several decades, Astrophysicist and Lead Scientist of The SAFIRE Project, Michael Clarage, PhD, has found none of our current sciences very good at describing how forms arise.

Be it geology, physics, chemistry, biology, or astronomy, there is a substantial amount of hand-waving when it comes to describing how form occurs.

Dr. Clarage conveys a powerful and profound idea. When your purpose changes, your shape changes. Purpose is causal. It makes things happen and presents a more useful and meaningful cosmology for all.

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*Transcript prepared by [Truth Comes to Light](#) editor:*

#### **Electrical Shaping of Biology**

An open question in biology is how do the shapes of creatures come about?

How does, for example, a certain frog species obtain its particular shape and not some other? How do its legs and toes and claws always get their particular shape and not some other? The same question for all the internal bits, the spine, the liver, the brain.

How do each of these always come to the same shape and interconnect in the same way, particular for this species and no other?

Most textbooks still repeat the 70-year-old idea that the DNA alone somehow determines everything. Though there is surprisingly little evidence for this.

I would like to highlight some of the evidence for the role of electricity in how plant and animal shapes come to be and also say a few words about the role of electric fields in how

inorganic objects obtain their shapes.

I was motivated to give this talk after reading about the work of the Michael Levin lab at Tufts University in Boston.

For more than a decade, the lab of Doctor Levin has been overturning some long-held beliefs about how biological shapes arise.

Back in the late 1950s, when DNA was being discovered and its role was starting to be understood, Watson and Crick championed the idea that the DNA determines everything about the organism. They call this the central dogma of biology.

For the past 70 years, most textbooks and funding have unquestioningly followed this dogma. It is a form of predeterminism all over again, since it assumes that the information flows only one way from the DNA out and nothing an organism could do would ever change that.

Crick was very vocal that finally he, a mere man, had once and for all eliminated the need for a god or any intelligence in the universe, since everything about us flows from our DNA.

Bombastic cheekiness aside, we can still run experiments to test the idea.

Over the past 70 years, many thousands of experiments have been run to elucidate the role of DNA in developmental biology. But try as we might, we could never show that genes actually create any forms.

What exactly in the DNA determines that an arm be shaped just so and not otherwise?

How is the inside of the mouth formed just right to know with the nose above and the throat below?

Search the literature and you will find that the best we can do is to show that disabling certain sections of DNA will

cause some body part to form incorrectly, but this does not mean that the DNA is causing the form of that body part.

I was always surprised at such sloppy thinking.

That would be like me showing that I can prevent you from driving to the store if I give you a flat tire. Correct. You cannot drive to the store if you have a flat tire, but the tire was never the cause of you going to the store.

Just because mucking with some DNA causes an arm to form incorrectly does not mean that the genes cause the shape of the arm.

Using a cooking metaphor, which is surprisingly accurate, ingredients do not by themselves cause anything. You need a recipe that tells you what to do with the ingredients. And what is the meal? How many people are you cooking for? What is the order of the evening? All that makes a real difference.

Our genes do not necessarily tell our bodies what to make or when to make it. These decisions are made mostly outside the genes.

Everyone should know that we do not really understand DNA.

Every decade, the advanced textbooks need to be rewritten because we find out that the system is way more complicated than we previously thought.

What we call genes are really a very small part of the total DNA. Genes are that small part of the code that contain the blueprint for building proteins.

We still do not know what most of the DNA does. The collection of all the genes in your DNA is much like a giant ingredient list.

If you had a cookbook of all the recipes you could ever make and you made an index of all the ingredients needed for all

those recipes, that is what the genes are.

All the blueprints for how to make each of the ingredients you might ever need. But again, genes constitute only a very small part of the DNA.

The work in Doctor Levins lab is impressive by any measure. These are virtuoso level skills. They alter the DNA of individual cells to change the number of ion pumps the cell makes for itself. This makes these particular cells more or less electrically polarized relative to what they would have been in the wild type.

At certain times in the development of the embryo, if enough cells in one place can be tricked into creating just the right electrical alterations, then body parts will grow in that location. An eye will grow inside of a stomach. A toe might grow on an elbow.

The 70-year-old central dogma of biology states that DNA, isolated inside the nucleus causes all shapes and forms to appear.

What does Levin's result show? That an electric field external to the nucleus cause the shapes and forms to appear when and where they did.

