

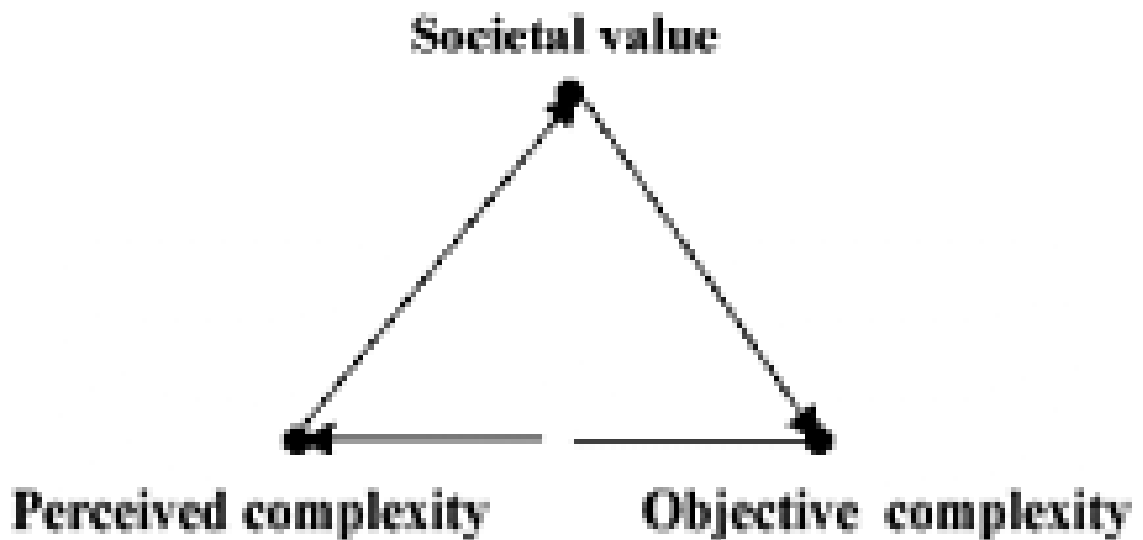
# ***Artistic Forms and Complexity***

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John Casti  
Richard Taylor

(Supported by the Andrea  
von Braun Foundation,  
Munich)

# ***Artistic Forms vs Complexity***

- Is there a connection?
- What's the connection?



# ***Artistic Forms and Complexity Research***

- What are “good” questions?
- How can artists and scientists communicate?
- What “style” of working together is likely to produce results?

# ***Focus Areas***

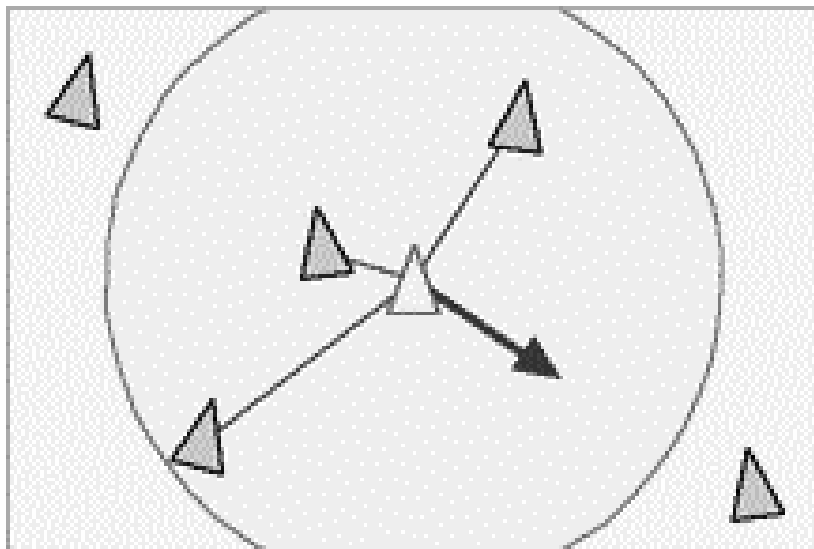
- Abstract Art
- Musical works
- Mathematical theorems

# ***COMPLEX SYSTEMS***

- Counterintuitive behavior
- Many interactions/feedback loops
- Decentralized decisionmaking
- Indecomposable

