

The DAO of VFX ANIMATION

Animating with Energy Patterns

Jeremy Griffith, Senior VFX Artist at Riot Games





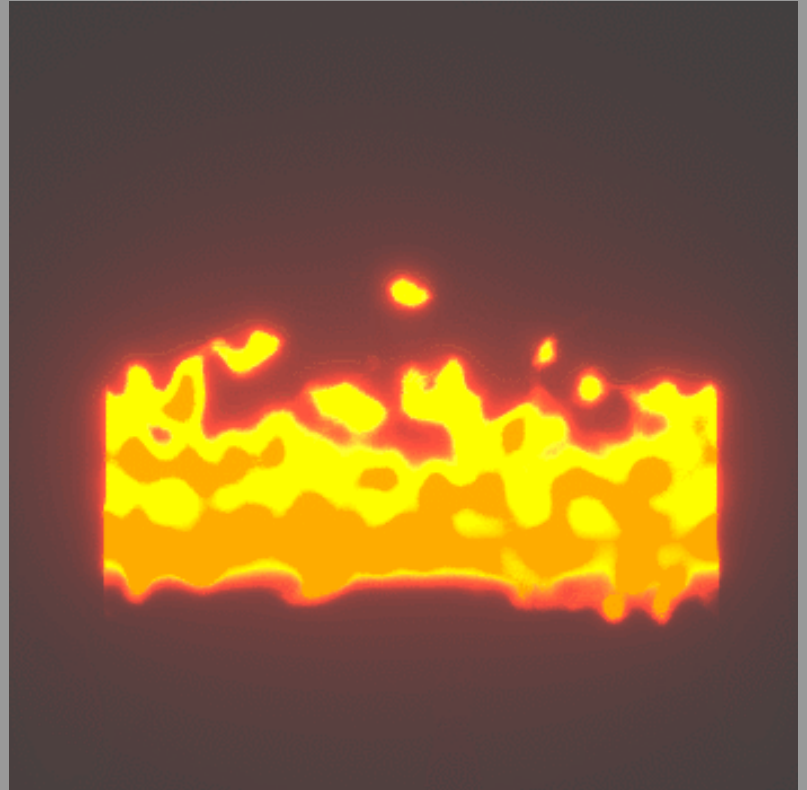
REALISM?

REALISM? or **BELIEVABILITY?**

DETAIL? or **ENERGY?**









Daoism



The background of the text is composed of three vertical panels. The left panel shows a close-up of a zebra's coat with dark and light stripes. The middle panel shows a close-up of water ripples on a surface. The right panel shows a close-up of dry, cracked earth with a network of fissures.

**THERE ARE DEEP RELATIONSHIPS
BETWEEN THINGS.**





Daoism

Daoism and world **ART HISTORY**

Daoism and its effect on **VFX**

This Talk

- Problem statement: realism vs. believability, detail vs. energy

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- Trace this problem through examples in art history, esp. Chinese inkwash

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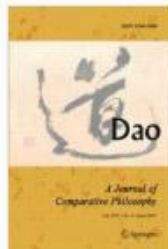
- Problem statement: realism vs. believability, detail vs. energy
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- Consider the mindset that would privilege energy over detail

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This Talk

- Problem statement: realism vs. believability, detail vs. energy
- Trace this problem through examples in art history, esp. Chinese inkwash
- Consider the mindset that would privilege energy over detail
- Trace that mindset to Daoism
- Put this mindset to work in VFX shaders

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From Leaky Pots to Spillover-Goblets: Plato and Zhuangzi on the Responsiveness of Knowledge

[Authors](#)[Authors and affiliations](#)Jeremy Griffith [Article](#)

First Online: 31 March 2017

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Abstract

This essay examines the question of whether language, knowledge, and truth are possible in a world of relativism and flux, developing along a line of comparison between the *Cratylus* and



DISCLAIMER:

I do not speak Mandarin



Tension of **detail** vs **energy**
even in still art.

1. Detail without Energy





2. Energy without Detail



(VIDEO)



Ma Yuan's *Water Album*
Or *A Study on the Properties of Water*:

寒塘清淺

王中興
楊柳山主筆

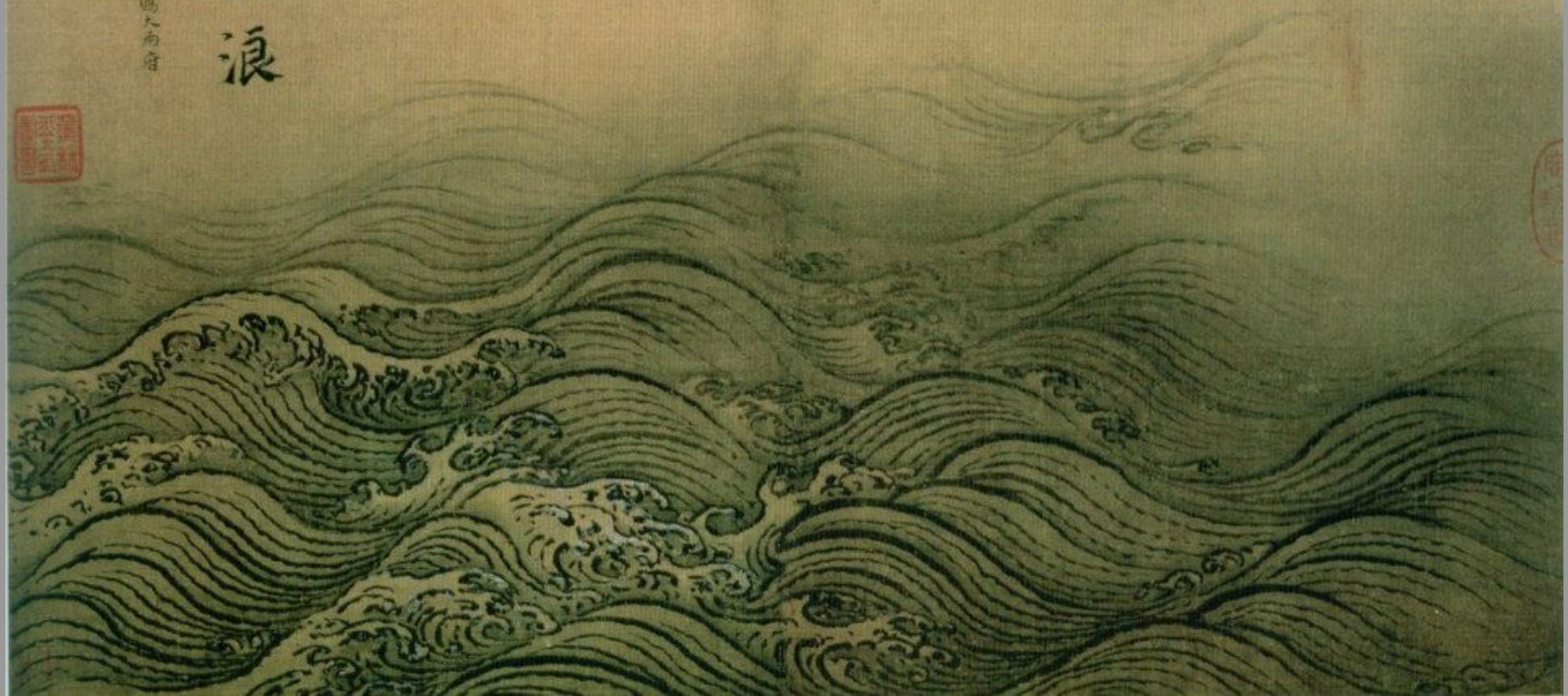
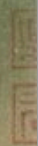
賜大兩府



層波疊浪



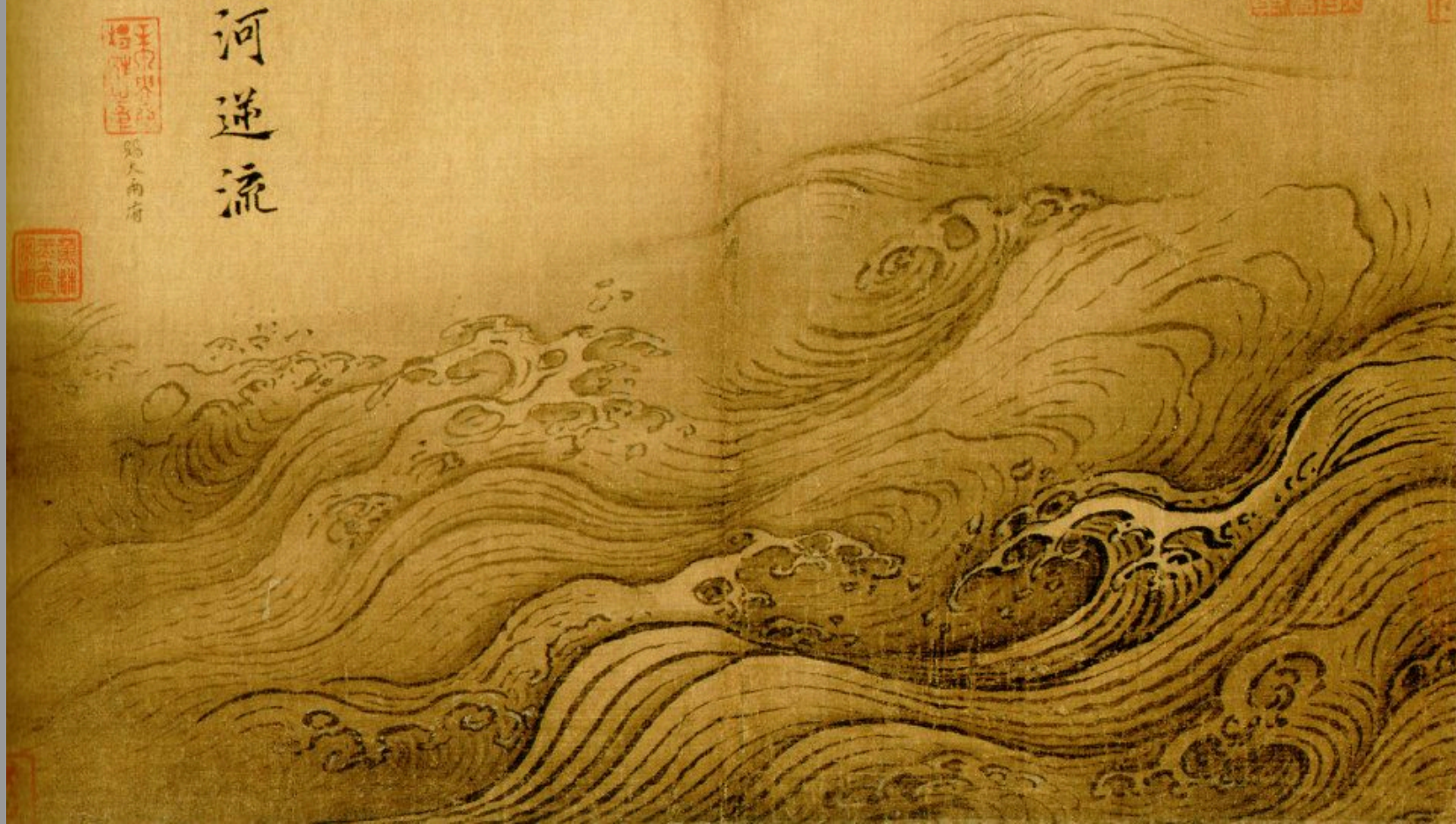
馬大角印



黄河逆流



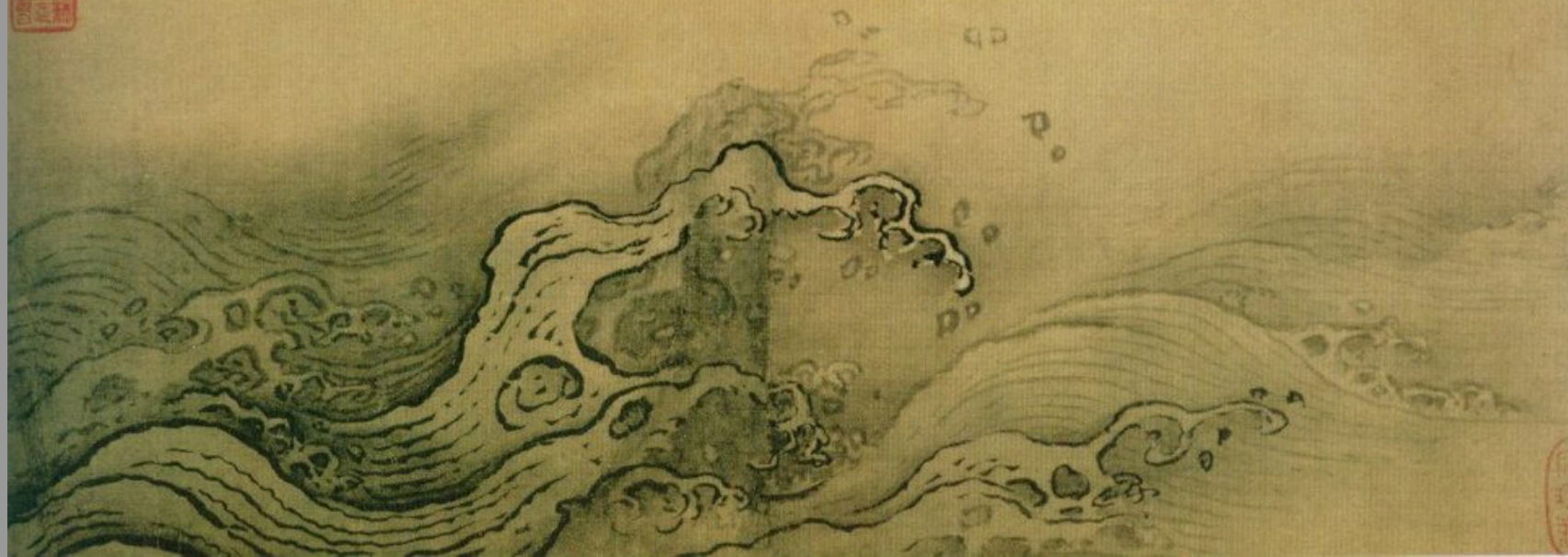
王公與
賜大南府



雲舒浪卷



王中興印





Why do I find these depictions of water
so successful --

despite such **simplicity**?