It does not mean that the fields create the form itself, but it does mean that the field can cause the shape to appear.

What does this mean for the central dogma? Things get really tricky because Dr. Levin is altering the genes in the cells which cause more ion channels to form on the cell wall, which causes a different electrical potential of the cell relative to its surroundings.

So you could argue that the DNA is controlling everything, but the argument has become muddled.

Why does the entire eye form in the electrified location and

not just pieces of an eye? And how is it that we instinctually know that the eye should not be in the stomach?

In Levin's cancer research, they show that changing wild type electrical fields can start and stop cancer cell growth.

Highly malleable cells such as stem cells and cancer cells, have less defined electrical potentials relative to their surroundings.

Whereas healthy, mature cells have higher electrical potentials.

One of the hallmarks of cancer cells is that they have lost their relationship to the larger body. They are an out-of-control growth of cells that are part of nothing. They have no function beyond their self interests.

Here Levin's results come very close to actually disproving Crick's central dogma with regard to the form and function since electric fields, external to the nucleus, can destroy all form and function.

On a more personal note, the Levin lab results are terrifying to me because, here we are again stumbling into areas we do not understand with tools too powerful for us to wield with wisdom.

Has this new technology allowed us to add beauty to the world? Not so far.

To date, we are only making grotesque monsters with legs growing out of their heads. The poor creatures live, somehow, and it turns my stomach to imagine that.





I'm afraid we are right back where we were with the DNA story.

We knew that mucking with the DNA will cause monsters. And now we know that mucking with the electric fields will cause monsters.

It does not prove the DNA is causing the proper shape, nor does it necessarily prove that the electrical field is causing the proper shape.

Dr. Levin's lab is justifying all this with the promise of new medical treatments if we can just make it through a few more decades of producing monsters.

I am also surprised that Dr. Levin does not seem to reference Dr. Robert Becker, who already showed most of these principles 40 years ago. You can see a good summary of Becker's work in his book "The Body Electric".

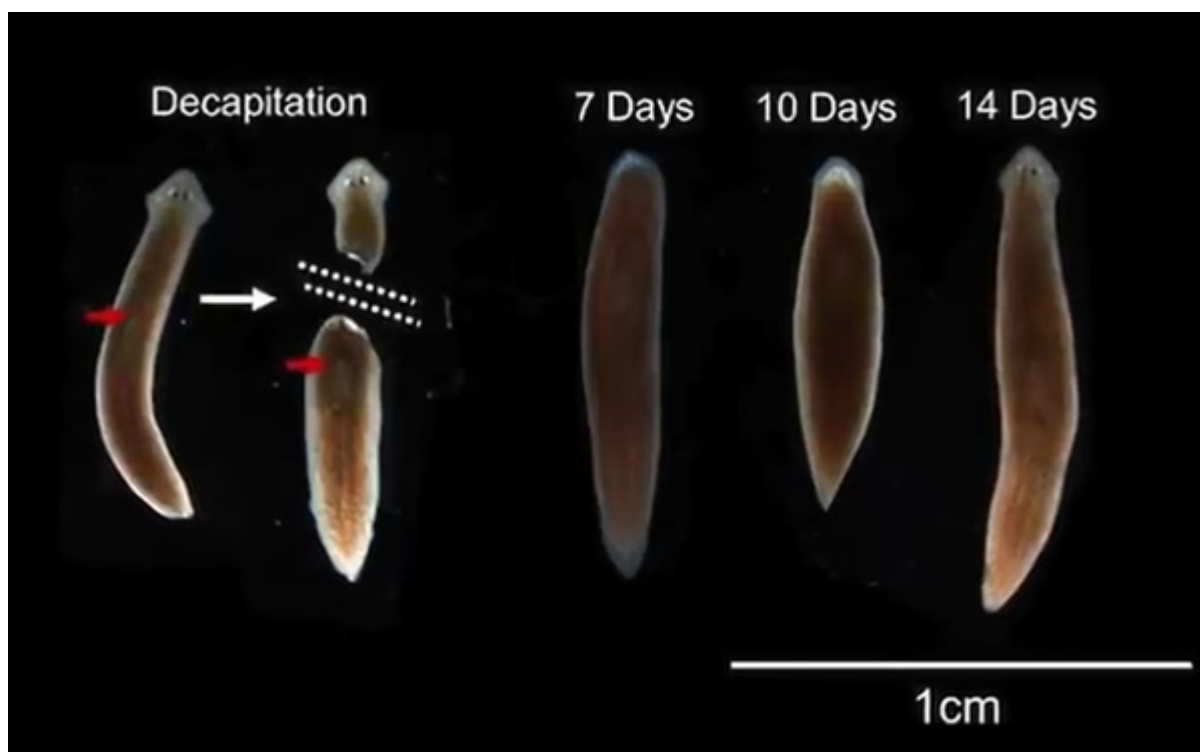
Dr. Becker, a practicing physician, discovered that controlling electric fields could heal burn victims and could let salamander tails grow back properly. Why not give credit where credit is due?