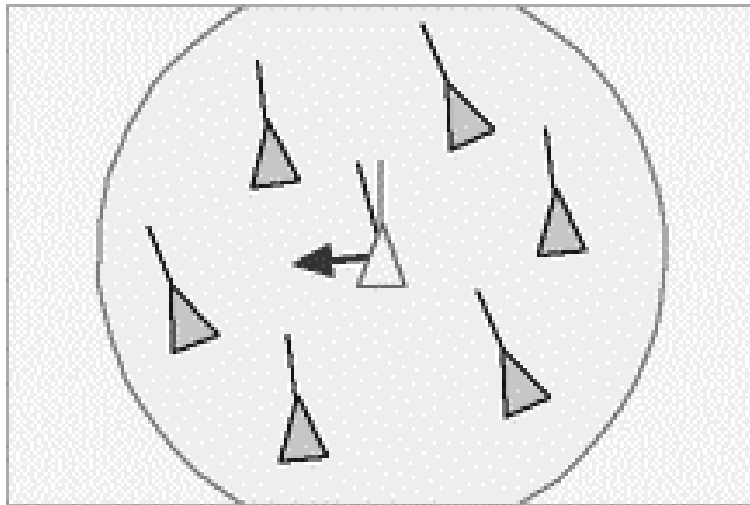
# ***Complex Systems: An Example– “Boids” (Courtesy Craig Reynolds)***