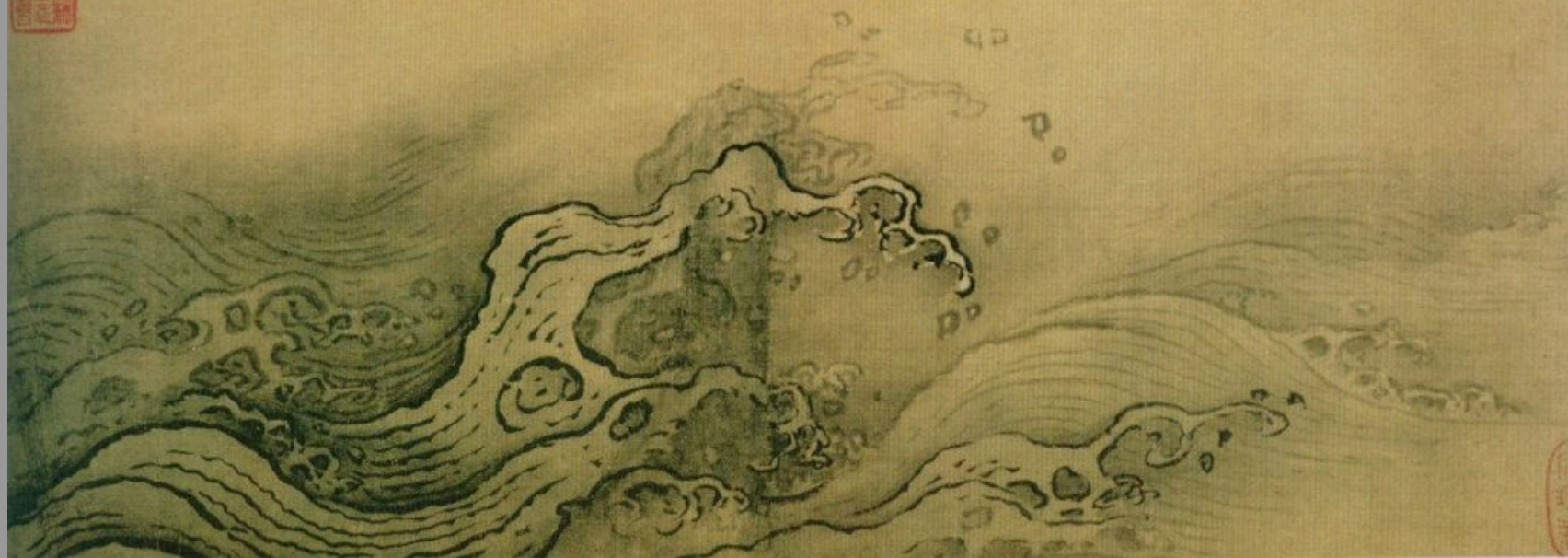




雲舒浪卷



王中興
楊維山
卷



DRAWING with **ENERGY**



SURFACE DETAIL

VS

UNDERLYING ENERGY



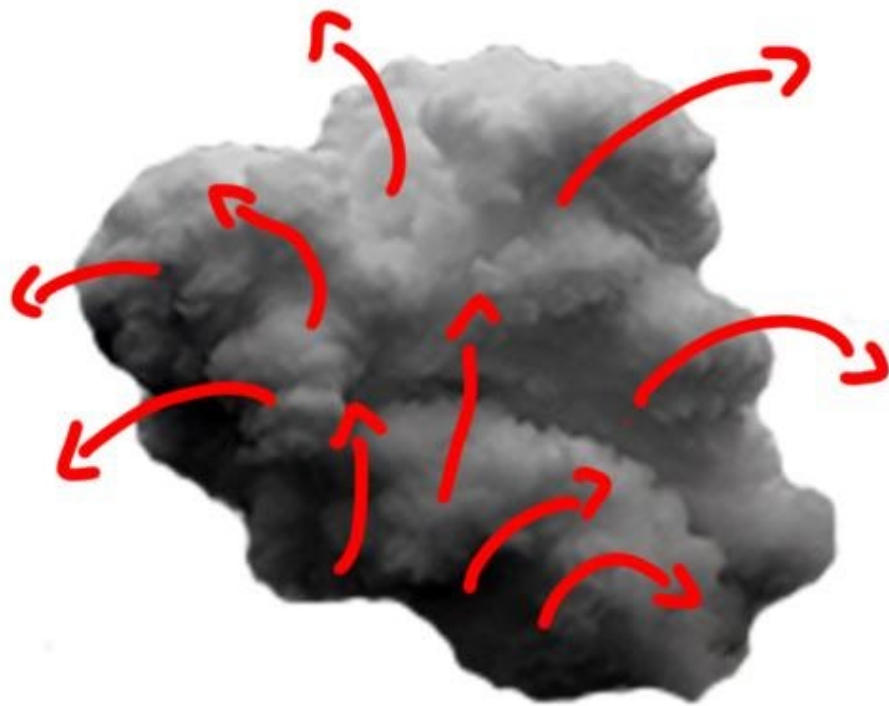
Motion makes this infinitely harder.



ERRONEOUS detail
is *worse* than LACK of detail

“WRONG SHAPES”













“Does it **FEEL** right?”

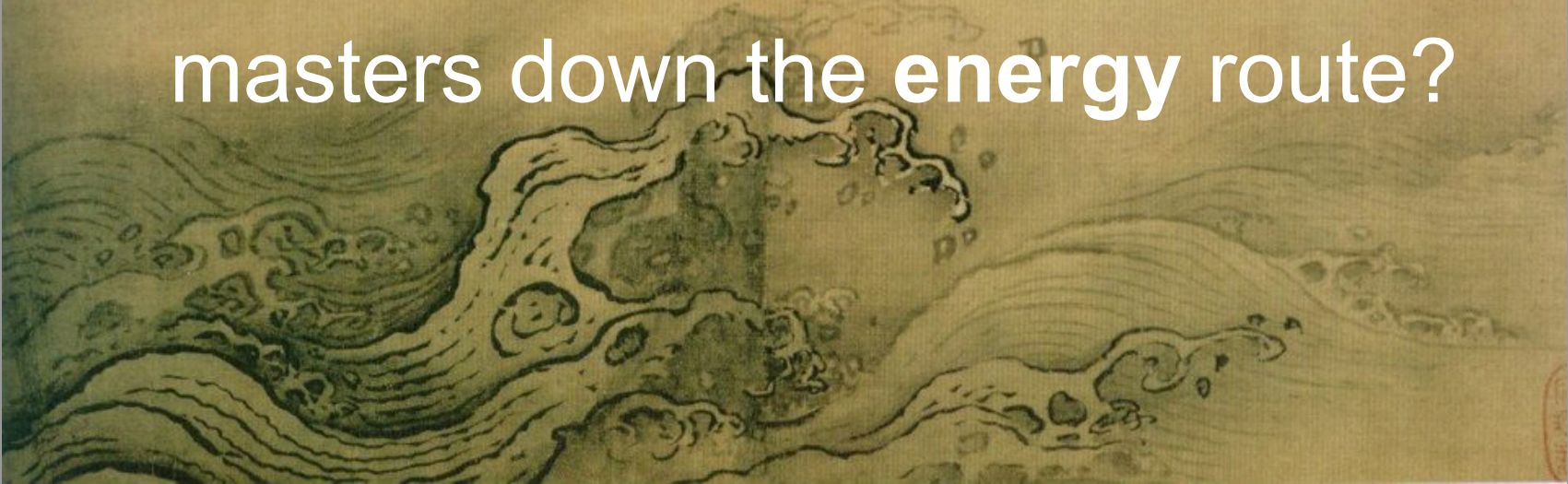
雲舒浪卷



王中興
題



What led the Chinese inkwash masters down the **energy** route?



DAOISM

- Looks to **NATURE**
- Valorizes the NATURAL, SPONTANEOUS, UNSPOILED
- **ZIRAN** 自然 -- the “self-so”

DAOISM

- Foundational concept: **DAO**
 - The *process* or **way of all things**.
 - The natural individual **way of each thing**.
 - It's own path to *ziran*.
- Assumption of ***interconnectedness***
 - “Boundlessness”
 - “Intoxicating Bottomlessness”

***Dao De Jing* Ch. 62:**

“Way-making (*dao*) is the **flowing together** of all things (*wanwu*).”







DAOISM

- Develops an MORALITY of *noninterventionism*
- “Acting without acting” -- *wuwei*
 - “Noncoercive action”
- Acting with the grain of the *dao*:
 - Not getting in the “way” of other things.

Dao De Jing Ch. 64:

“Those who would do things ruin them;

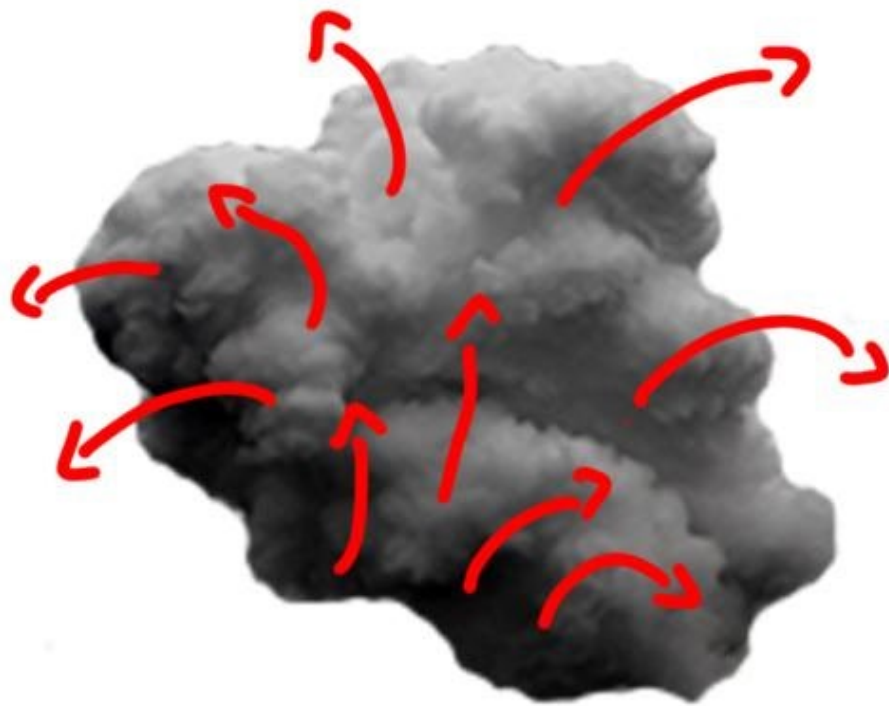
Those who would control things lose them.

Hence because the sages do things noncoercively (*wuwei*)

They do not ruin them,

And **because they do not try to control things**

They do not lose them.”



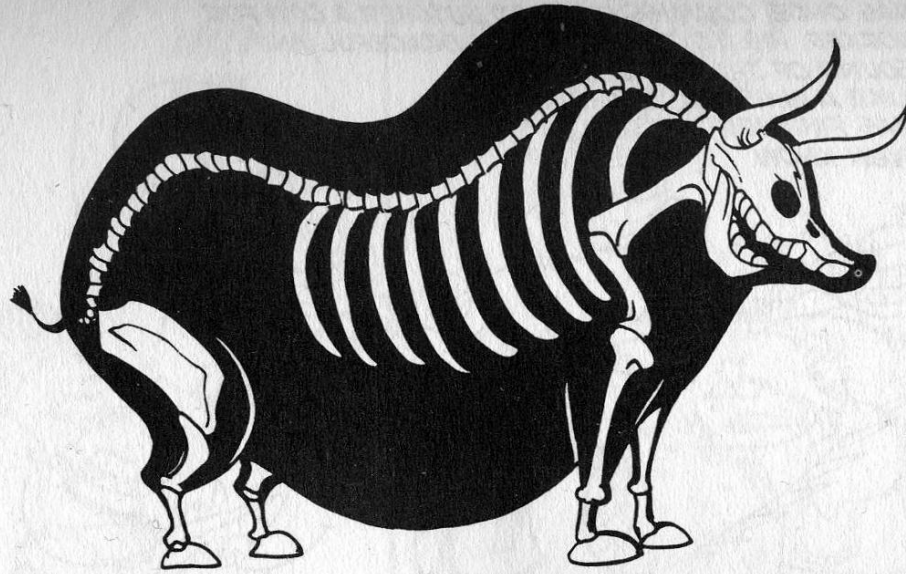


WUWEI is both moral *and* practical

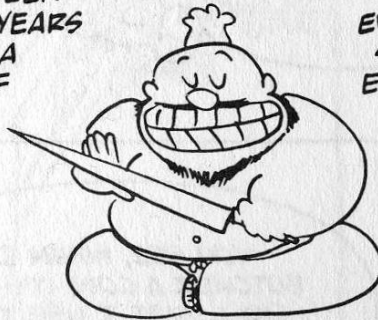
WUWEI is being able to **see** deep relationships -- and act accordingly.

Butcher parable from the *Zhuangzi*





BUT AFTER I HAD BEEN
AT IT FOR A FEW YEARS
AND BUTCHERED A
GOOD NUMBER OF
COWS, WHAT
I SAW WAS NO
LONGER THE
WHOLE COW
BUT JUST ITS
SKELETAL
STRUCTURE.



EVER SINCE THEN, I
STOPPED USING MY
EYES AND USED MY
MIND INSTEAD,
TO INTUIT
MY WAY
AROUND
THE COW.

LEARNING to **SEE** the deep relations
between things.

