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# Frog Physics

Ok, this is the beginning of frog physics. It grows out of the experimental observation of the bug detector of frogs.

The frog has four types of ganglion cells, one of which is sometimes playfully described as a “bug detector” but is known more scientifically as a moving-edge detector; there are also a net-convexity detector, a net-dimming detector, and a sustained-contrast cell. Much emphasis has been placed on frogs’ ability to detect movement. They leap from a lily pad, throw out their sticky tongues, and catch an insect on the wing. For a creature with only four types of receptor cells, that’s pretty good coordinated movement. But some scientists believe that frogs detect movement so well because they cannot see anything that is stationary. Since the background does not interfere, the moving object stands out. Put a frog in a cage with dead, motionless worms, and it may well starve to death.<sup>1</sup>

The beginning, then, is perception.

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The world is all yellow without any sense of depth.

Out of this yellow there appear small dots.

In groups or singly they move across this yellow

getting larger

getting smaller,

as long as they are moving, they are there.

Unless they vanish!

A dot may vanish by slowing down. Just when you would say it is standing still, it vanishes.

Or it may vanish by simply getting smaller and smaller. You would say it is going into the distance, but in our story, there is no perceived depth—only yellow flatness in which dots appear.

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Now, our frog has three properties.

One you would call hunger. This is a sensation that sometimes gets quite strong (or larger). It can be satisfied (and then becomes smaller).

Suppose a dot appears and hunger is large. Then, a streak, very much as if from the center of hunger, simply appears in the yellow and one dot disappears; hunger gets smaller.

The streak is what you would call “tongue.” Tongue, or streak, is the second property.

For a streak to join dot to hunger, the dot must be either getting larger or getting smaller, but not below a certain size. Sometimes when there is a streak from this center of hunger, the dot does not disappear.

When the streak has already joined several dots to hunger, then hunger (which has become small) no longer streaks even though more dots still move through the yellow.

Sometimes, a streak may appear in the yellow, yet the streak does not come from this center of hunger. It comes from some other place. Sometimes, when a dot appears, two streaks converge toward it. Sometimes, they both miss the dot, and join together! Then there is a sensation not like what you would call tasting a dot; but a rather stranger sensation.

Usually then, both streaks immediately disappear; hunger is “confused.”

The third property is **croak**. This is a sound.

The center of hunger may croak, or sometimes, croak sounds out of the yellow.

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So, how does a frog go about living in this world? For a lot of critters, the question really does not arise. There is simply a play of color, and sound, and sensation. Dot appears, is joined to hunger, and disappears. Every once in a while, there is another streak or croak.

But for some frogs a certain awareness arises. That is, hunger develops a sense of self.

If you ask such a frog what it is, it would say, **I am Hunger.**

Hunger finds that it can streak without there having to be any dot at all. It can work itself into a great (large) state, or it can become quiet and small. And it can make its own sounds.

It finds though, that there are other sounds, other croaks, and that it cannot make dots come just because it wants them to.

So Hunger realizes that **This yellow must be something else!** that these dots are *Eatabilities*, and the trick is to join streak to Eatability before it vanishes.

Hunger thinks

**When I see a dot and feel like joining to it,  
the streak I see is MY hunger jumping!**

When Eatability vanishes into hunger, Hunger is happy.

Hunger croaks.  
Hunger sees.  
Hunger hears.  
Hunger jumps.  
Hunger enjoys.

Soon Hunger finds there are other Hungers. **Clearly the flashes I see, that look exactly like my hunger when it jumps, and the occasional sounds which sound like my sounds, but are not my sounds, must be other centers of hunger! There must be US-es.**

But when another streak reaches for the same dot, Hunger is not happy. If the streak joins the dot, Hunger feels a sharp edge toward it. Hunger may touch this other's streak and feel this sensation that is not like eating. So, sometimes Hunger doesn't like knowing that there are these other Hungers hanging around.

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Frogs come in many colors, or more simply, as you would say, "mentalities?"

Among the other frogs, there is one we can name Ara.

