

**SAS Honors Seminar 259:
Extraterrestrial Life**

9/8/2008

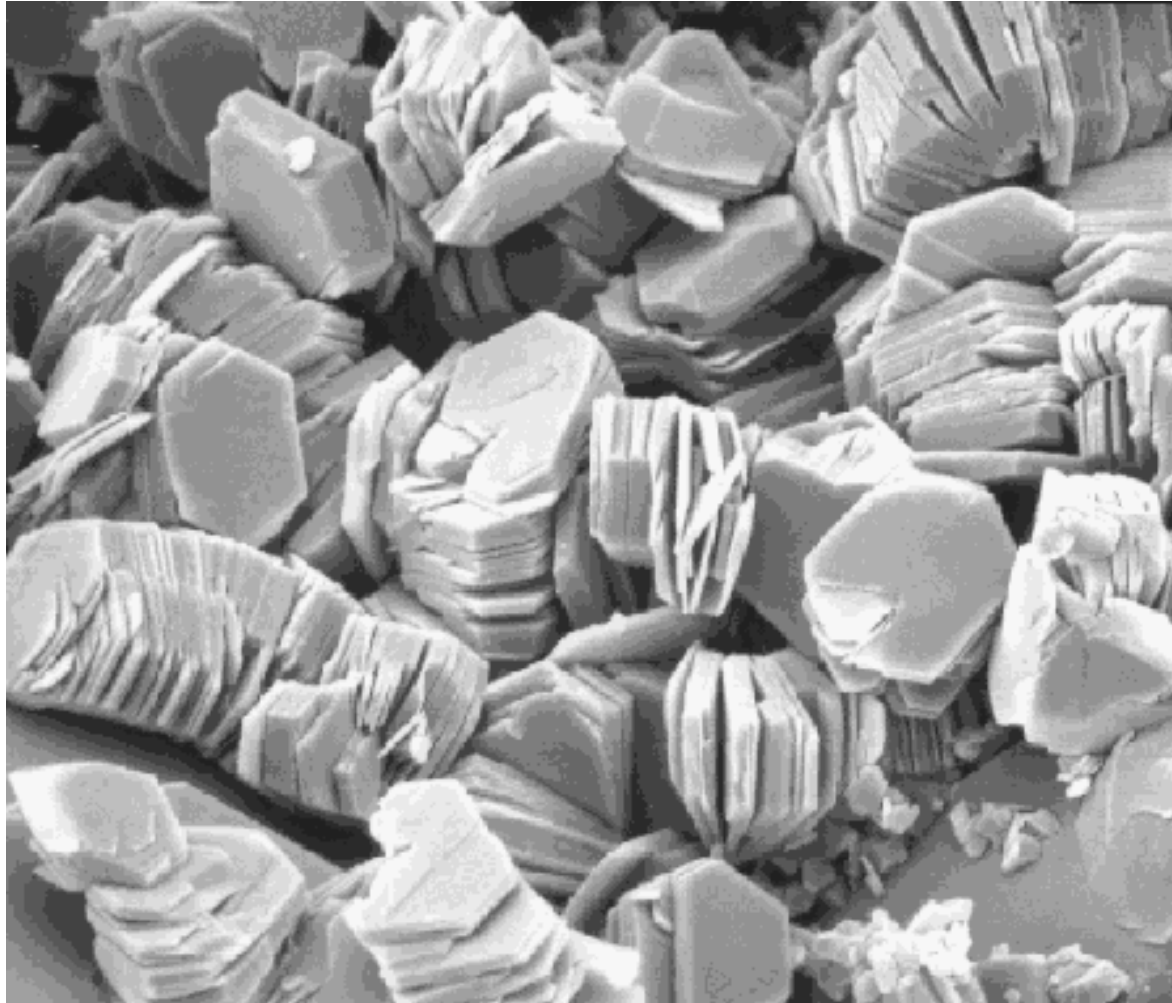
Is clay alive?