Internalizing the **DAO**

The **DAO** of **COW**

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DAOIST AESTHETICS

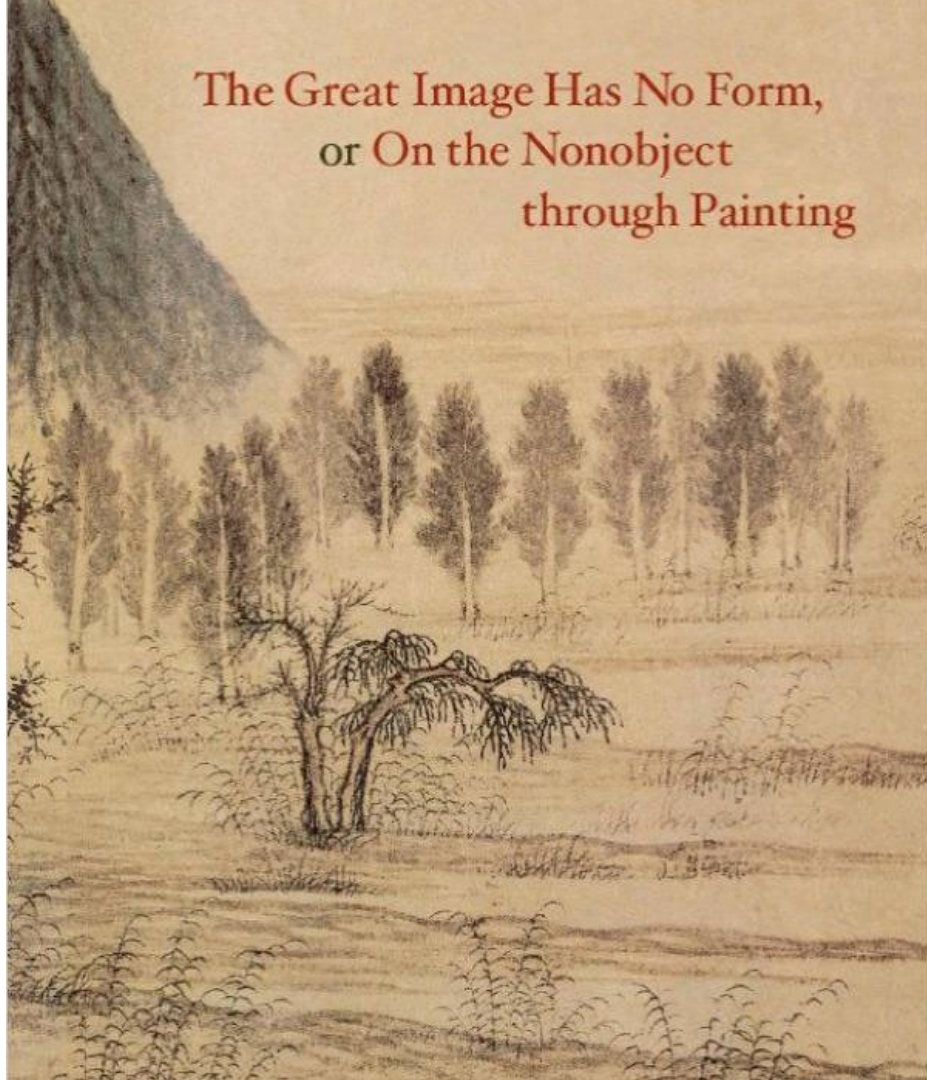




INTERNALIZE the “way” of your subject.

Capture your subject with ***WUWEI.***

The Great Image Has No Form,
or On the Nonobject
through Painting

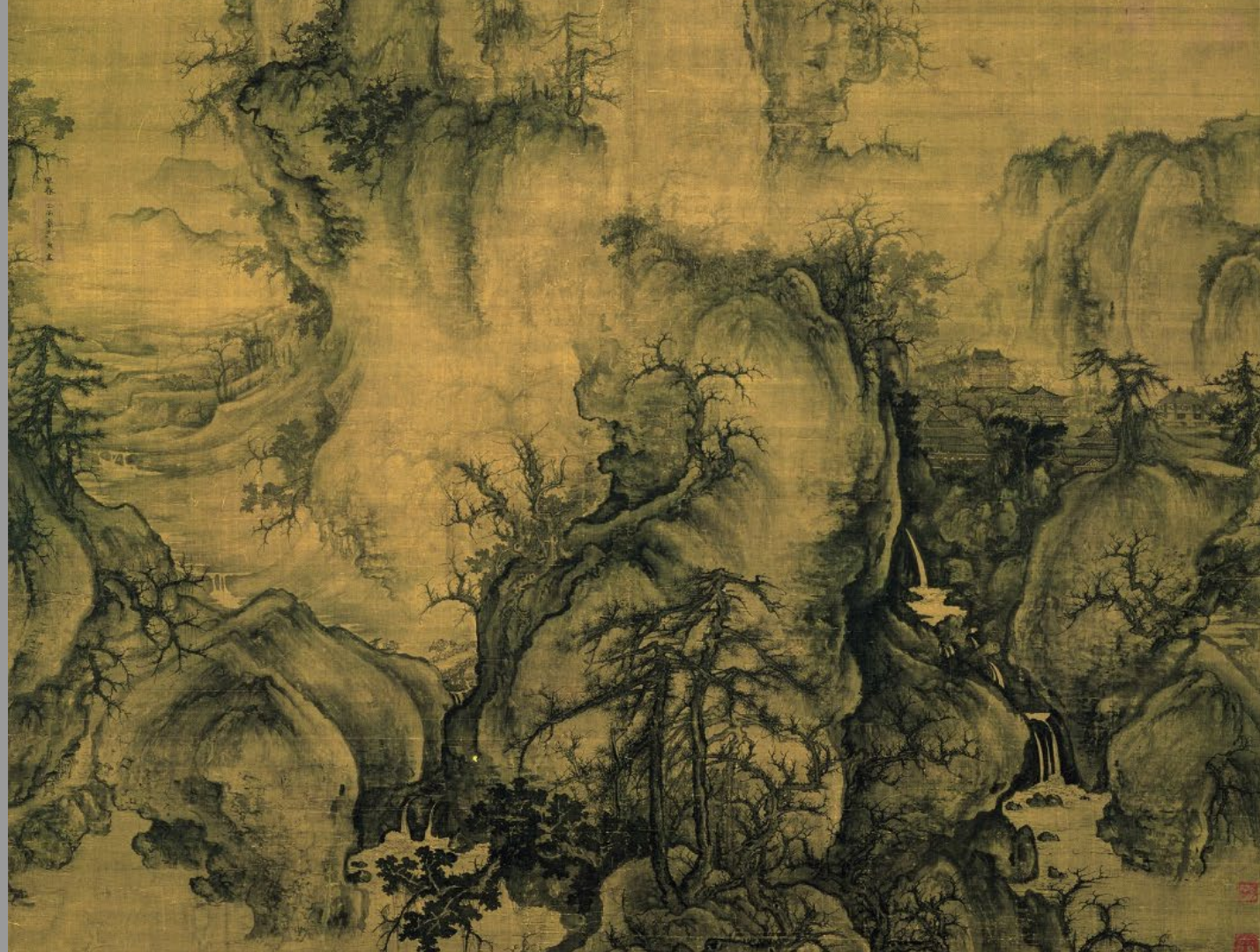


Francois Jullien:

“being used by”

VS

“represent from without”



If you create art with ***wuwei***,

Letting a subject ring true with ***ziran***,

then the ***dao*** itself can shine through.

Not getting in the “way” of your subject,

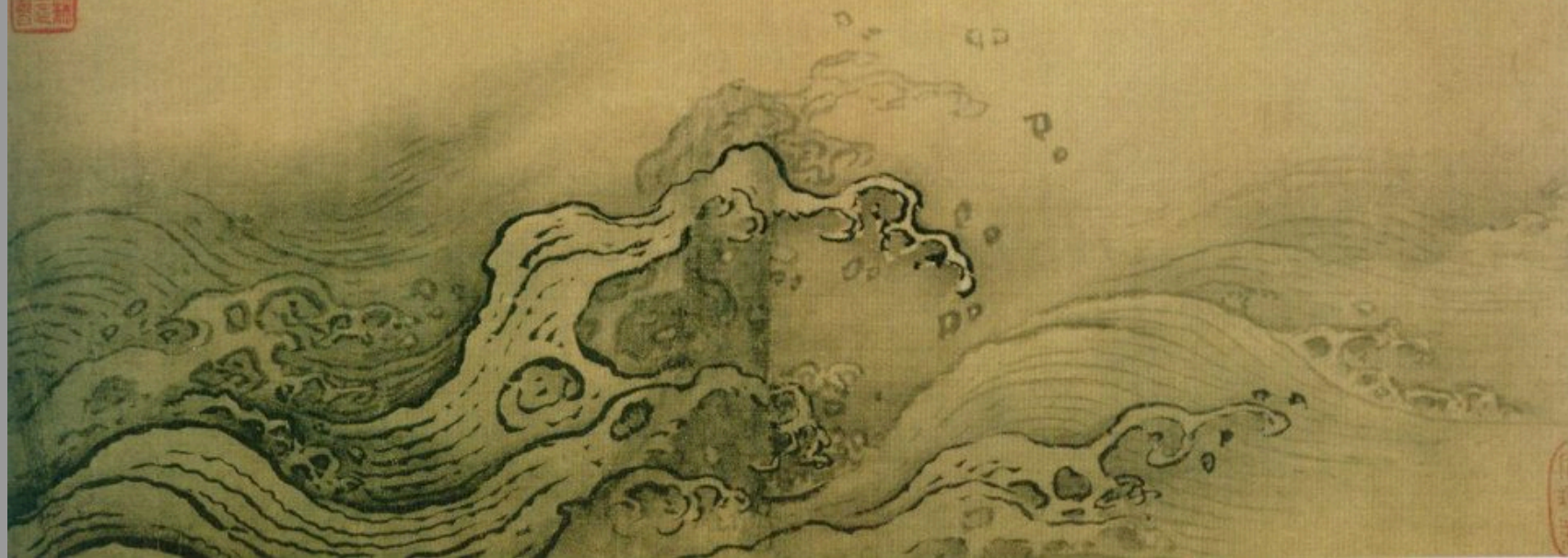
Not getting in the “way” of your subject,
Like with superfluous or erroneous detail.



雲舒浪卷



王中興印





SCHOLAR'S ROCKS

Gongshi



SCHOLAR'S ROCKS

Gongshi



先生如燕已臥癖市具衣冠拜
 高石年未六十如老人相見
 王康懶長揖

清狂道人
 泰和蕭初



FIRE SHADER



Tiled ivy





Static structures
are records of
energy flows.



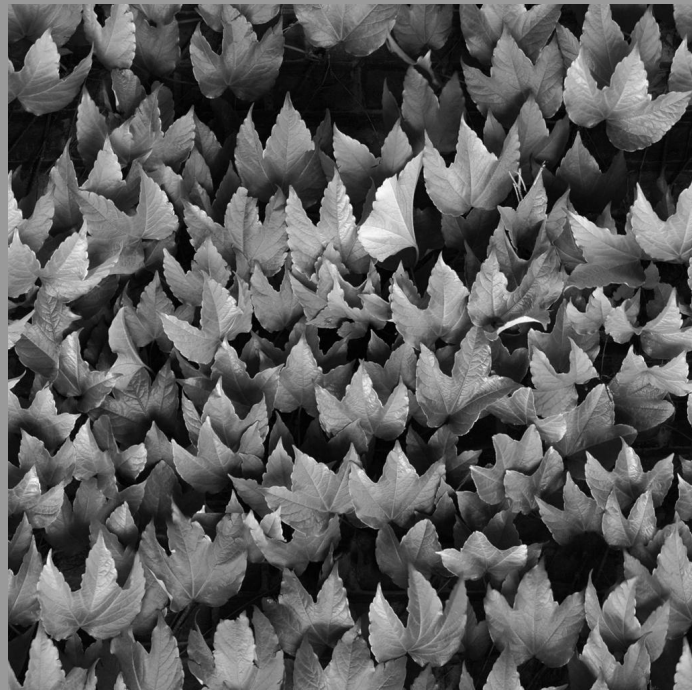




Static structures
are records of
energy flows.



Grayscale and
flipped

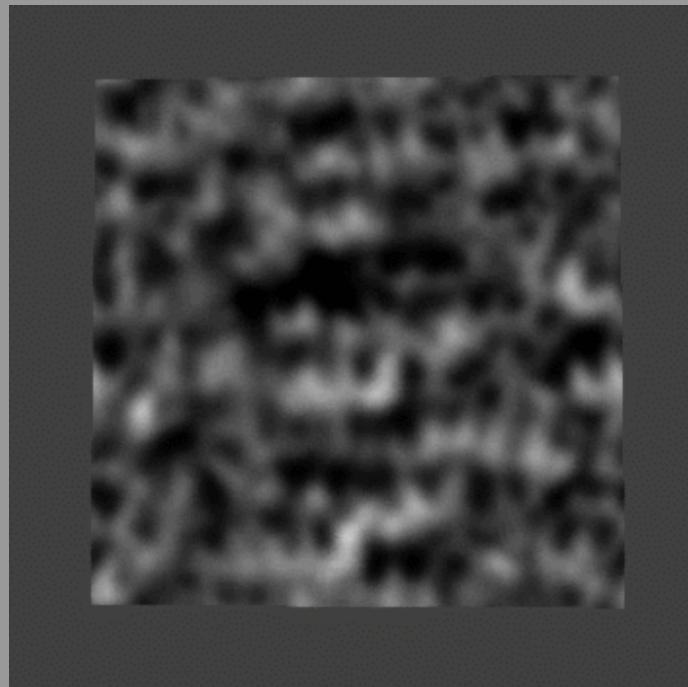




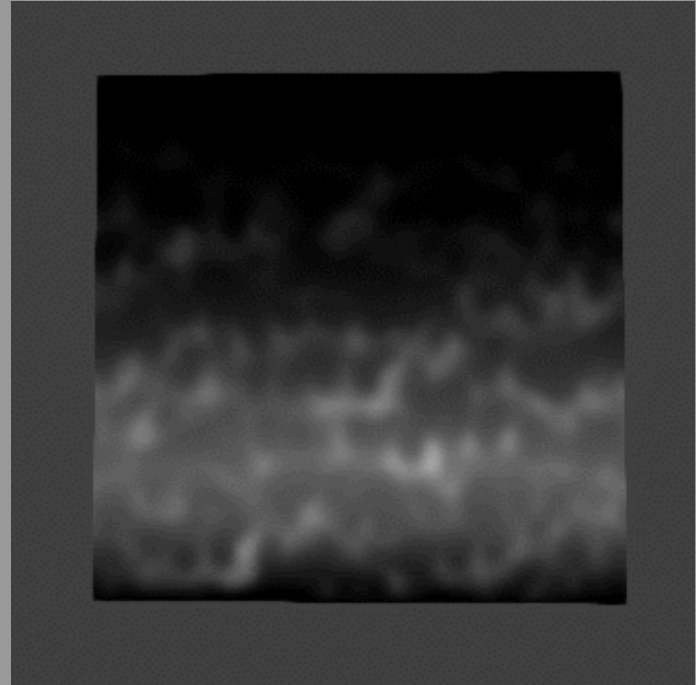
Blurred for first
approximation
“ dao of leaf ”