***Rule I: Separation–steer to avoid  
crowding neighbors***

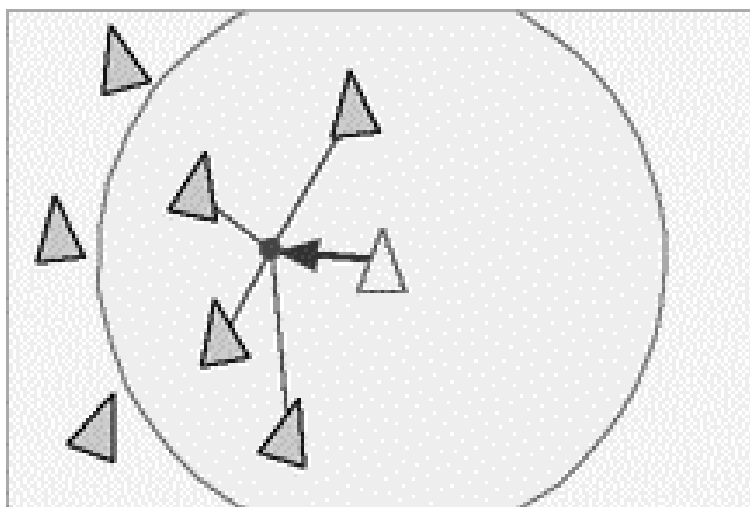


# ***Boids (cont'd)***

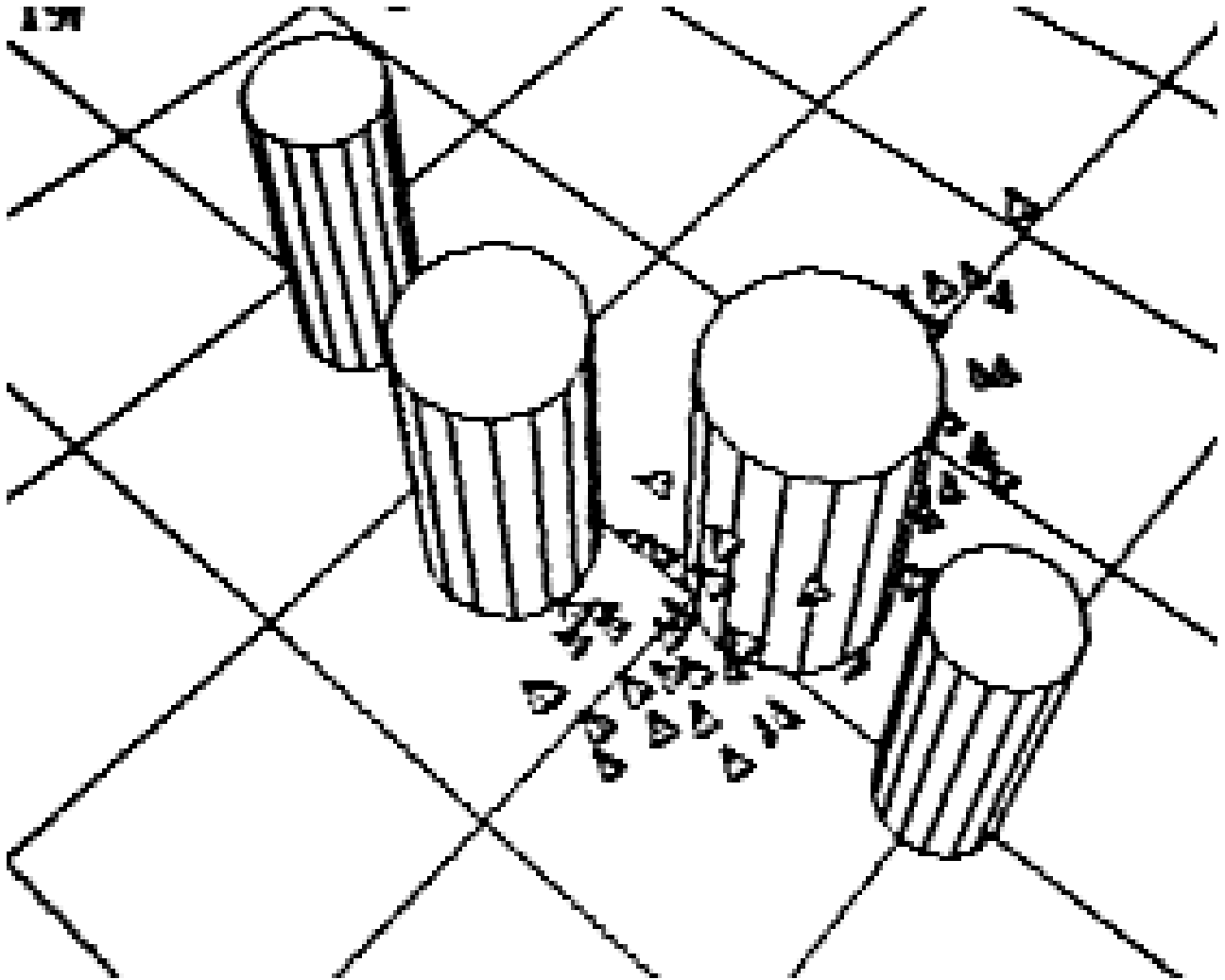
***Rule II: Alignment—steer towards the average heading of neighbors***



***Rule III: Cohesion—steer to move toward the average position of neighbors***



# ***Boids Flocking***





# ***“31 Flavors” of Complexity***

***Measures of Complexity  
(courtesy Seth Lloyd, MIT)***

- *Difficulty of Description*
- *Difficulty of Creation*
- *Degree of Organization*