Ara feels deeply, with keen awareness, the pain of unsatisfied hunger,  
the happiness of satisfied hunger  
the confusion of touching another streak.  
the need to understand

**What do feelings mean?**

Ara needs to see these feelings, to express them: **This is my feeling.  
This is what I am . . .**

Ara invents song. Ara evokes through song a personal sense of hunger and satisfaction, and even a larger sense of hunger and satisfaction by alluding to, and finally incorporating the songs of other Hungers.

Ara also invents dance: patterns of streaks in yellow, flickering and weaving, either as solo or with other streaks.

I will describe the time that Ara developed dance from taste. Ara reflected, **There are other Hungers, Other Hungers! See their streaks! What does all this mean? I am Hunger! Who are these Hungers? Why do I feel these ways? . . .** and so on.

**I will try to express it, to explore it, till it makes sense to me**

**I can share this with other Hungers. They must feel. We must share what we feel. Feeling is what we are!**

So,

Ara touches another Hunger.  
Streak to streak,  
but now holding touching tasting

Ara likes that word; *taste*. The sensation is not like eating but much, much more—something else. As if hunger is larger than ever. As if hunger has two centers. No, rather, as if Hunger can taste the taste of two-centered becoming single-centered.

The feeling	Ara begins to dance.
This is how the dance begins:	
Another hunger jumps	streak appears.
Ara's streak curls around the other streak.	
streaks sway	
streak slow	almost invisible
then fast	shooting across yellow
touch again	
taste	
disappear	yet taste remains!
croak	the other croaks
streak	and curling streak

This *rhythm* how can it be described?

Other Hungers join.

All these Hungers, streak and dance, croak, and sing, invite others to come, to come and join all of this. Ara evokes the whole range of feelings. All of this: hunger of lightness, hunger of sharpness, hunger of satisfaction, hunger of softness. Ara desires to heighten these, to see how sensation fills the entire expanse of Hunger.

This gives Ara *Self*.

Then there is Otto. His desire is to know what *really* is true. **What is fundamental? Surely not volatile feelings.** Otto feels there must be something firm, permanent—a foundation, a structure, on which to build understanding. Otto has an intrinsic mistrust of art—dance and song—as being anything more fundamental than simply heightened emotion.

**What is the structure of our world?** Otto starts with the demonstrable relation that hunger, which is the sense of *I-ness* or *Hunger-ness* is made out of Eatabilities. **It is clear that Yellow is not the same as I, for I cannot find a way of moving my sensation to another part of the yellow. Yet if I look carefully at the properties of Eatability, I am sure that I will begin to fully understand everything. My own sensation is localized and not seeable, but it is clear that I am made out of hunger and hunger is made out of Eatabilities, for Eatabilities disappear into my hunger. Eatability is therefore equal to hunger, but in the *free state*. Satisfaction then, as we know it, is an accumulative process. It is cumulated, or *bound* Eatabilities.**

He learns to make careful observations with his tongue and to *measure*. He learns to touch a dot without joining it—that is, to isolate the act of streak-jumping-to-dot from the complex whole process of eating. When most frogs catch an Eatability they never pay any attention to how “far” their tongue goes because this is always in a completed act of eating. But Otto, by beginning to just touch with his tongue, discovers *depth*.

**If a dot is too small, I cannot jump to it. On the other hand, if a dot is large, I do not have to jump as far.**

Far!

So yellow has this property that is space, and what may be called distance. Otto discovers *space*, *distance*, and *depth*, and that Eatabilities are somewhere in this space.

Yellow and Eatabilities are obviously a reality independent of Hunger, and this becomes a major cannon of what is now known as physics:

*There is a reality independent of Hunger.*

Eatabilities are matter. Matter appears out of yellow and exists as long as there is motion.

Otto concludes:

**matter is motion.**

This is a fundamental statement of matter. Some Ottos begin to believe that Eatability is *activated* yellow, so that yellow which is not activated has one form and when activated becomes edible.

The laws of matter are found to characterize the structure of the *universe* and even lead to the discovery that time is reversible.

First, the spatial universe:

Dots appear in motion against different portions of yellow which has no reference except to a center, being hunger. Now, as happens, when more than one dot, more than one Eatability appear they are clearly in relative motion to each other and to the absolute center of hunger. This is sufficient for Otto to deduce a spherical geometry to the universe.

