

# A Catastrophic Introduction to Topology

Charles Delman  
Department of Mathematics & Computer Science  
EIU

October 25, 2019

## Catastrophe (mathematics)

Discontinuous  
(not gradual) change in  
state that occurs as  
parameters (conditions)  
vary continuously.



Painting by Tom Bagshaw

# Fold Catastrophe

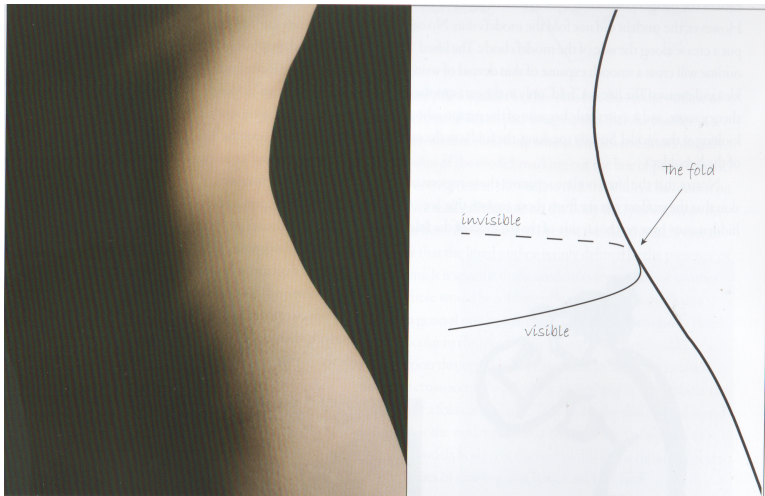
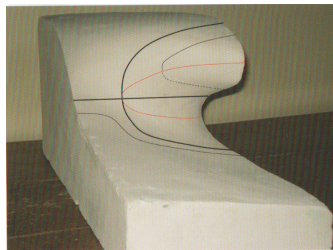
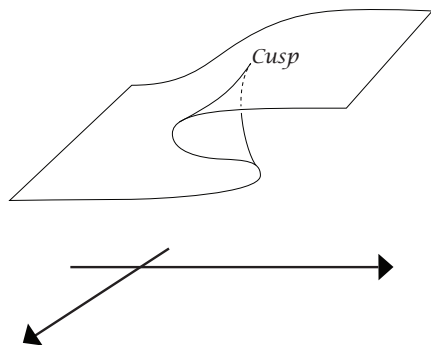


Illustration from A. McRobie, *The Seduction Curves*

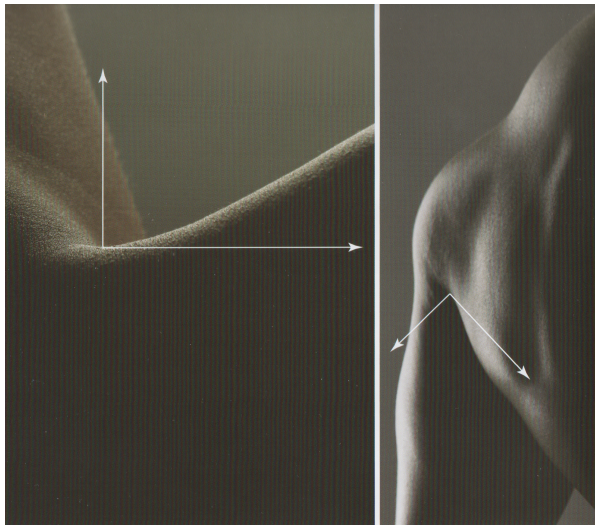
# Cusp Catastrophe



McRobie, op. cit.

*modality & hysteresis*

# Cusps Seen on the Human Form



# Light Caustic in Your Morning Coffee

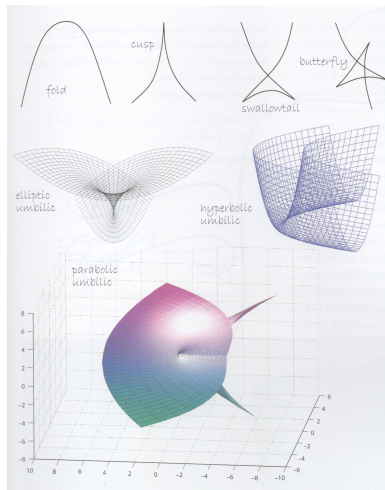


Ibid.

# René Thom (1923-2002) & 7 Elementary Catastrophes



Photo by Konrad Jacobs



McRobie, op. cit.

# Mathematics is Collaborative



Photo by Renate Schmid



Photo by Günther Sawitzki

Many people contributed to the proof and to further development of the theory.





Topology is a powerful means of  
visualizing, modeling, and  
understanding the qualitative aspects  
of the world.

Thank you!