# ***The Good, the Bad and the Indifferent***

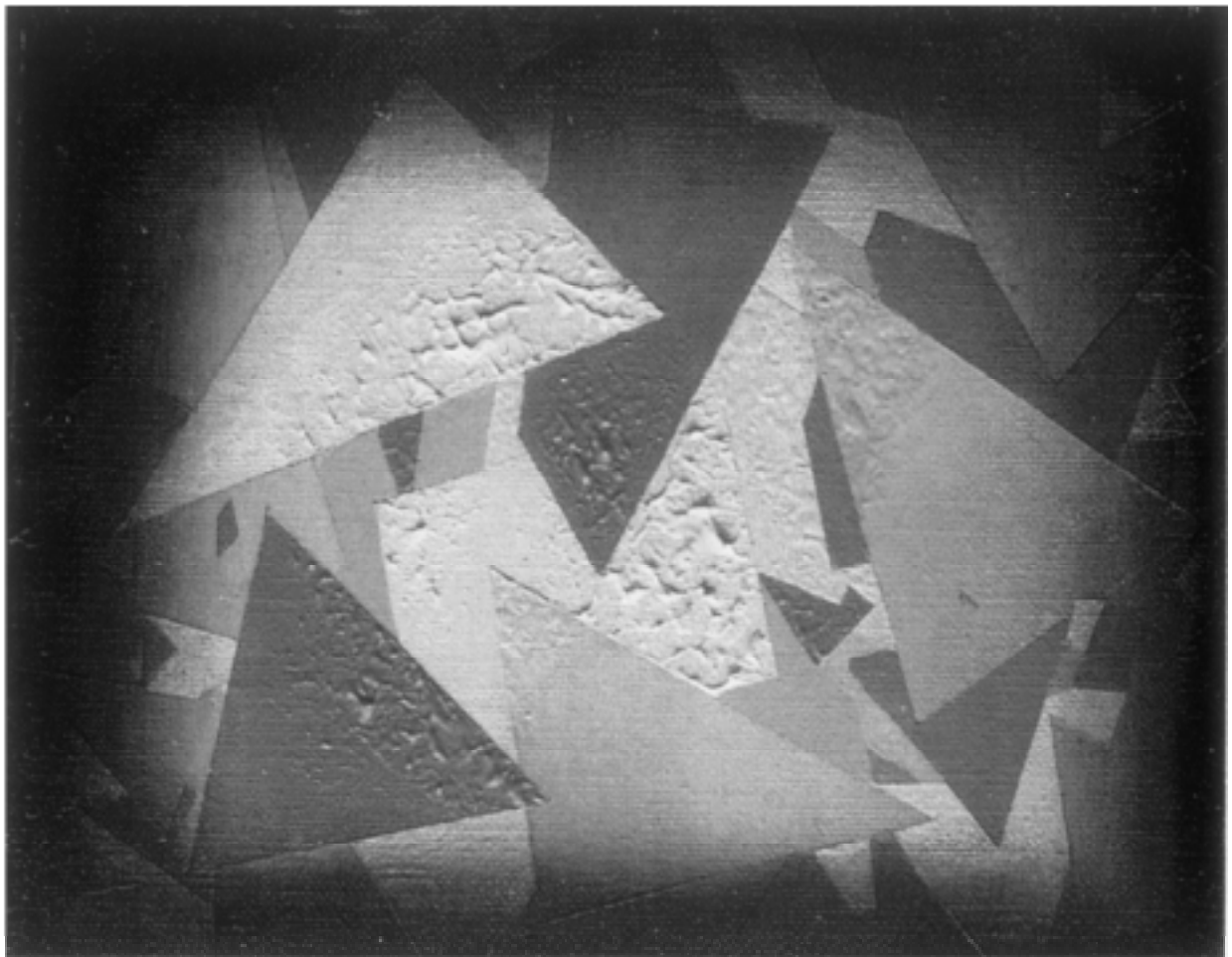
**What kind of art do people  
like?**

**(Source: *Painting by Numbers,  
Komar and Melamid's Scientific  
Guide to Art*, J. Wypijewski, ed,  
FSG, NY, 1997)**

# ***USA-Best***



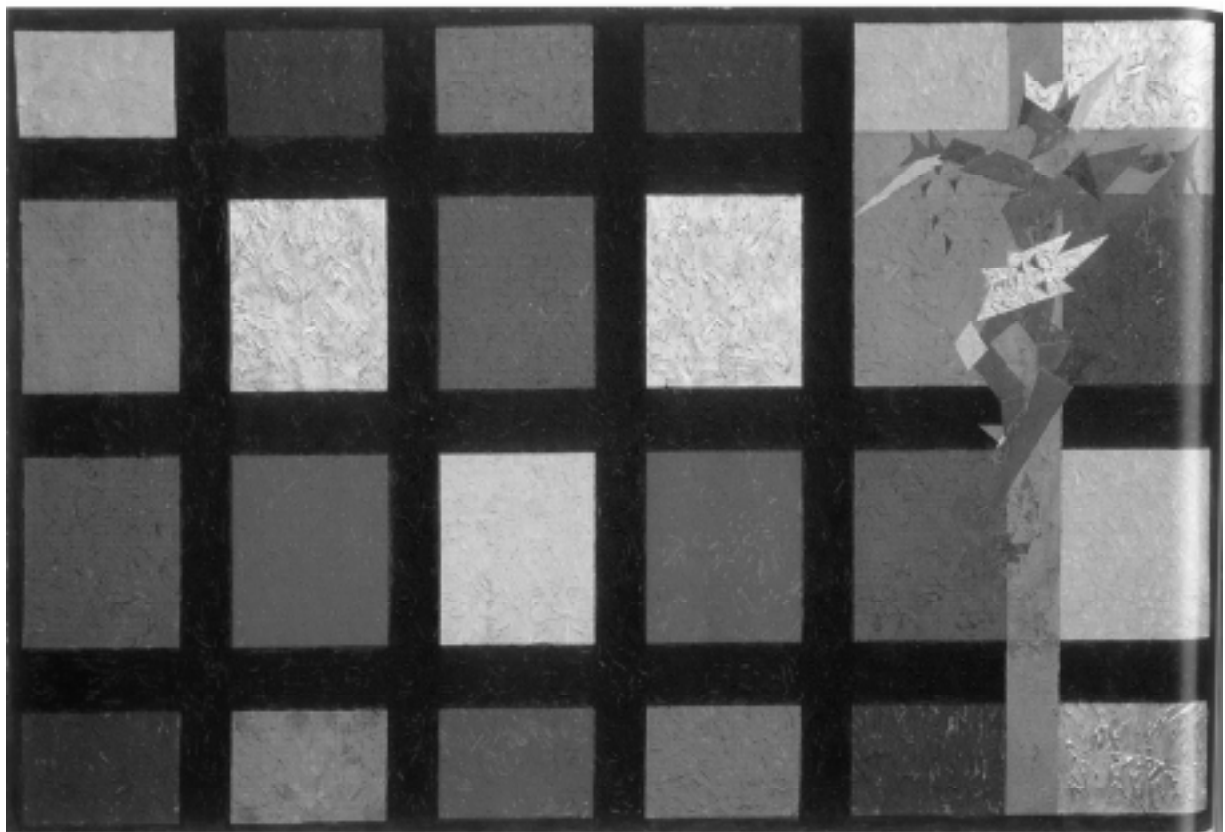
# ***USA-Worst***



# ***FRANCE-Best***

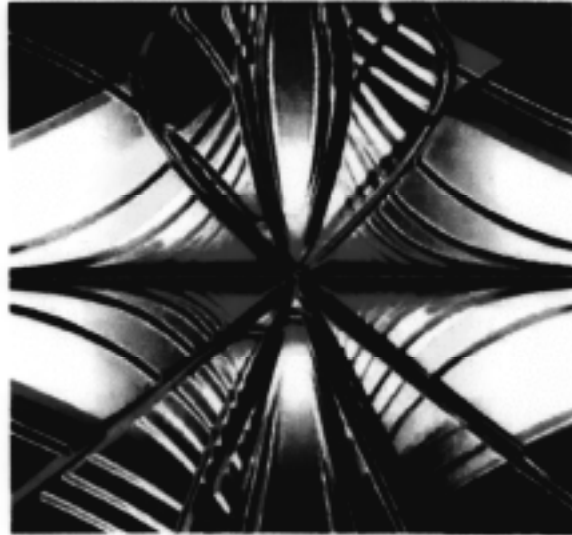