**The center clearly cannot be just my individual hunger but basically the population of Hungers which I can hear and whose tongues I can share.**

The objective world is therefore determined by comparing the radial positions, the spherical geometry of dots between the centers of two or more Hungers. This becomes abstracted to the general principle of an absolute reference frame which allows a description of events.

Now, reversible time:

There is something obvious, but subtly important about a sequence of events, or about sequence itself: there is no Eatability, then there is Eatability, and if a streak does not connect with Eatability, then Eatability continues to appear, finally disappearing in its own way. There is this fundamental sequence of no appearance of Eatability, then appearance of Eatability, and then vanishing of Eatability; Eatability coming into and going out of existence. In between those events, or independent of them, there can be the streaking of hunger.

Otto concludes: **So Eatability itself can be described as a sequence of not being there, then there, then not there, and this fundamental sequence can go either way. If we realize this sequence defines time, then time is reversible.**

Otto also perceives that streaking, while faster than Eatability, appears and disappears by the same law of Sequence. That is, although every lay-frog knows that a streak does not look like an Eatability, Otto realizes it is not clear that if Eatability couldn't move very fast that it would not appear as a streak of hunger reaching out. **So, more fundamental than the sensation of hunger or the reaching out of hunger is this law of Sequence, a law that holds for both Eatability and hunger.**

He tells this to a friend: Wait, says his friend, **If my hunger streaks and joins an Eatability, I feel different than when I started. If I miss the dot, I don't feel smaller. So time is not reversible as you think it is. In one case I feel different than in the other.** Otto replies, **That's sensation. I don't yet know what hunger is, but I do know that it has the same structure as Eatability, so I'll hypothesize that sensation is somehow the reaction to this interaction. Clearly the sequence of nothing, then appearance, then nothing, is fundamental. My response to you is that your point is something to be understood secondarily to that.**

Recently, questions of sequence and matter led to a new experimental effort—to reaching out (measuring) right after an Eatability has disappeared by slowing down. The experimental result was to touch other structures in the yellow that could not be perceived! In fact, this finding is both reproducible and repeatable.

This *hidden structure* seems to give rise sometimes to the spontaneous occurrence of an Eatability, which simply appears to *bud* out from this hidden structure as motion. This hidden state is called *potential matter*. The hot topic in physics becomes the relation of hidden variables to space and to potential and active matter. Some Ottos still consider this potential stuff as a kind of field which, where it is dense enough, gives rise to Eatabilities on a probabilistic basis.

And so the questions and research continue.

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We had to get to this concept of hidden structure because there have always been some frogs—*crazy frogs*—who claim that they have always seen this hidden structure. The crazy frogs see everything with *our eyes*—not quite, but close enough so they see reeds

**There are fine, thin yellow lines in the yellow**

They see the hidden structure, understand the sense of depth, but have never been able to articulate it.

Knowing that others cannot see this way, they are at a loss.

Or else croak of hidden things.  
**Ah, yes, there is much to see beyond what you think can be.**

Their world is full of forms and animated ghosts.  
Their name is simply

Seer.

Seeing when a bug is about to fly off of a reed,

Seer predicts:

**There will be Eatabilities.**

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What is more fundamental than eating and satisfaction?

Everything pales if there is unsatisfied hunger

and sometimes,

sometimes, every once in a while,

the dots do not appear.

do not appear

do not appear

And at such times, hunger gets bigger and bigger—no, harder and harder.

Action must be taken!

Hunger turns to Seer. Hunger turns to Otto. Hunger turns,

and turns

and turns

in desperation

The physicist proposes *shaking* the yellow to transform potential into Eatabilities. Otto tells Hunger abstract conditions which Hunger does not understand.

Seer simply

croaks.

What is Hunger to think?

Hunger laments: **Could it be that Eatabilities are being held by some, some Other-Hunger-Self? Can Eatabilities only come to me at OTHER'S bidding? Am I forever at the bidding of OTHER?**

How do I reach OTHER—to tell OTHER to let Eatabilities go!

Hunger turns to rituals of beckoning, of invocation to OTHER—*The Bestower of Eatabilities*. Song and dance become offerings.

Finally

Seer says **they will be here soon.**

The physicist does not confirm this.

The Eatabilities return.

Now Hunger dances again—calling this *thanking*

Thanking is dance totally encompassing, and feeling deeply, all the elements of Hunger, Eatability, and OTHER—the sum of everything there is in Hunger's realm.