Add motion
and another
layer, offset



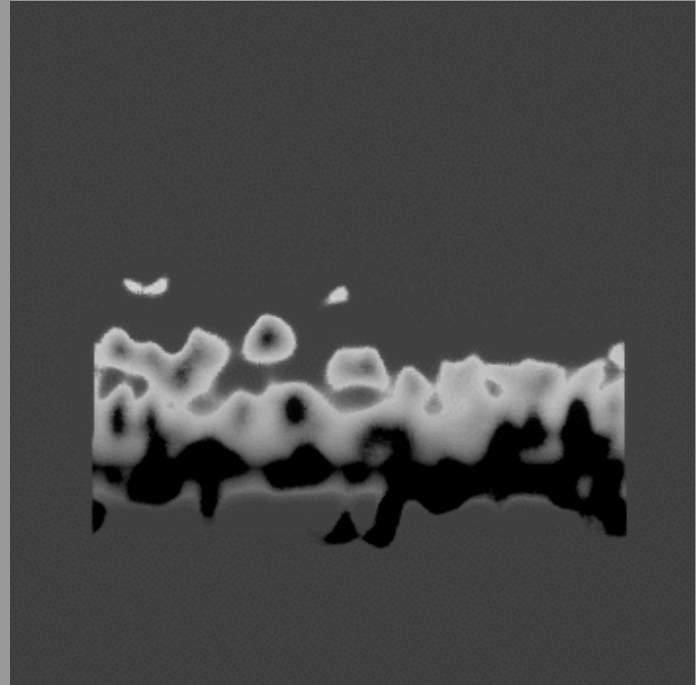
Impose “heat”
gradients --
“dao of fire”



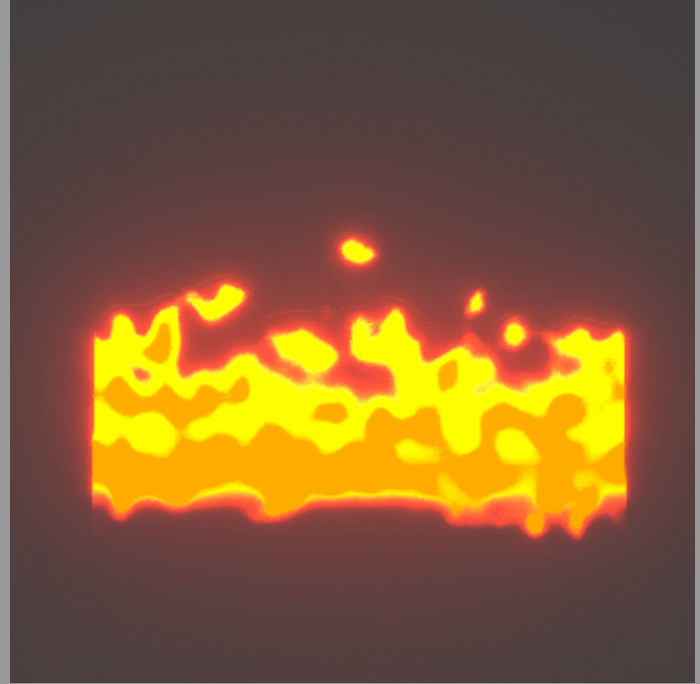
Clamp opacity
for a fiery
outline

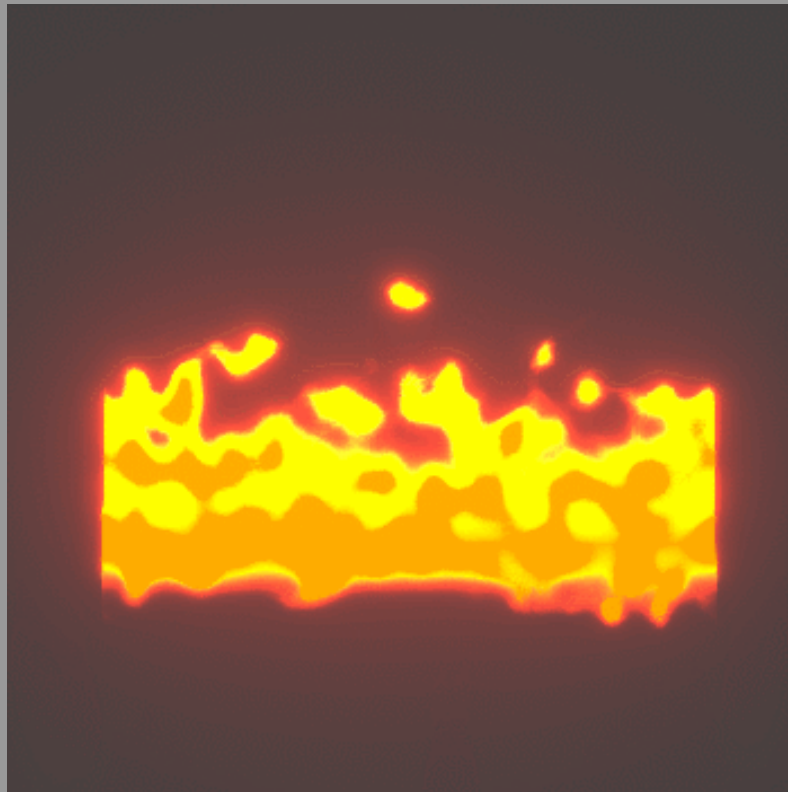


Interior color
mask using
above steps

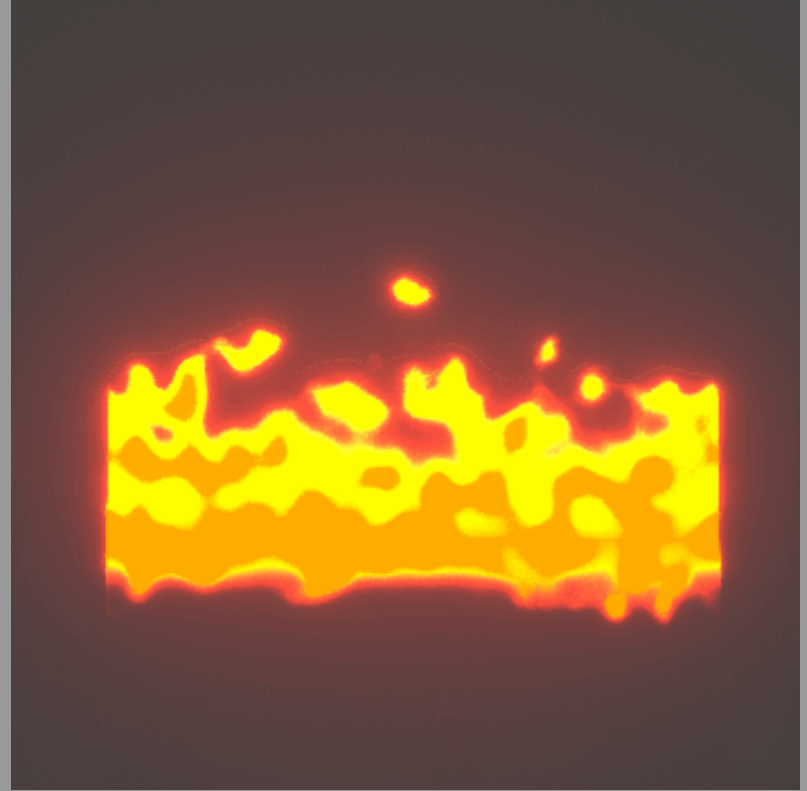
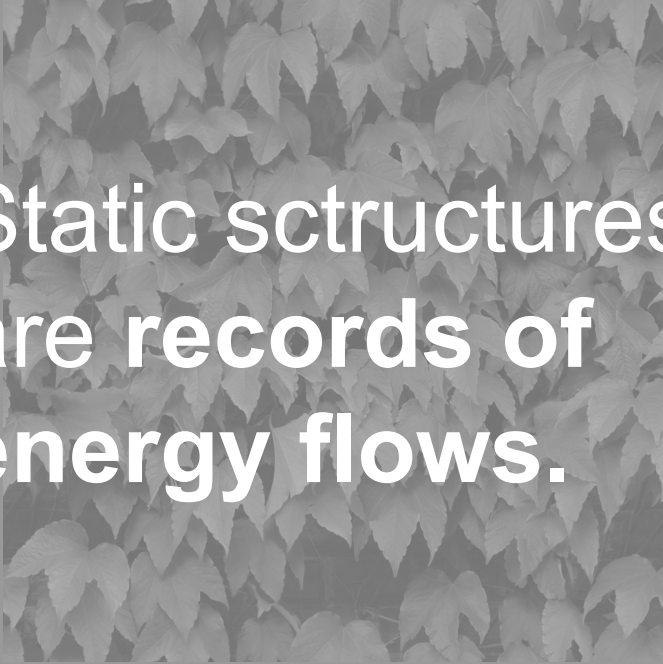


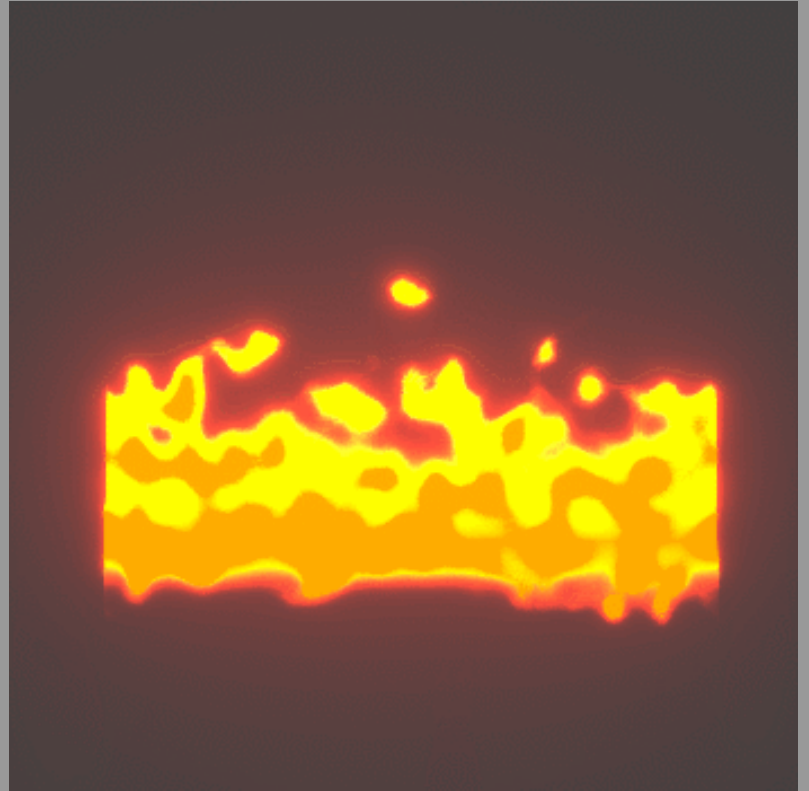
Apply color.

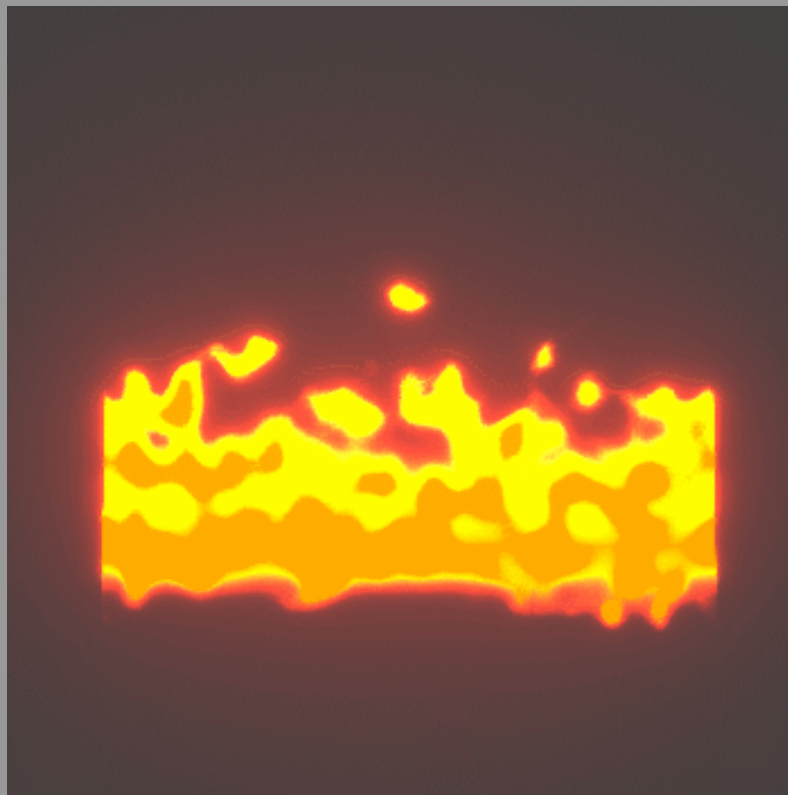
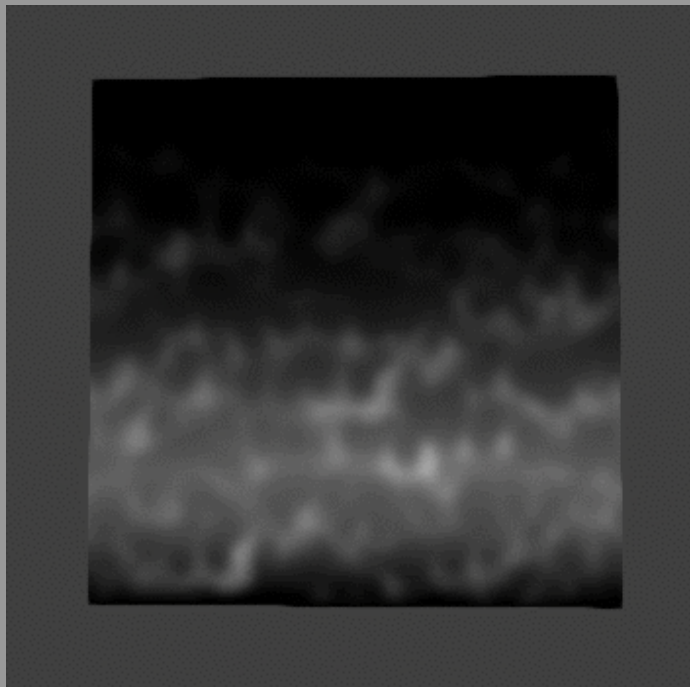