# ***FRANCE-Worst***



# *Artistic Forms-I*

Is this

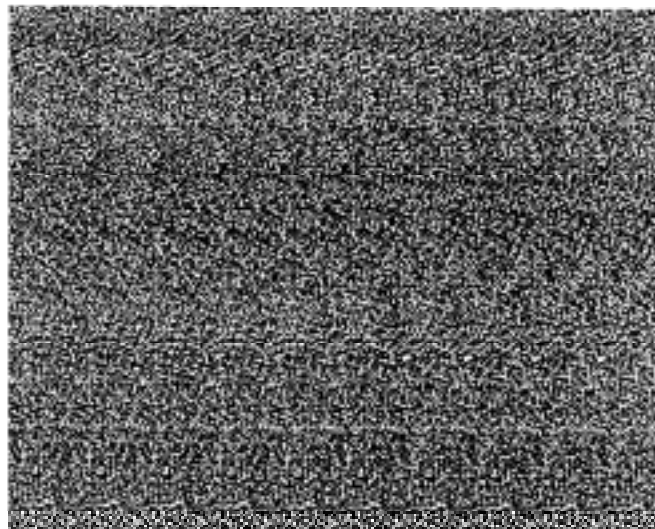


(a)

```
(round(log(+y (color-grad(round(+abs (round  
(log(+y(color-grad(round(+y(log(invert y) 15.5))  
x)3.1 1.86#(0.95 0.7 0.59) 1.35))0.19)x))(log  
(invert y)15.5))x)3.1 1.9#(0.95(0.7 0.35)1.35))  
0.19)x)
```

More complex than this?

***DATA TO PICTURES***



# *Artistic Forms-II*

THIS



or

THIS?