I fear it is because it became known that Robert Becker had a spiritual side. He maintained that humans were more than just sacks of chemicals.

I fear that since Dr. Becker did not believe in pure materialist reductionism many journals will not allow reference to his work.

Let us look at two more sets of experiments from Dr. Levin's lab. Then we can step back and ask why does it all matter?

These experiments involve planarian flatworms. In the wild, if the tail of the worm gets chopped off, then a new tail will grow. If the head of the worm gets chopped off, a new head will grow, brain and all. Pretty amazing.



The wild type worm has an electrical gradient along its body, more positive towards the head. The researchers cut off the tail, then artificially gave that end a positive charge. This caused a new head to grow off the back end. We now have a new shape. A two-headed worm.

This new two-headed worm then propagates. It reproduces

asexually, as all planarians do.

Is this a new species? I think so. Yet the DNA has not changed. You can see that the connection between the DNA of the animal and the shape of the animal is becoming less clear.

How could the DNA remember that this new worm species has two heads, so all future progeny must also have two heads.

Returning to the cooking metaphor, it looks like the genes are available to get the raw ingredients produced, but the recipe and the plans for the full meal are being handled at quite another level, quite outside the world of the genes.

In a different experiment, they went to the wild type, cut off its head, then, while the new head was forming, they modified the electrical potential of some cells, and ended up producing the head and brain types of another species of planaria.

Let that sink in. The DNA is still that of the original species, but the form, the shape of the new worm head is that of a related species of worm. We have created a new species but we have not altered the DNA.

In my opinion, any notion of DNA determining the shapes of creatures is on pretty shaky ground.

Why does any of this matter?

It matters because the story of DNA that we grew up with and still teach to our children is not only wrong, it is actually harmful to our spirit because it gives us a false understanding of ourselves and of our relationship to the universe.

We were told that a simple molecule, with sequences of four molecular letters determines everything about us.

We were assured that not only our shape, but our entire being is supposedly a simple unfolding of some molecular computer

program into which we have no input.

I find all aspects of this dogma incorrect and harmful.

As a scientist, I am trying to reconstruct a cosmology that is more accurate and more meaningful. In the second-half, we will look at the question of whether matter is even capable of organizing itself. And if not, then where could all these shapes be coming from?

### **Electrical Form and Function**

Picking up right where we left off.

Is matter even capable of organizing itself?

If you believe in materialist reductionism, you say that the universe is only matter. Matter and forces. And the forces are not matter.

But I'm happy to overlook that inconsistency for now.

In the first half of the lecture we saw how a materialist reductionism applied to biology states that DNA is everything. All you need is the DNA and a bag of chemicals, and you can make any life form you want.

Yet, as shown, in the first part, this theory runs into some major problems, confusions and contradictions when applied to even a simple worm.

Many previous civilizations would say that we are stuck on these very basic questions because we are looking in the wrong place for the answer.

We keep wanting the matter to produce the form. But what if matter cannot, on its own, produce form?

Another idea is that forms and shapes are imposed upon matter or made available to matter.

To illustrate this, let us look at some examples that are often rolled out as proofs of self-organized matter. The Belousov–Zhabotinsky reaction is given often as proof that matter alone can self organize.

Here, a simple chemical preparation cycles through beautiful alternating spirals. Some point to the growth of crystals as an example of self-organized matter, such as geodes or growing rock candy at home.

But, without exception, in all these laboratory cases, the researchers are spending many hours setting up specialized equipment that creates very special conditions. They then flip a switch and say, voila, the matter has self organized.