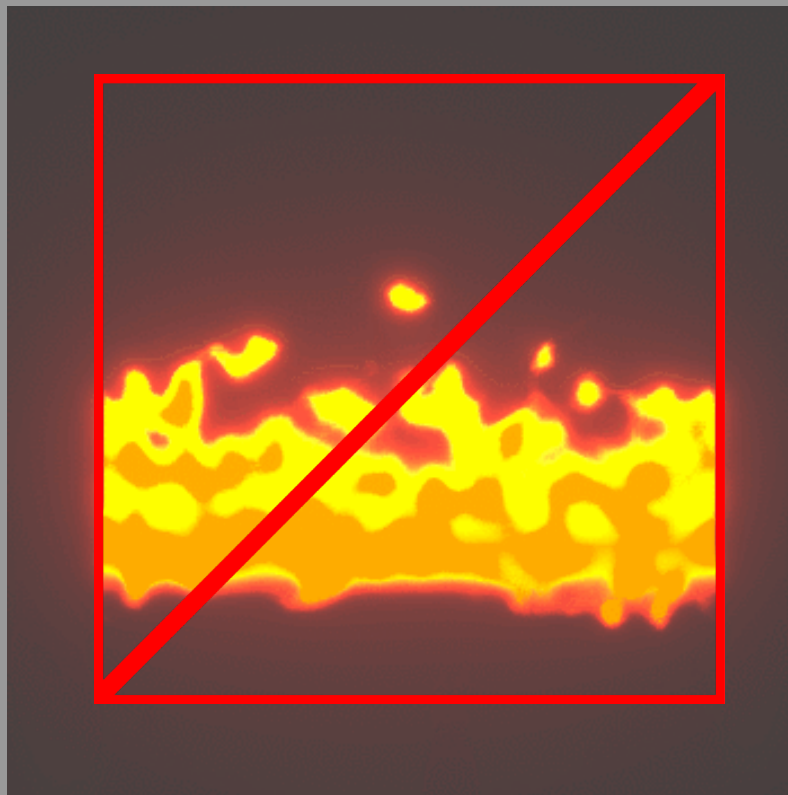
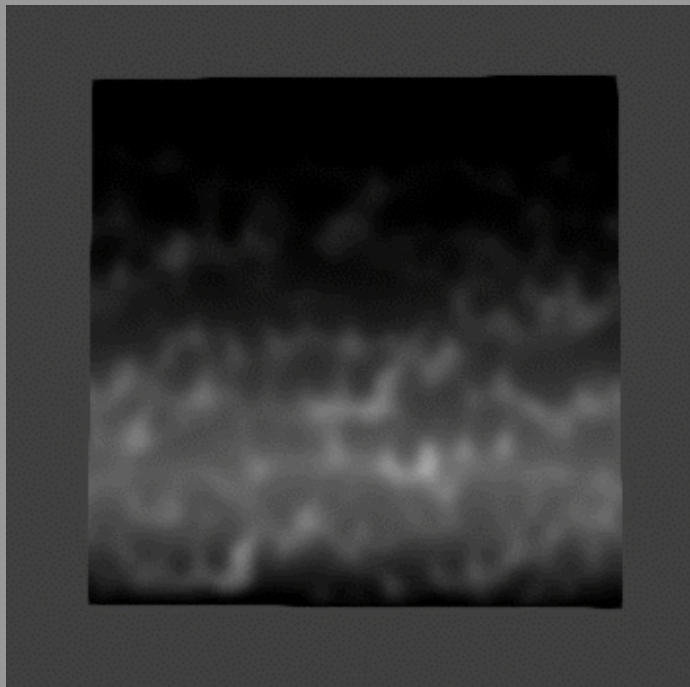


Static structures
are records of
energy flows.