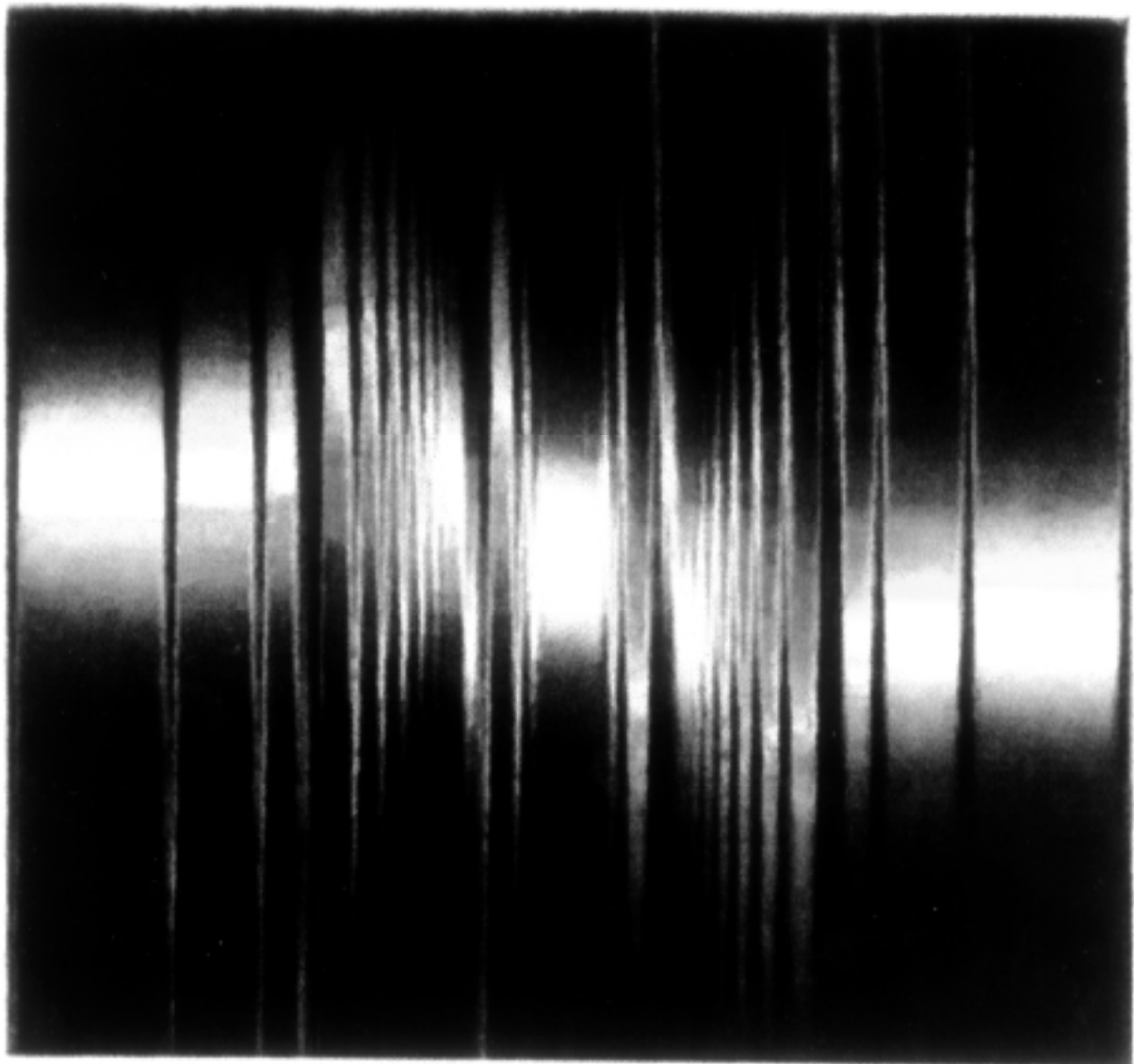






(a)

```
(round(log(+y (color-grad(round(+abs (round  
(log(+y(color-grad(round(+y(log(invert y) 15.5))  
x)3.1 1.86#(0.95 0.7 0.59) 1.35))0.19)x)) (log  
(invert y)15.5))x)3.1 1.9#(0.95(0.7 0.35)1.35))  
0.19)x)
```