And I'm like, no, you just spent months carefully arranging thing, imposing a form from the outside. You have, in fact, proved that matter cannot self organize.

In the case of crystal growth, in graduate school we spent many months trying to grow protein crystals for our X-ray diffraction experiments. And I can tell you from experience that most of the time nothing forms. And it was only through very carefully-controlled conditions and obvious artistry that crystals form, once again showing that matter does not self organize.

So where do form and shape come from? An older body of ideas states that shape and form are imposed upon something from the larger world of which it is a part. For example, the cell in the liver has its form and function because it is part of the liver and has very clearly defined jobs to do in the larger body of the liver.

If that cell were part of a different world, say part of the stomach, then that cell would have a different shape.

The organs themselves each have their particular forms only because they are part of the body and have clearly defined

jobs that they each do for the body.

The very idea of proper shape only has meaning for something that is part of a larger body. That is the only way you know if you have the right shape. That is the only way you know if you are doing the right job.

When something breaks its connection with a larger world then it can no longer have a proper shape.

The cancer cell has broken its connection with the larger body. The cancer cell has no shape, no function. The cancer cells are still connected to the matter of the body. The substance of the blood still flows to the cancer. There is not a material disconnection. There is, instead, a disconnection of purpose and function, which leads to a loss of shape and form.

I realize this is a different way to think. I have pondered it for many years and I still find it elusive.

We are so immersed in centuries of thinking that matter explains everything. It can be challenging to think that form and shape are quite distinct from matter.

Shape is something that can be imposed upon matter or made available to matter. But shape is not matter and shape does not come from matter.

In living systems there are proper shapes. It's not arbitrary.

A frog toe must have a certain shape to be part of a frog foot, which must have a certain shape to be part of a frog leg, which must have a certain shape to be part of a whole frog. Once we have seen a frog, it is obvious when any part is mis-formed or not doing the right job.

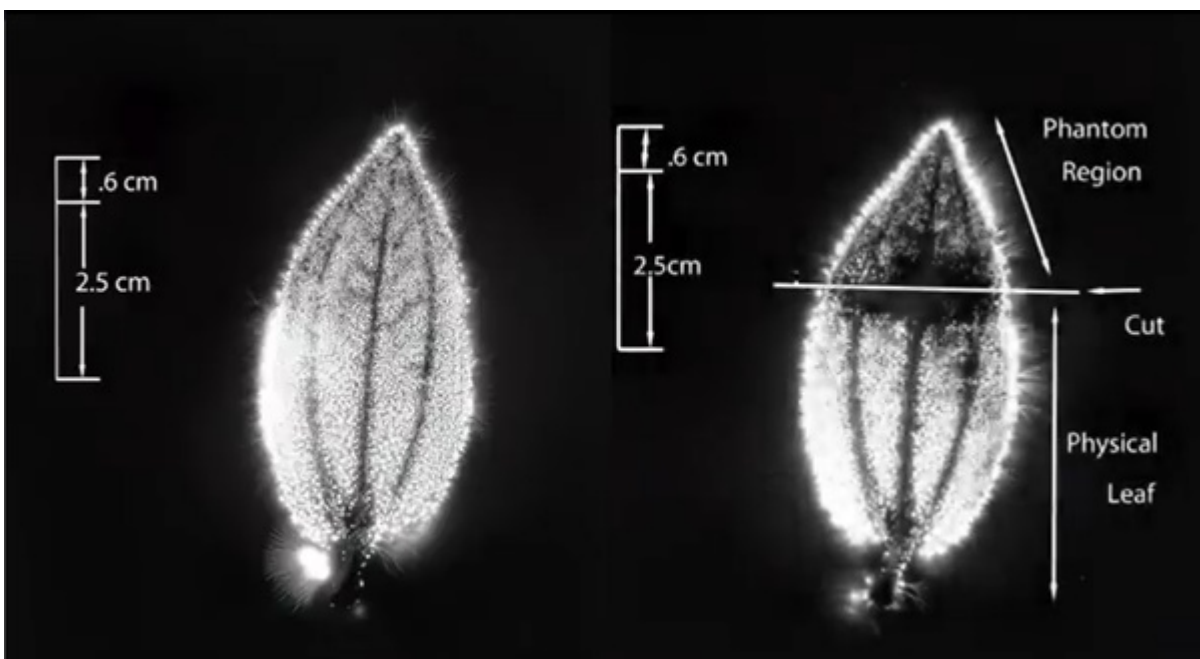
Instead of asking questions about how DNA can cause shapes and functions, we should ask: What is it about the environment that will call forth different ingredients from the DNA?