Photo Credit: Rob Fensome, Geological Survey of Canada

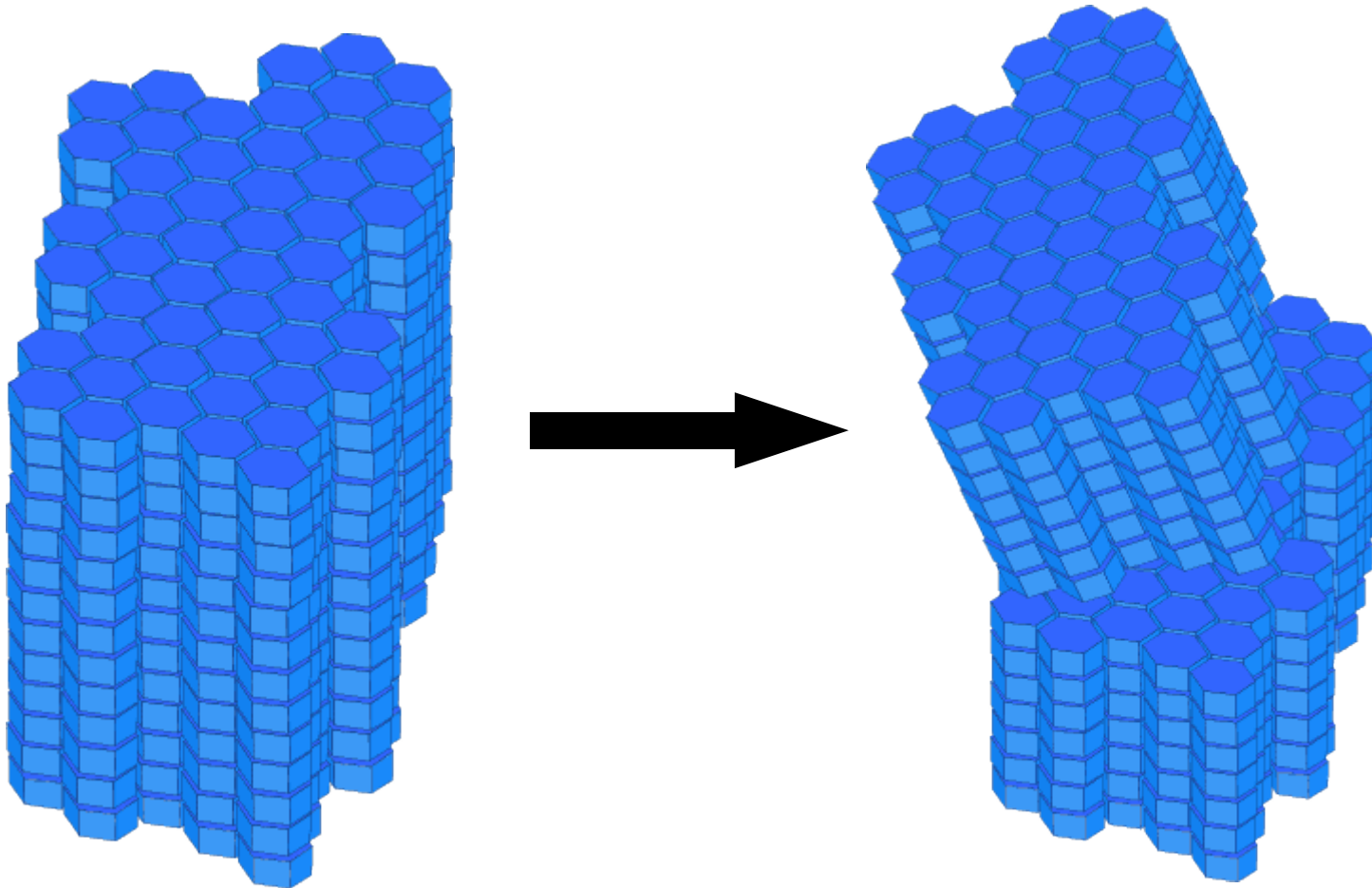
$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$ (kaolinite) bed, Canada

Under the microscope...