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One frog, sitting on the side, has been watching all of this. The frog's name is Shrima.

There is something Shri notices.

No one, the dancer  
the physicist  
the seer

has deeply questioned Hunger itself;

That is, deeply questioned Hunger's knowing; that Hunger knows,

That is, deeply questioned Knowing,

That is, deeply questioned the core that is the awareness, or attention, of sensation and structure, of self and world.

This frog sits on the side,

and watches this silly question:

**Why worlds?**

This question appears to Shrima as **something out there also.**

This is not a question to ask and analyze. It is a question to watch.

**I must watch hunger and awareness itself.**

Shrima thinks:

**The physicist describes structure as more basic than sensation, and then asks other frogs to feel this truth. The dancer dances sensation and asks other frogs to know it through the expressive structure of the dance.**

All this: hunger/satisfaction  
center/yellow  
structure/feeling  
out/in  
space/time

about what do they move?

That is, do they not need to arise in pairs?

Can they hold alone?

Can one be without the other?

Their source

Their source

in quiet moments

even hunger disappears

even yellow disappears

This, our frog reflects, This I will pursue.

Am "I" Hunger?

Am "I" Center?

So start this.

I will watch my hunger.

How does it come and go?

On what does it rest?

Shrima finds the need to become absolutely honest.

Shri notes: **Honest habits, both outer (e.g. streaking) and inner (e.g. sensation) must be practiced: for these outer and inner activities are the very locus of self—and I must watch, not be desirous or expectant. Hunger must become honest, or it will fool itself into being grand, or important, or sensitive, or not sensitive and hence be its own mask.**

Shrima finds that *posture* is very important. **I must hold streak and hunger in balance and comfortable poise, for then they become aligned and do not distract, pulling my watching into their very activity.**

Now, Shrima, honest and in quiet posture begins to find *watching* is like a lens—to bring attention to one object of attention.

But attention wanders, and Shri must again and again bring it back. Shri notes: **Now quiet in habit and pose, I seek also the quiet pose of attention. I may watch a dot, or yellow without dots, or quietly repeat "croooooooooak"; or attend to the "center" that seems me. Return, and return again, until one object can be held quietly in complete attention—expanding to fill the whole seeing itself. When this attention can be held for some time, this is concentration.**

Shri finds perception becomes exceedingly subtle. Shri can bring "mind" to match the motion of matter. Shri then perceives another "world." The hidden variables pop out.

Shri realizes perception of this entire world rests on minds' own reference of/in motion.

The hidden variables become not an externality, but as Shri calls it

**a variable of awareness attending stillness.**

Movement, matter, is seen to emerge from awareness.

It is clear now that awareness somehow creates the world and in the same logic, the world is independent of self-centered awareness.

The world can no longer be spoken of as dualistic. It is somehow a qualified, or reduced-dualistic, or participatory world. Shri begins to perceive directly Hungers all around. In surprise, Shri sees that they are what you would call "green."

Shri perceives (although you may not use that word) other Hungers' sensations. That is, their sensations are felt as tangibly as Shrima's own. Once, Shrima suddenly felt *dance*, and then, a small green Hunger danced streak joyfully. Or again, once felt another frog's pain of hunger, feeling as if a streak was feverishly lashing out to yellow.

Can I dare to call mind and the object of *mind's* attention separate?

Shri writes:

Attention gives way to "meditation." By this is meant: as honesty becomes flow and unattended; as poise becomes flow, and unattended, so does attention transmove beyond awareness of self-hunger and of Eatabilities, and becomes subtle.

Attention becomes flowing in meditation unattended, and knowingly then flows before my seeing. Beyond this, every description is silence, for then there is no separation, no space, no time, even seeing becomes self-less. The centerless Center from which all emerges is joined, yet can not be call joined. For name and form are but "illusion" born as creation. Manifestation being reborn, then also does speech become full and point to, yet hide *that which is*.

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The world is all yellow

There are only dots

and croaks

and hunger. . .

It is a beautiful day.

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1 Sinclair, Sandra (1985). *HOW ANIMALS SEE: Other Visions of Our World*. New York, Oxford: Facts On File Publications p 74

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