Do we have any evidence that form exists without matter?

In corona discharge imaging, we place an object inside an electric field of several kilovolts per centimeter. The object distorts the flow of electrons, which produces a very beautiful image of the object.



When you place a leaf between the plates, you see the structure of the leaf.



The image on the left shows the corona discharge picture of one such leaf.

You then cut off the top part of the leaf. You choose a new cover plate and film, so that there is no contamination from the previous image, and you make a new coronal discharge image.

The image on the right shows what you get. Much of the part that you cut off is still visible.

In one study, 137 leaves were photographed from 14 different species. Ninety-six of the photographs showed at least some image of the section of the leaf that was removed.

How could that be since the matter in that section is missing? The form exists independent of the matter and is detectable through electric fields and the flow of electrons.

I personally think that the electric field is a mediator for the form. I do not believe that the electric field is the source of the form, but this hypothesis can be checked in further experiments.

These results might also remind you of a hologram where every small section of a hologram film contains the entire picture. Although holograms can be easily explained using physics, I personally am always amazed every time I see one. I am baffled that they actually exist. I cannot get my head around the fact that each part of the hologram picture can actually be used to recreate the entire picture.

In these leaf experiments, we see the same thing, where a remaining part of the leaf still somehow contains the information needed to construct the entire leaf.

It is the same with the planarian worms. The remaining part of the worm somehow still has the pattern of the whole worm, which the matter then fills in.



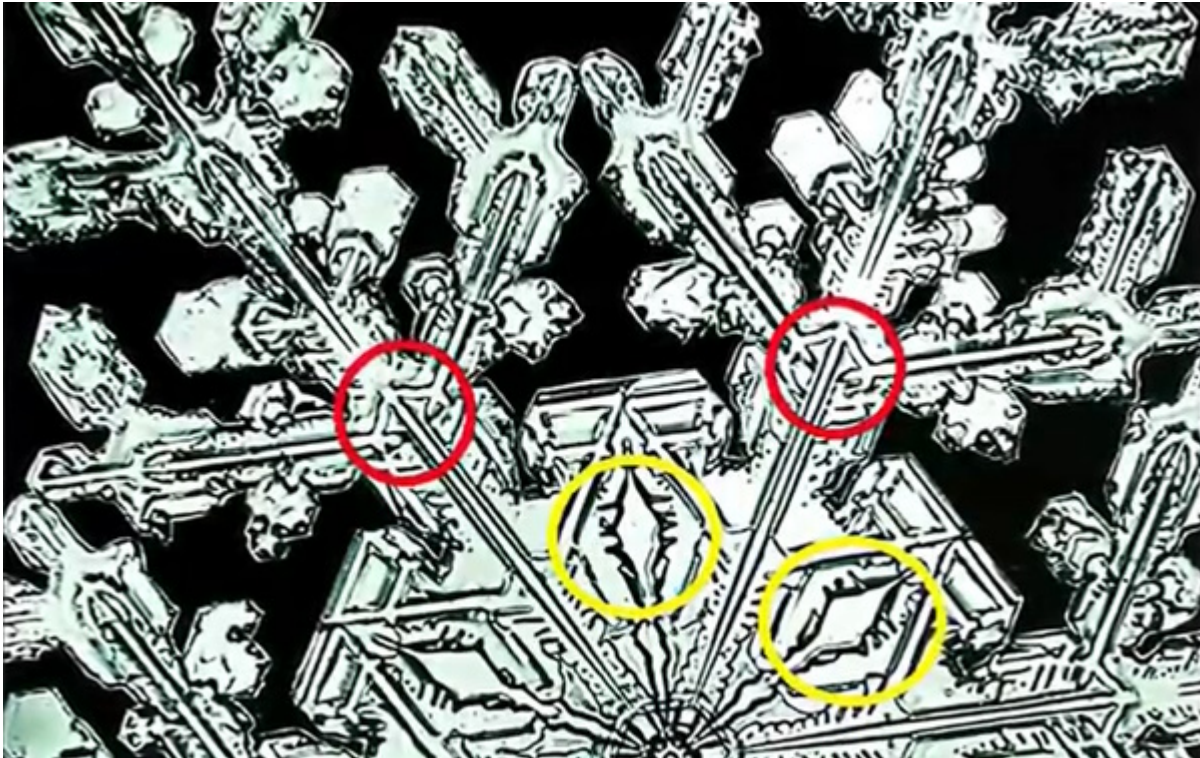
Let us leave the world of biology. Forget about DNA, clear our heads, and look at all this in an entirely different setting.