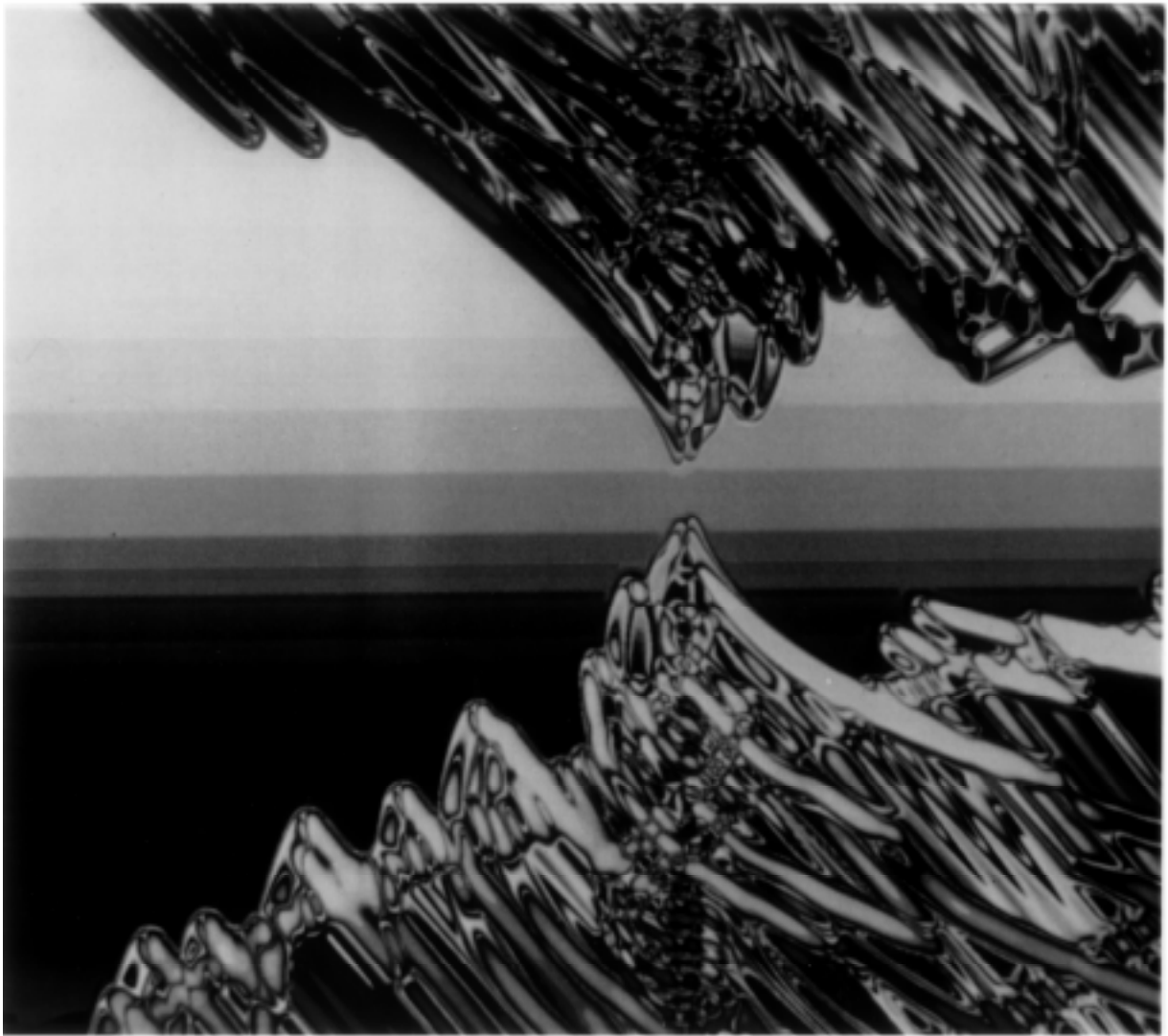
(b)

```
(rotate-vector(log(+y(color-grad(round(+ (abs  
round(log #(0.01 0.67 0.86)0.19) x))(hsv-to-  
rgb(bump(if x 10.7 y)#(0.94 0.01 0.4)0.78#(  
0.18 0.28 0.58)#(0.4 0.92 0.58)10.6 0.23  
0.91)))x)3.1 1.93#(0.95 0.7 0.35)3.03))-0.03)  
x#(0.76 0.08 0.24))
```

**A**



***B***



C



# ***SURVEY RESULTS***

## **LISP LENGTH**

**A = 186, B = 434, C = 264**

## **COMPLEXITY (24 replies)**

**A = 42, B = 52, C = 50**

## **AESTHETICS (23 replies)**

**A = 48, B = 53, C = 37**