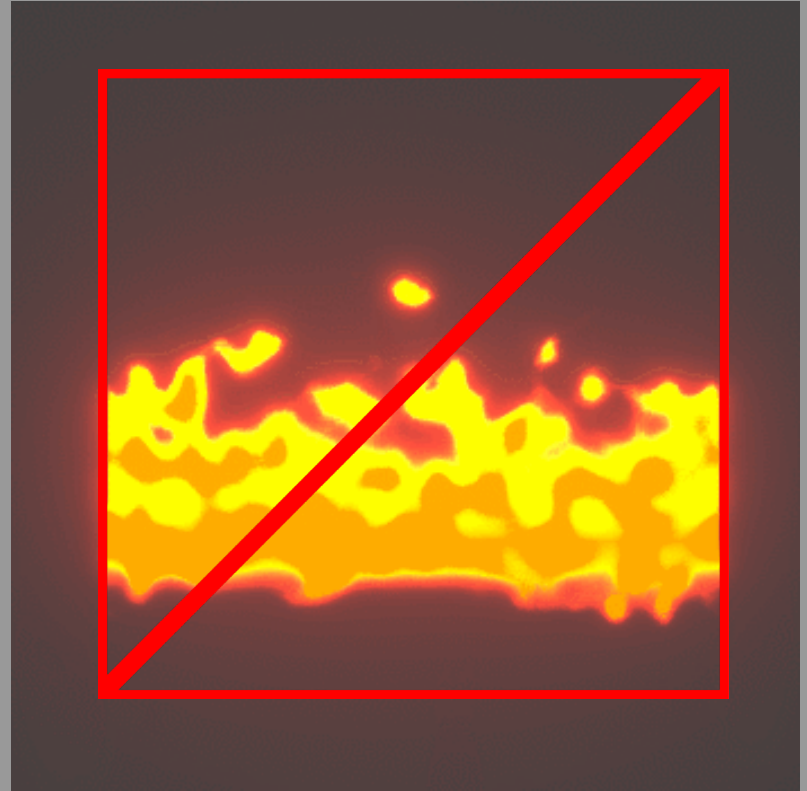






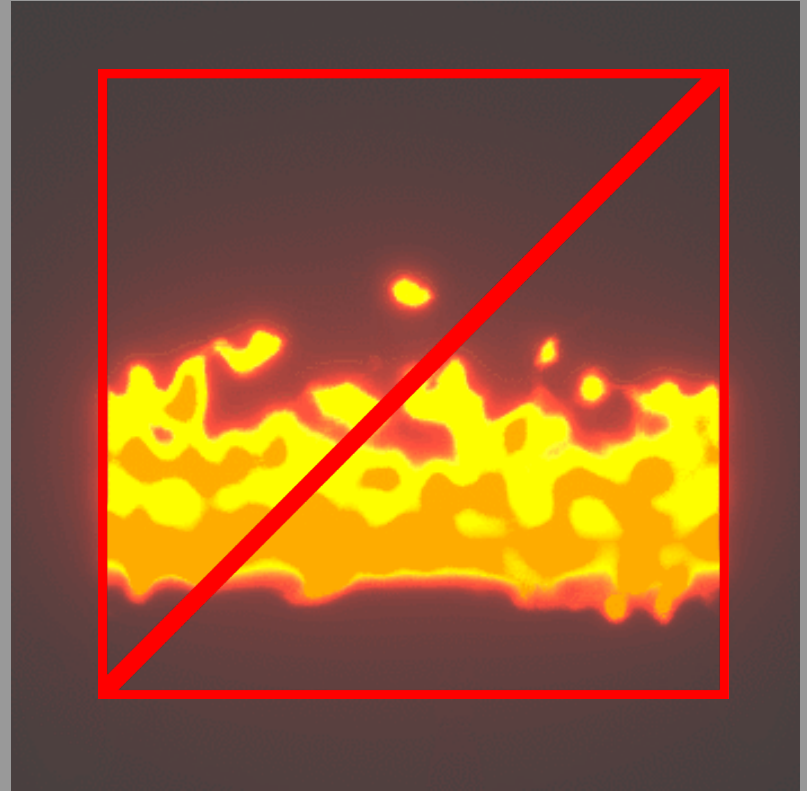


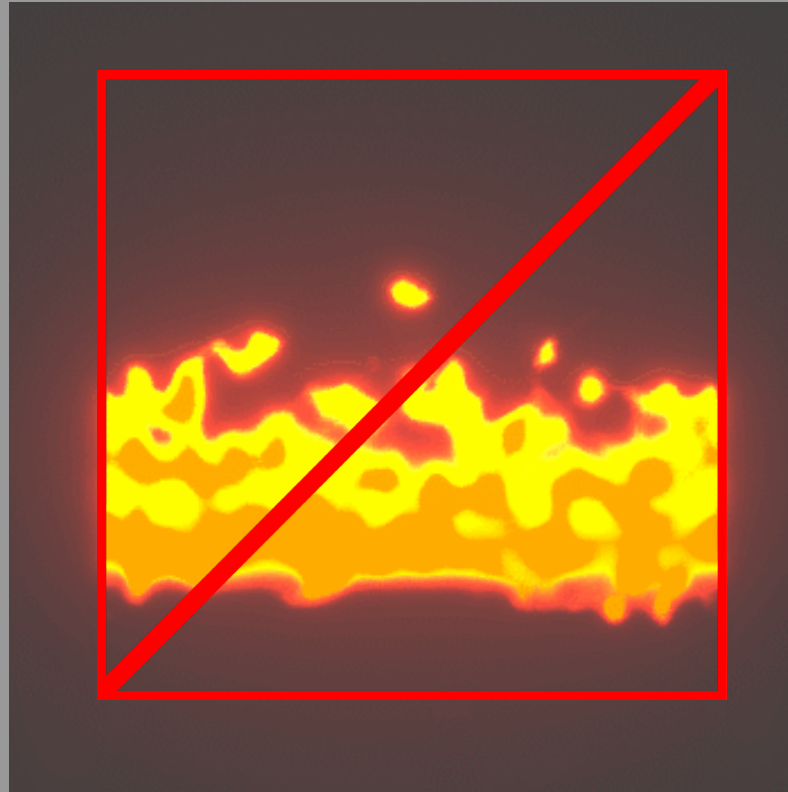
INTRA-PARTICLE MOTION

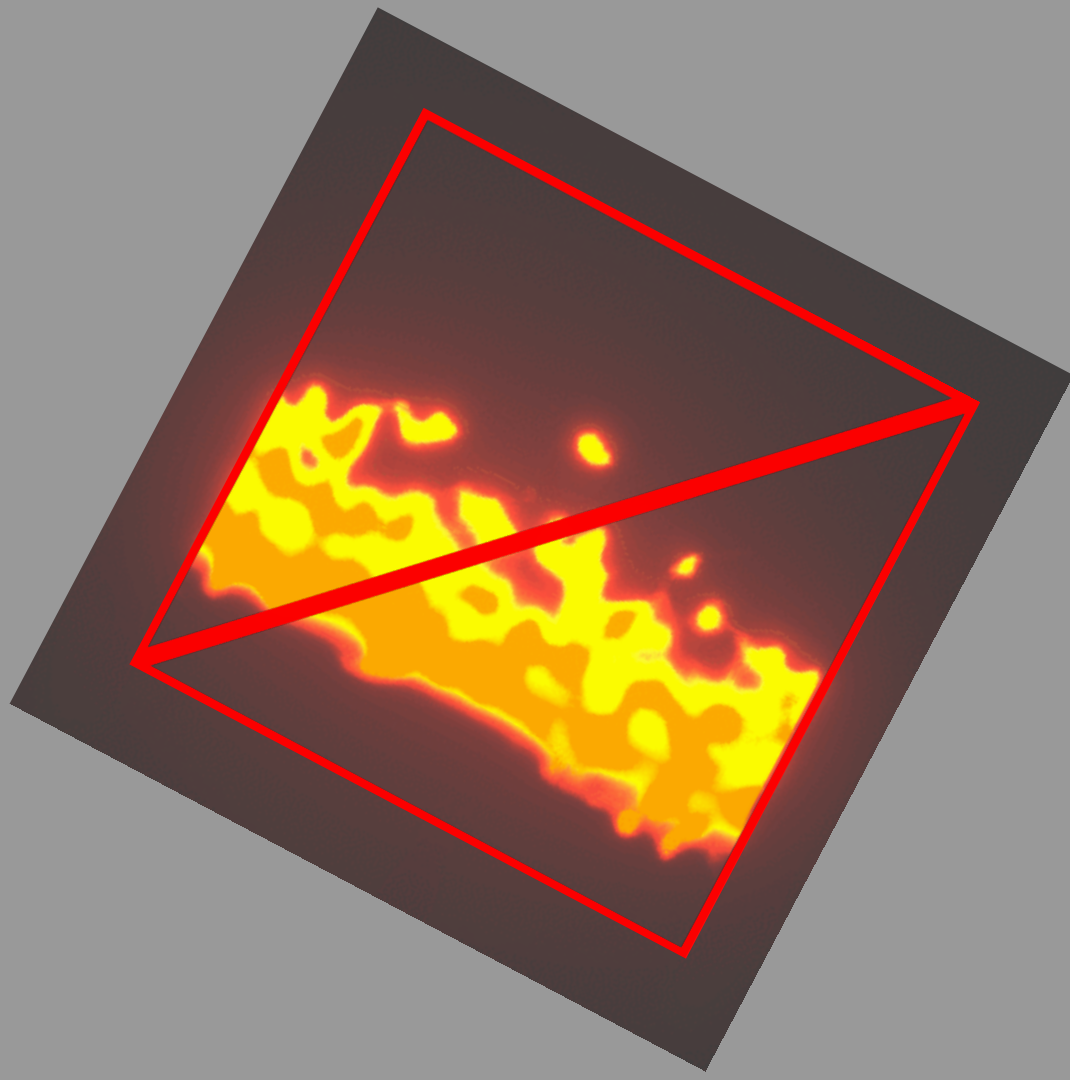


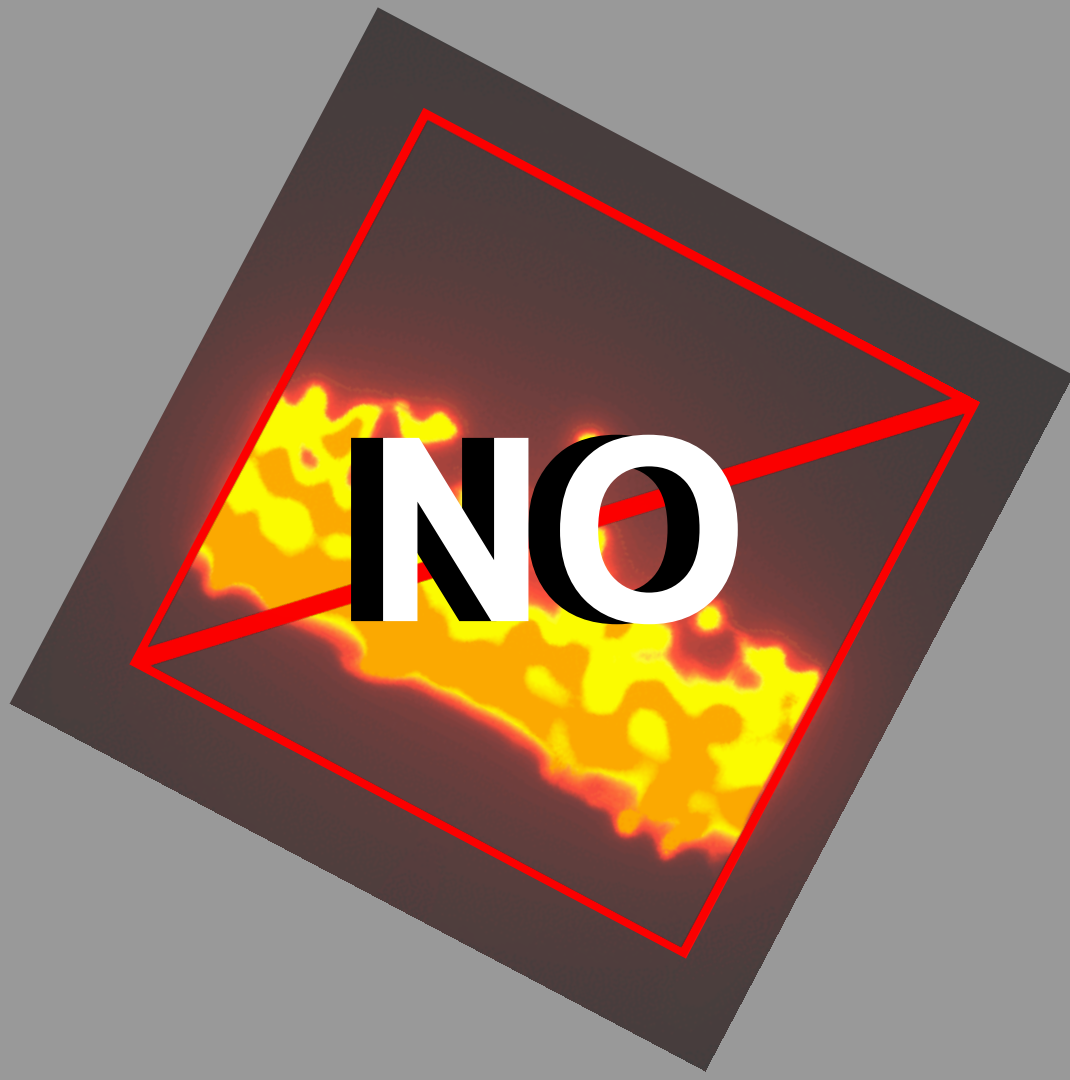


Detail in motion

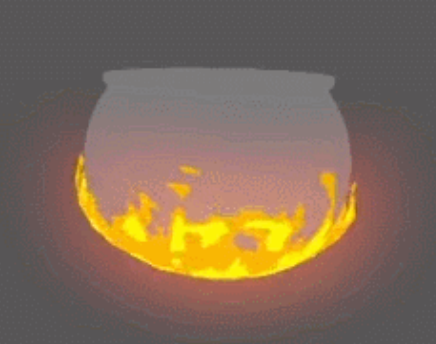
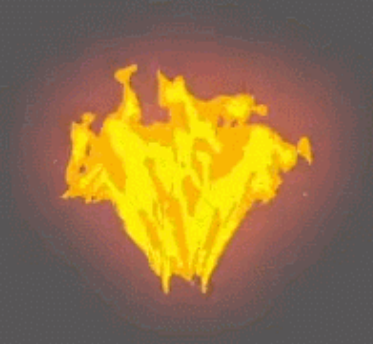






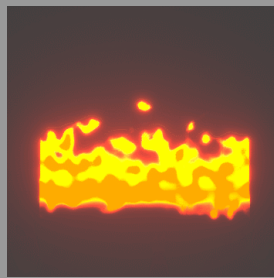
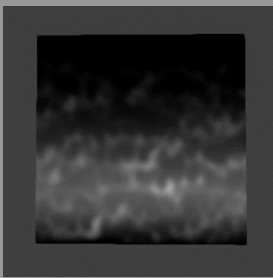
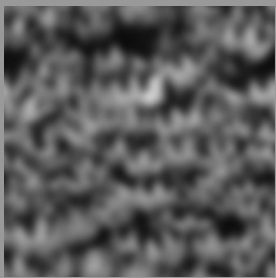


Less **sprites**, more *paths*.

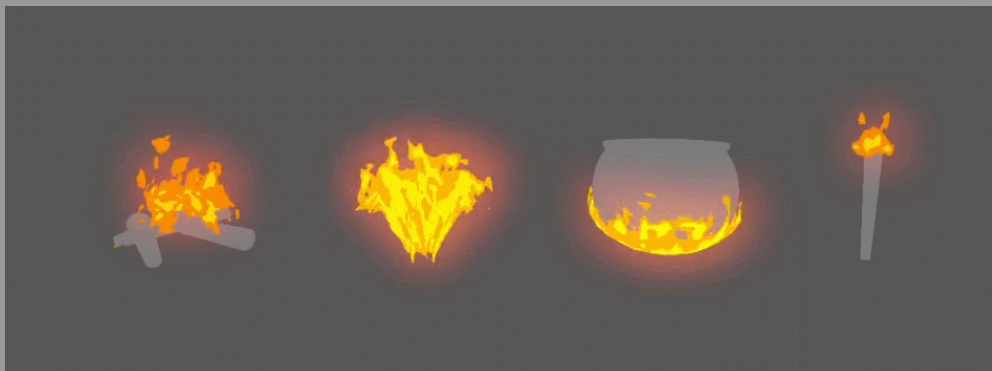


Using the more **general relationships**
implied behind the detail...

To build up **detail that works in motion.**



Unlocking the **energy** hidden behind the static detail and giving it **paths** to follow.



This doesn't work **by accident.**



This doesn't work **by accident**.

There really *are* **deep relationships**
between **disparate things**.









PATTERNS IN NATURE

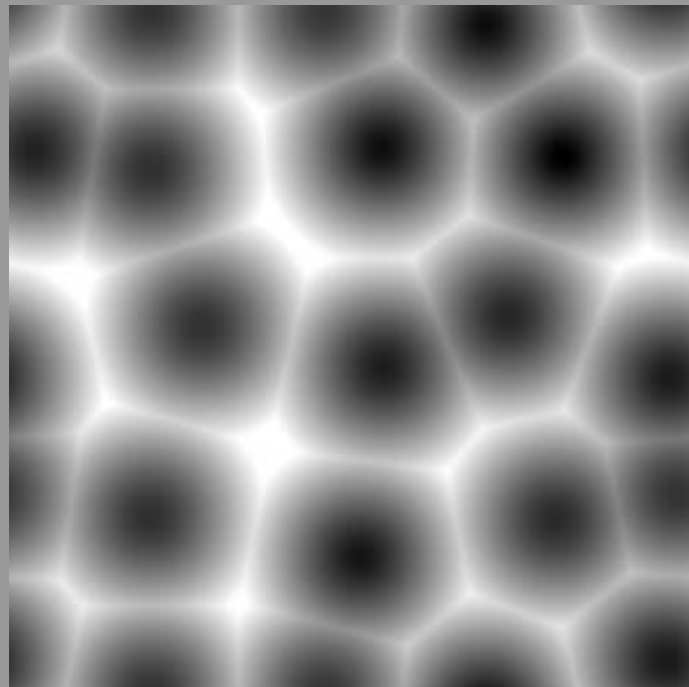
WHY THE NATURAL WORLD LOOKS THE WAY IT DOES

PHILIP BALL

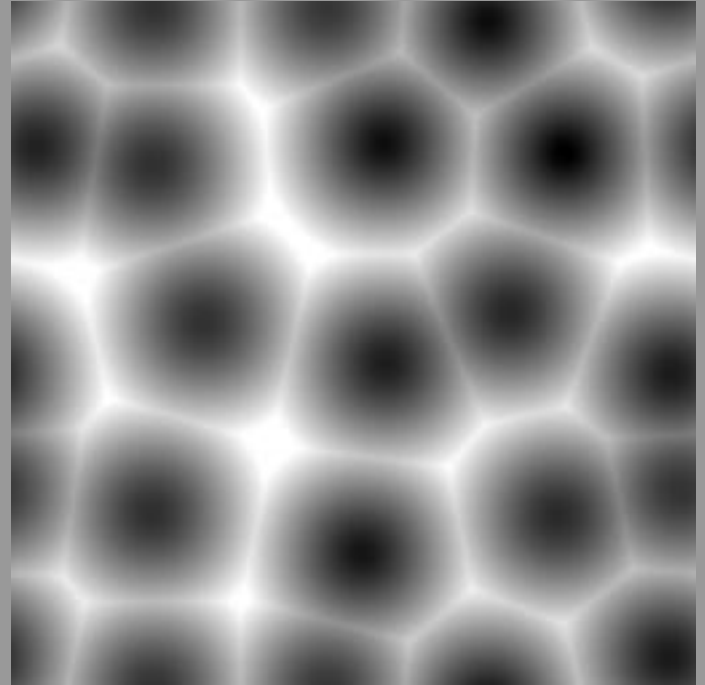


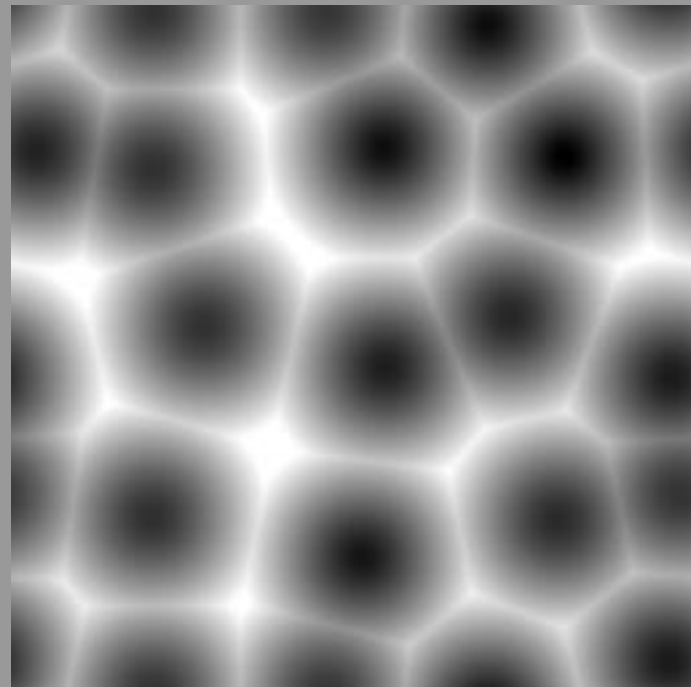
We exploit this all the time already with
noise textures!

voronoi



**tension that
gives rise to
boundaries.**



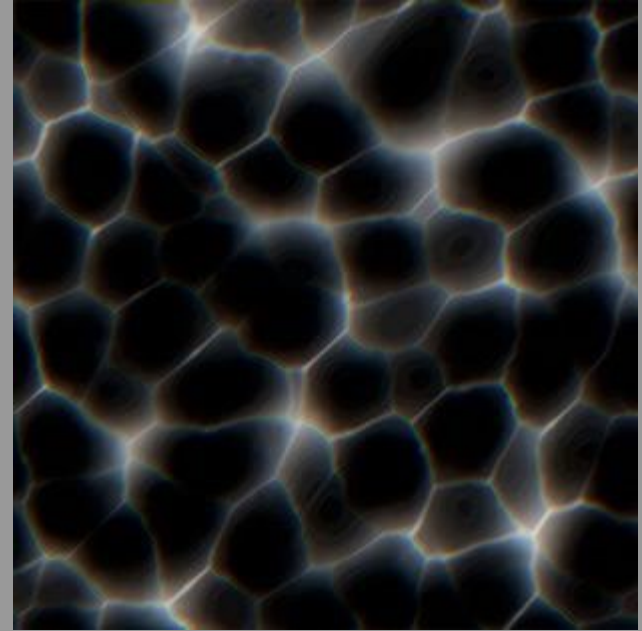




Ryan Brucks:

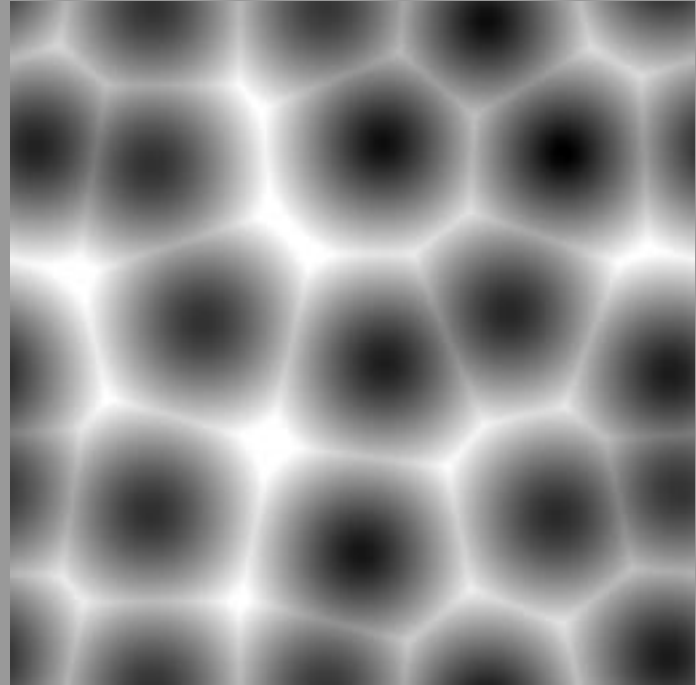


Ryan Brucks:

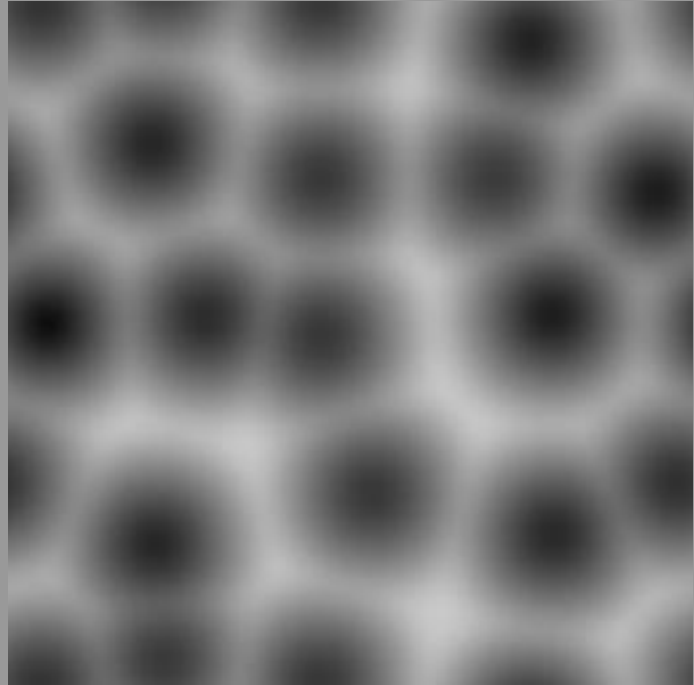


But my favorite use of **voronoi** is...