Consider the snowflake. Stunningly beautiful. Millions have been looked at and so far no two are exactly the same. Endless variations within a theme.

You may have heard, or assumed, that physics or maybe chemistry has explained how snowflakes get their shape. Not so. The origin of snowflake morphology is a mystery.

I have marked off two sections on this snowflake picture. Look at the two red circles, then look at the two yellow circles.



How did the two red regions know to make the same shape?

How did the two yellow sections get the message to make their shape?

There are trillions of molecules separating these regions. That is basically infinitely far away if you are a molecule. And it's not just two regions that get the message from infinitely far away. It's six regions for every feature that end up looking the same.

I propose that the overall form of the snowflake is imposed upon the freezing water all at once, like a New England contradance hall forming and unforming to the caller and the music. I think that the entire pattern exists in an electric field at the region where the snowflake forms.

I'm not saying that the electric field is all by itself the cause or the origin of the form. But I do think the electric field is a mediator or a translator of the form into matter.

Maybe somebody could help us by doing electric field snowflake experiments. We already have good evidence that crystal growth is disrupted by the presence of pulsed microwave electric fields, which shows that electric fields are involved with crystal formation.

To take the next step in snowflake research, we must see that the large scale shape of the snowflake is not coming from the individual water molecules. And why would you want it to anyway?

If you are a scientist, why would you want to explain this enormous, elaborate shape arising from isolated molecules that cannot know anything about each other?

In closing, I will ask aloud:

Dr. Clarage, you seem to be saying that matter alone is not sufficient to explain everything and that we must consider this other principle called shape or form. Yet you never clearly define what this is or where it comes from.

To which I reply:

But neither can you clearly define exactly what is matter or where does it come from. And I really do not see how form is any less obvious than matter.

So perhaps we should change the terms of the discussion and ask why would anyone want to describe everything with only one principle called matter?

Why is that preferable to having also a second principle of form?

If you say that it is obvious that having only one principle is simpler, I will say, "Oh man, really? I just spent all this time showing experimental evidence why matter alone leads to all kinds of complications, confusions and outright contradictions."

I have been researching the origin of forms in nature for several decades. I have found that none of our current sciences are very good at describing how form arises, be it geology, physics, chemistry, biology, astronomy.

There is a substantial amount of hand-waving when it comes to describing how the form of things arises.

For example, in astrophysics we do not know why solar systems form with a certain number of planets, why the spacings between the orbits closely follows an exponential spiral, why the planets have their particular sizes, why the star has its particular cycle of magnetic patterns, et cetera, et cetera. This question is so difficult for astrophysics that it is generally ignored.

I think all our sciences are weak in this area because we are looking in the wrong place for the origin of forms and shapes. We keep wanting the matter to organize itself. I think that is a dead end.

To get out of this dead end, two questions can be useful.

The first is: Why would you personally want a world view where matter organizes itself? I hope you can answer this for yourself and not from some physics video you saw, or a book that you read.

The second question is: In your personal experience, in your life, what useful functions or procedures have you personally seen come about spontaneously with no effort?

**When your purpose changes, your shape changes.**

**Purpose is causal. It makes things happen.**

**A more useful and meaningful cosmology would include that.**

It is my hope that I have helped convey some of that message.

Thank you.

Cover image credit: [Public Domain](#)

The [Flammarion engraving](#) is a [wood engraving](#) by an unknown artist that first appeared in [Camille Flammarion](#)'s *L'atmosphère: météorologie populaire* (1888). The image depicts a man crawling under the edge of the sky, depicted as if it were a solid hemisphere, to look at the mysterious [Empyrean](#) beyond. The caption translates to "A medieval missionary tells that he has found the point where heaven and Earth meet..."