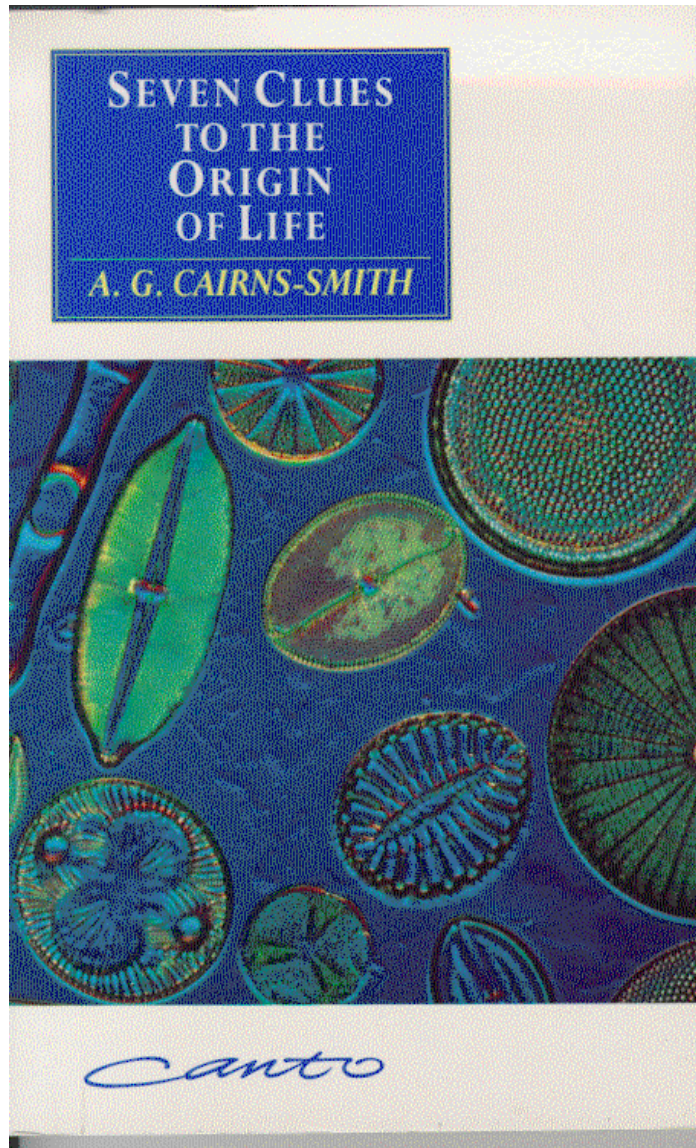
kaolinite crystals imaged with an electron microscope

Growth, order, and reproduction?



schematic from <http://originoflife.net/>

Mineral life first?



A. G. Cairns-Smith (Scottish chemist): posited that the first replicator was a clay mineral, and that nucleic acids “took over” as replicators after their formation was catalyzed by crystal surfaces.

Not widely believed, but intriguing...

Reading for next class (9/10)

Bennett & Shostak 5.3-5.4 – background on terran life

Benner et al. (2004) – somewhat technical article

Sismour & Benner (2005) – *very* technical article, so

read only abstract, introduction, and discussion

(plus last paragraph of “Results”)

Web site features a cheat sheet for latter two articles

(mostly a glossary of technical terms).

Key question for next class

Must all life everywhere be based on DNA and the same biochemistry (water as solvent, etc.) as on earth?



An analogous question: is every sheep white?

Reading for Monday (9/15)



Bennett & Shostak 4.2, 6.1, 6.3

– history of terran life

Sagan (1967)

– revolutionized biology

Lynn Margulis

University of Massachusetts

Schedule change: 7:40-9:00pm

for everyone who can make it.

Response paper for Monday (9/15)

The British scientist James Lovelock has proposed that Earth's living organisms, in conjunction with its physical components (atmosphere, oceans, etc.), can be considered together as the equivalent of a single “superorganism”.

Do you feel that such an entity (dubbed “Gaia” by Lovelock) can satisfy all, some, or none of the definitions of “life” that we have discussed in this class? Write a statement explaining and justifying your answer to this question.



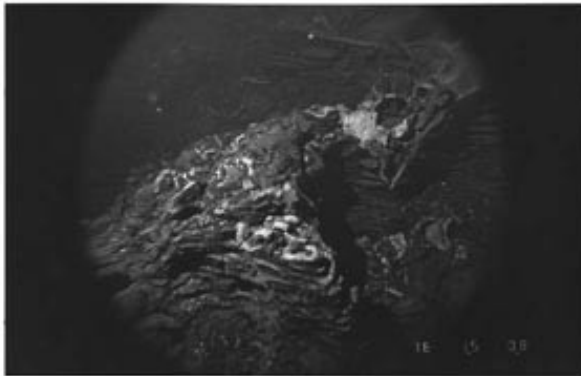
Upcoming field trip (9/24)

Deep Sea Microbiology Lab – Prof. Costa Vetriani

Institute of Marine & Coastal Sciences

Department of Biochemistry and Microbiology

<http://www.marine.rutgers.edu/deep-seamicrobiology/>



lava flows and tube worms 2500m below the surface of the Pacific