voronoi



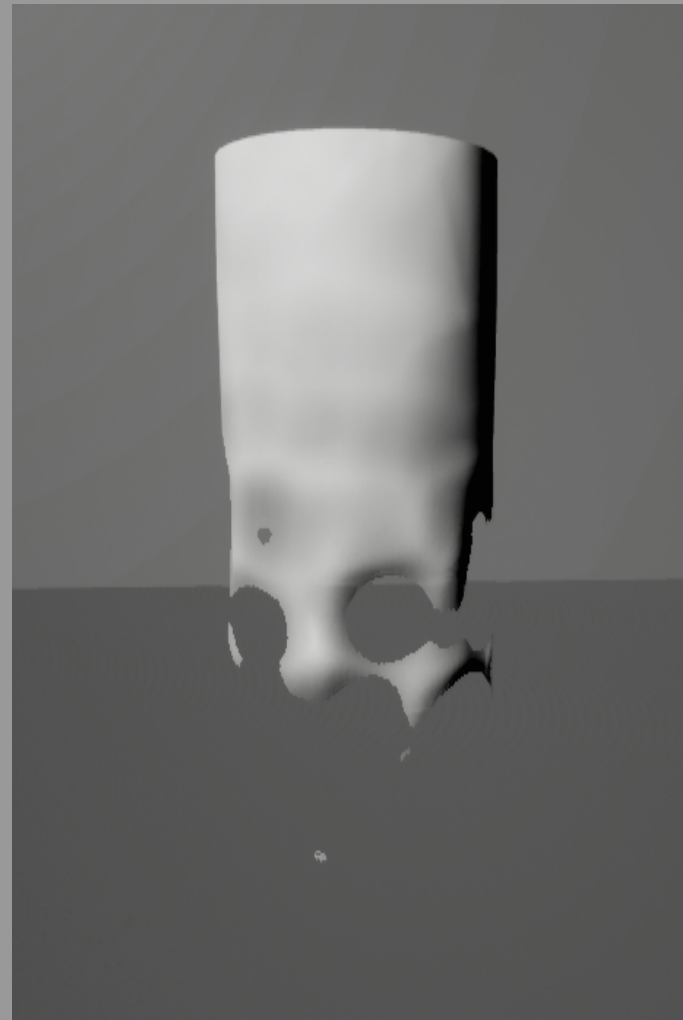
blurred



transition from
laminar to
turbulent flow



mask +
normals

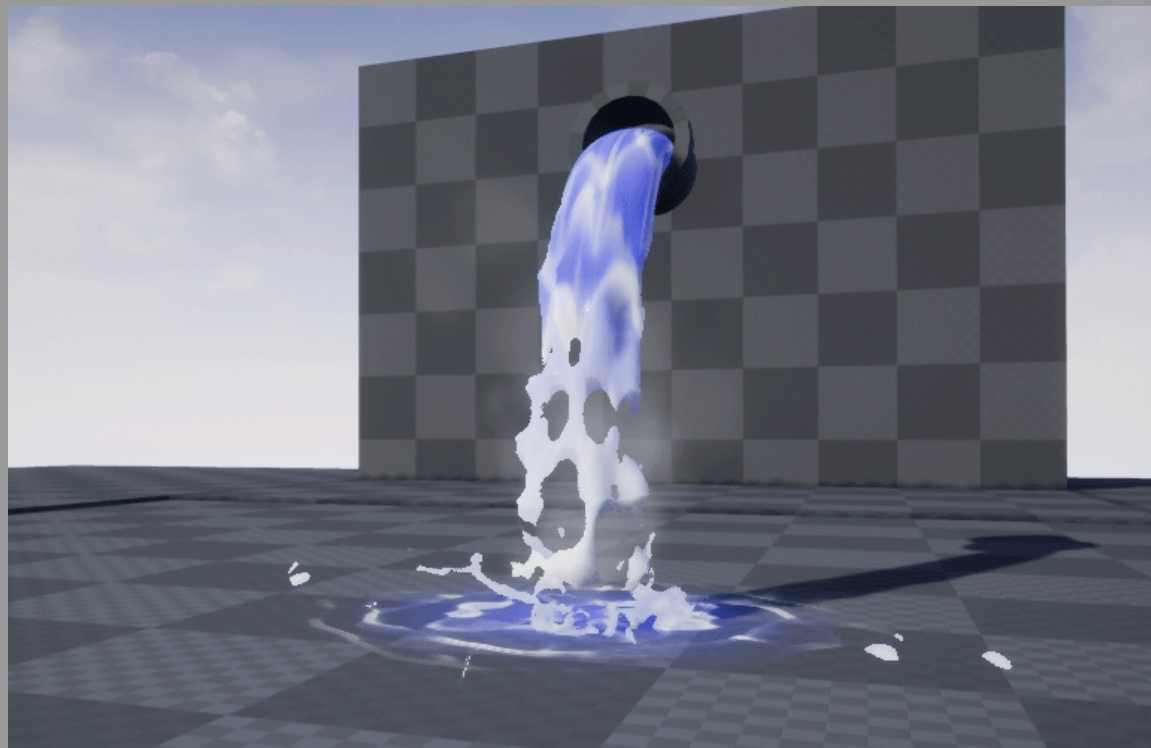


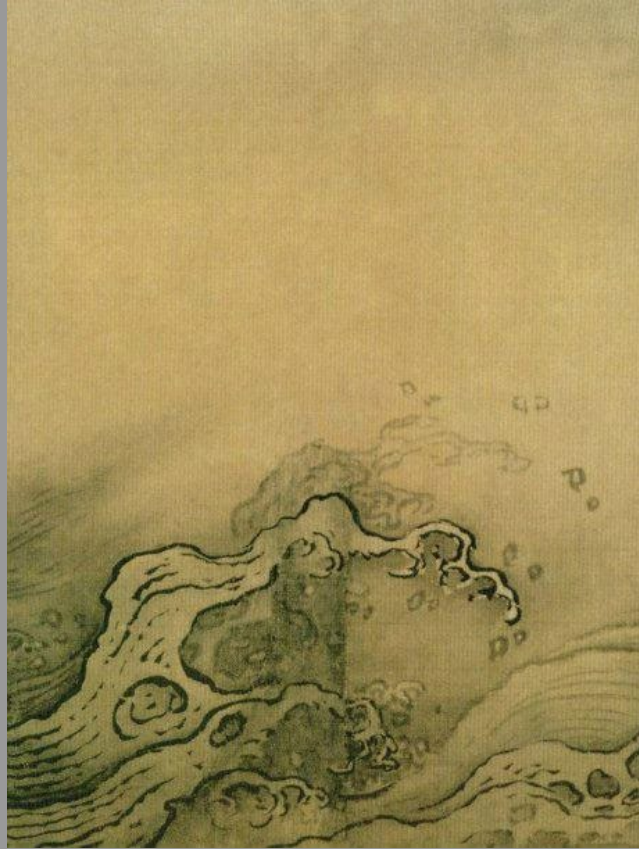
WPO

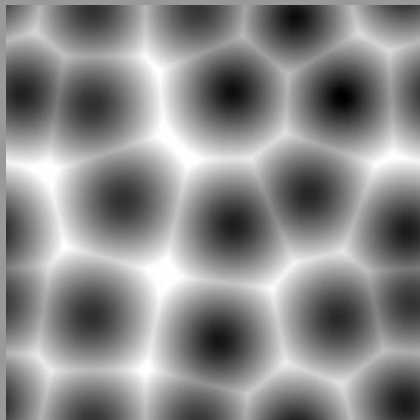
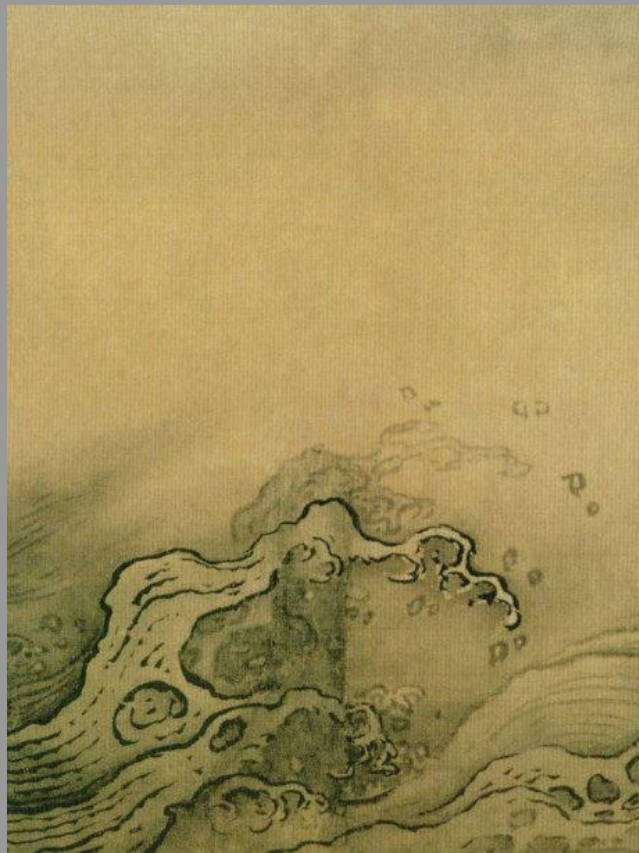


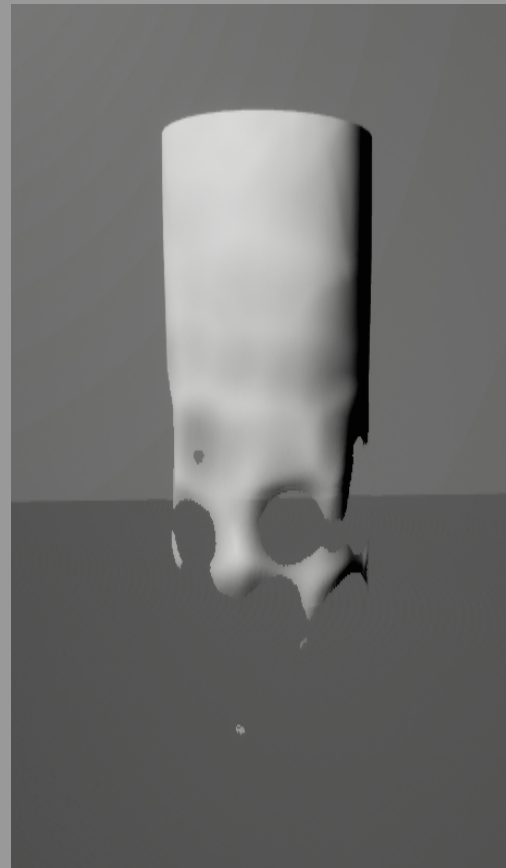
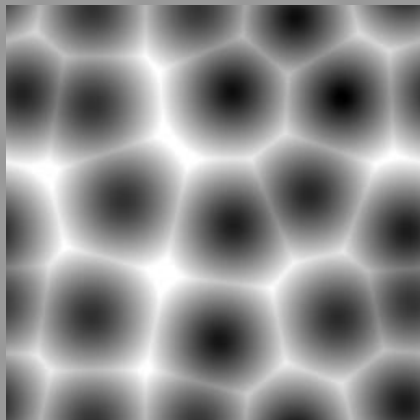
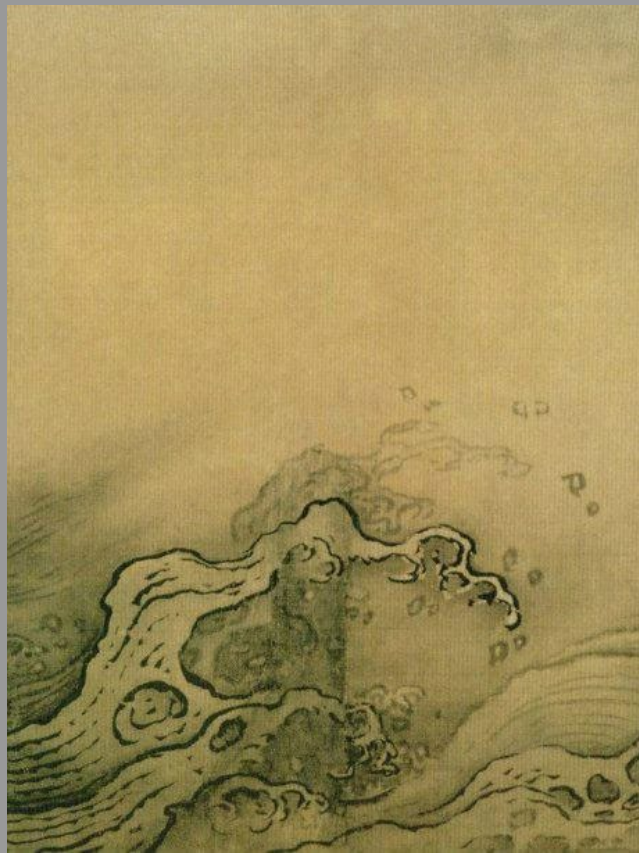
color











Focusing on **energy** *more* so than detail...

Focusing on **energy** *more* so than detail...

And using those energies to **build up** detail...

Focusing on **energy** *more* so than detail...

And using those energies to **build up** detail...

-- empowers us to work in a wider range of art directions and styles with **consistent results**.

Relying on **surface detail** like reflectivity
and transparency is **less flexible**.



It works because things in the natural world are **interrelated** in ways that store patterns of energy flows.

雲舒浪卷



王中興
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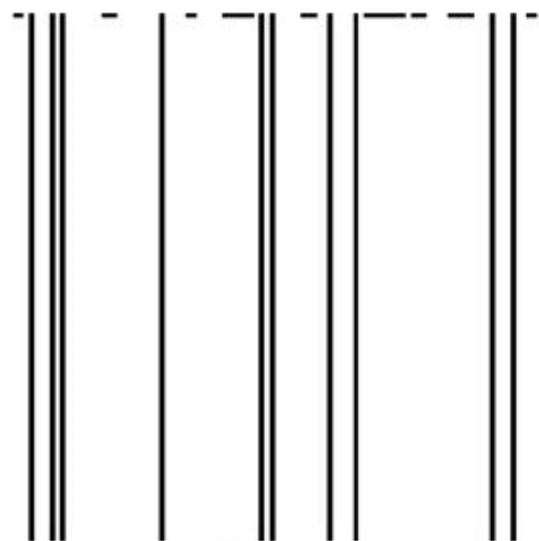


DAOIST AESTHETICS: “Internalizing the *dao*”

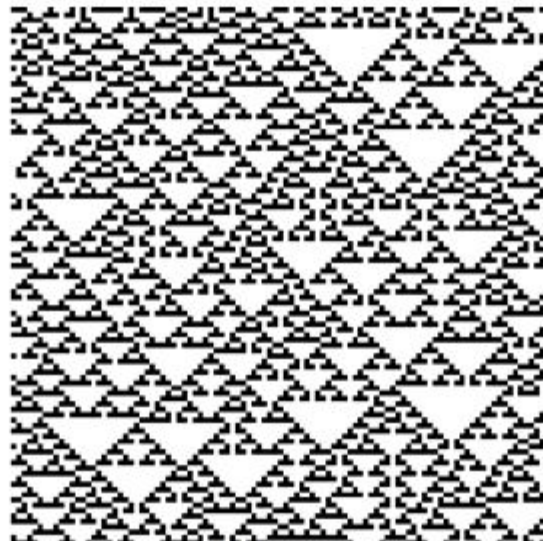


How to internalize the Dao, those
relationships?

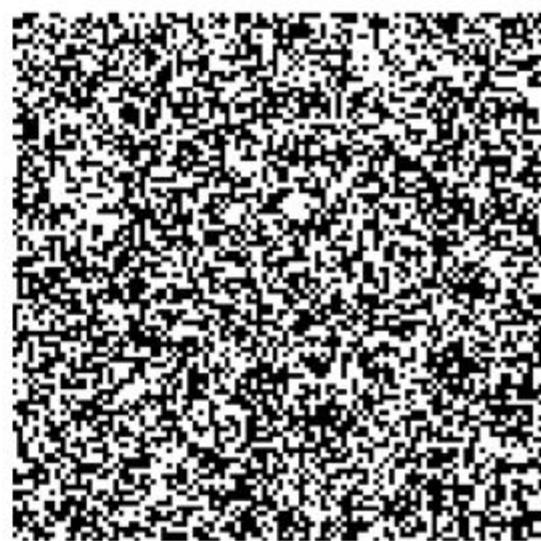
1. Get interested in patterns.



Rule 4



Rule 22

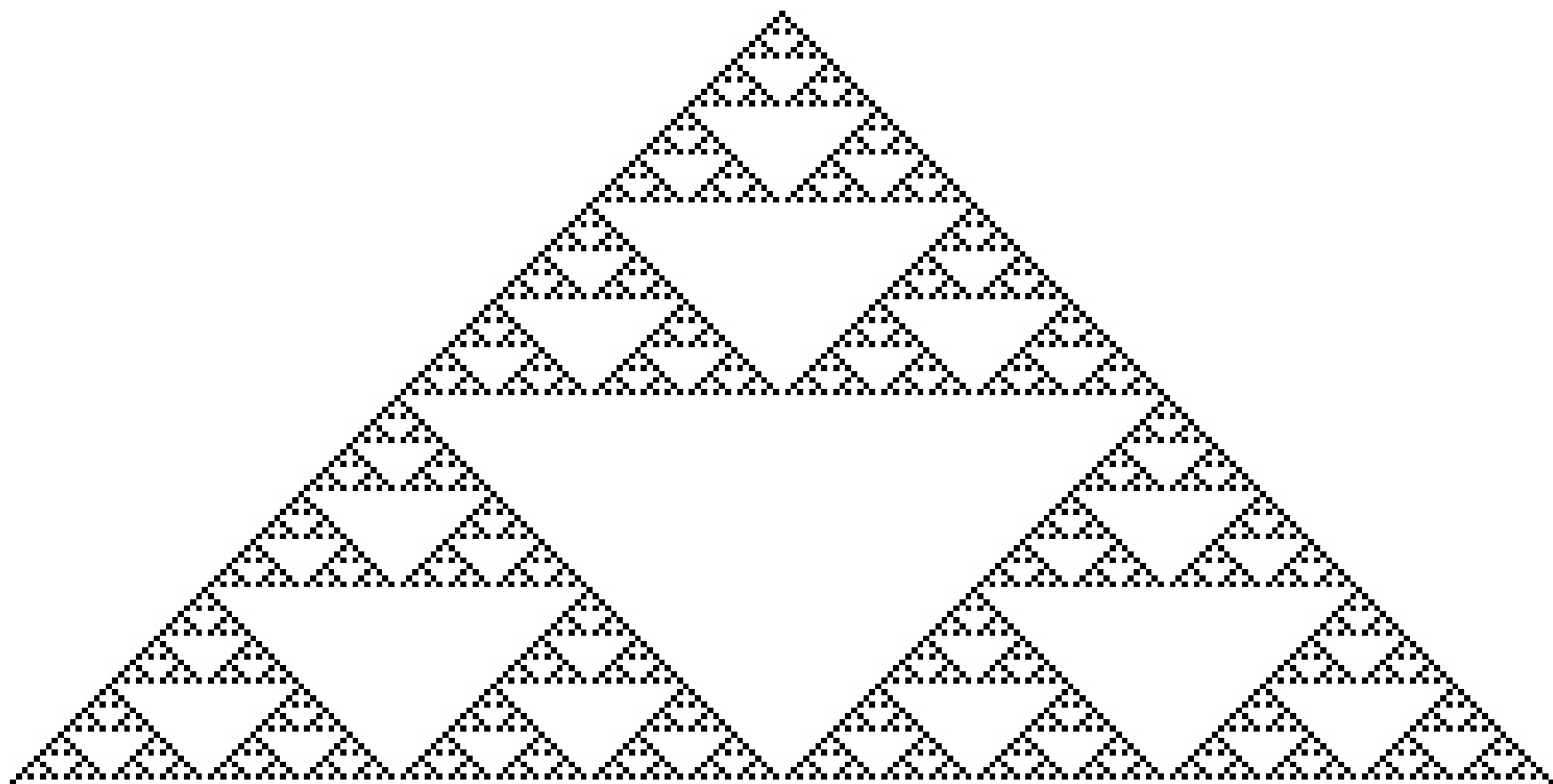


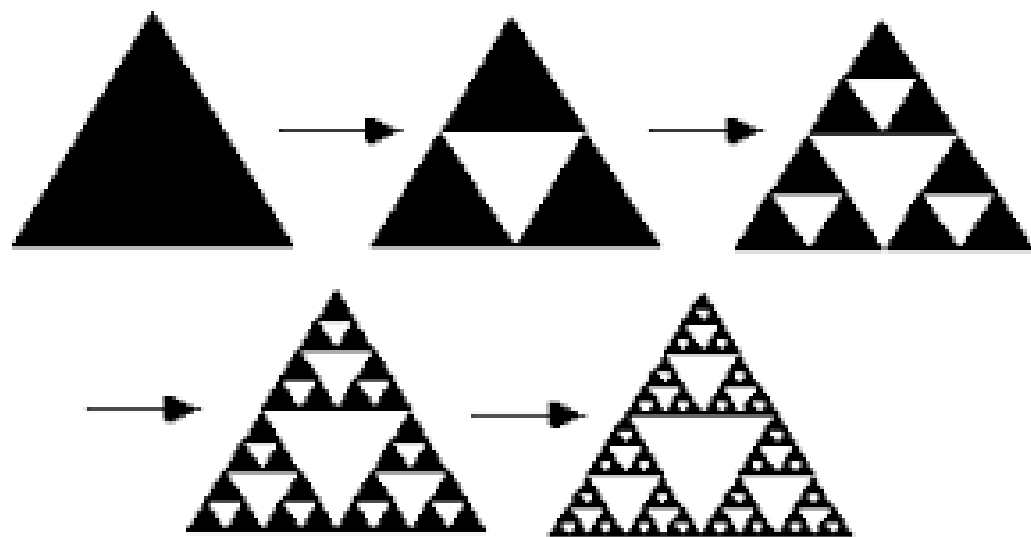
random

rule 60













A black and white photograph of four seashells arranged in a square pattern around a central text. The shells have various intricate patterns, including geometric shapes and organic textures. The background is a dark, textured surface.

SCHOLAR'S ROCKS

2. Go out into the world!

2. Go out into the world!

Train yourself to **see** those connections!

2. Go out into the world!

Train yourself to **see** those connections!

Take your own reference!



Voronoi noise
“In the wild”:

Beer foam.

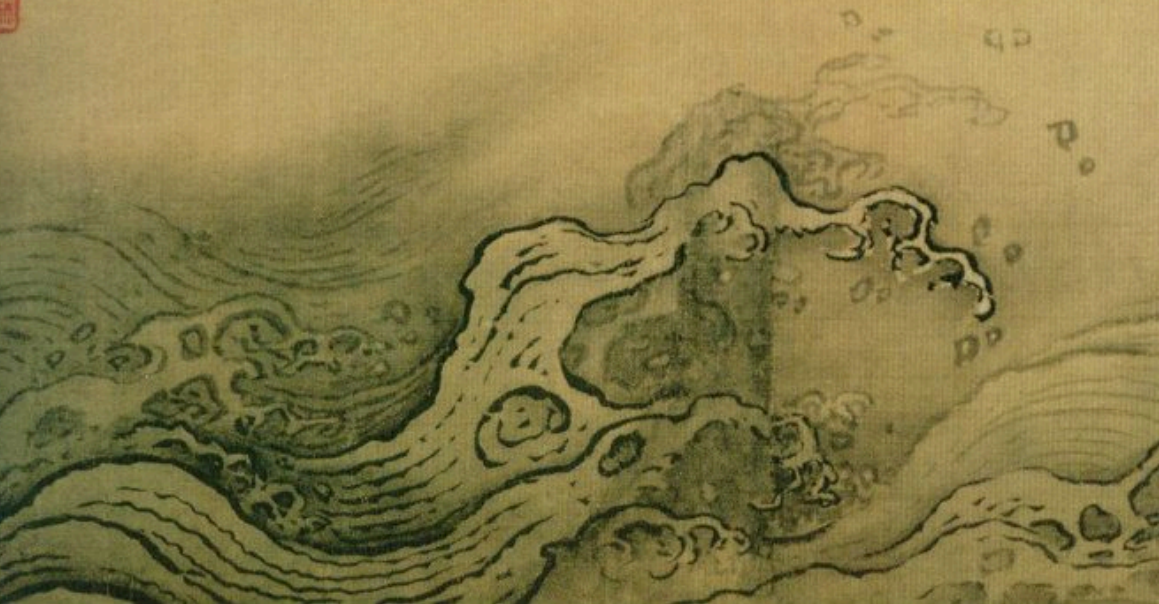




雲舒浪卷



王中興
繪
龍人內寄



TAKEAWAYS



Believable **Energy** > Realistic **Detail**



Believable **Energy** > Realistic **Detail**

There are **deep connections**
between disparate things in this world.



Believable **Energy** > Realistic **Detail**

There are **deep connections**
between disparate things in this world.

We can make use of those **general connections**
to **build up** detail that works in motion.

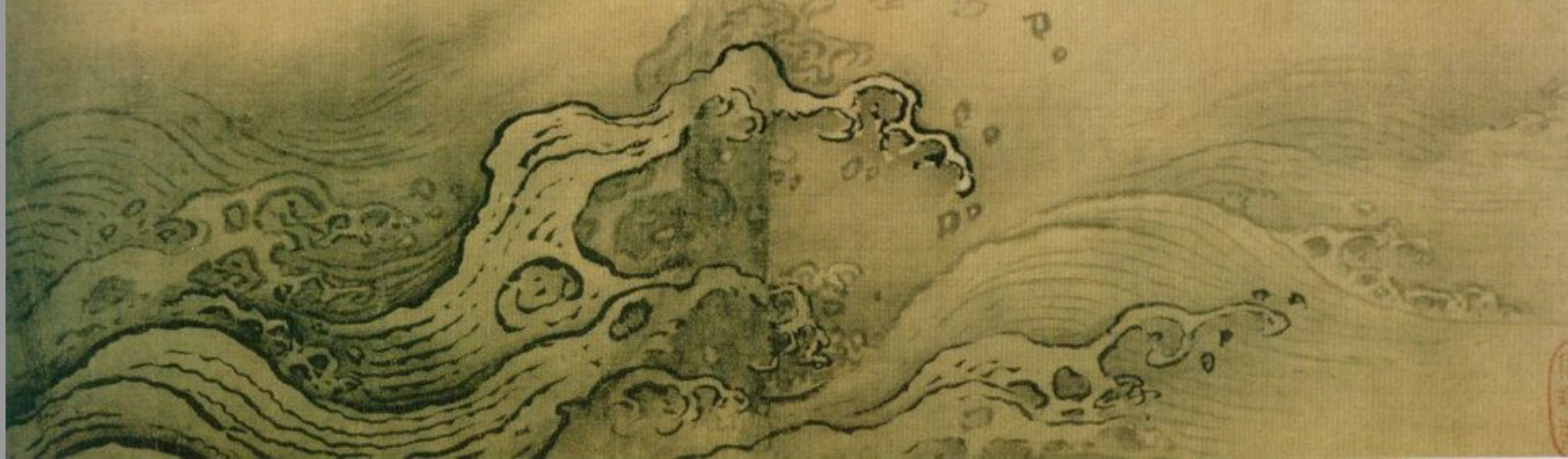
雲舒浪卷



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“XIAO YAO YOU”





Suggested reading:

- ***Dao De Jing*** trans. Roger Ames and David Hall
- ***Zhaungzi*** trans. Brook Ziporyn
- ***The Great Image Has No Form*** by Francois Jullien
- ***In Praise of Blandness*** by Francois Jullien
- ***Patterns in Nature*** by Philip Ball
- **“Getting the most out of noise in UE4”** -- Ryan Brucks

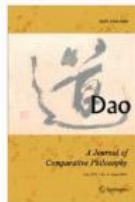
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EPILOGUE

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From Leaky Pots to Spillover-Goblets: Plato and Zhuangzi on the Responsiveness of Knowledge

Authors

[Authors and affiliations](#)Jeremy Griffith 

Article

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Abstract

This essay examines the question of whether language, knowledge, and truth are possible in a world of relativism and flux, developing along a line of comparison between the *Cratylus* and *Theaetetus* of Plato on the one hand, and the *Zhuangzi* 莊子 of the Daoist philosophical tradition on the other. Against Plato's image of "leaky pots" that symbolizes the impossibility of language in a state of flux, the *Zhuangzi* introduces "spillover-goblet words" (*zhiyan* 卮言) that resist the language of necessity and essence by continually emptying themselves out, only to be filled again with the always contingent. To put the ideas and metaphors of each of these perspectives into conversation, the essay drafts a comparison between two manners of animal

Philip Ball's “realistic” vs “schematic”
+
Da Vinci

[illegible]





