## Hot Science Cool Talks

UT Environmental Science Institute

## #3

## Volcanoes: Killers and Creators

## Dr. Daniel Barker February 25, 2000

Produced by and for *Hot Science - Cool Talks* by the Environmental Science Institute. We request that the use of these materials include an acknowledgement of the presenter and *Hot Science - Cool Talks* by the Environmental Science Institute at UT Austin. We hope you find these materials educational and enjoyable.











Fig. 3. An engraving of the 1538 eruption in the letter by Marchesino (1538) describing the event

































Actual eruption and initial gas release

Debris avalanche Beheaded trough of SHOESTRING GLACIER: (Flowed down east slope) False

Summit

9677.#

Small remnant of DOGS HEAD

SUGAR BOWL

VIEW FROM NORTHWEST Mt. St. Helens Volcano\_













PLATE I. Comparai, 1862 (cat. no. 10).














Crater Floor





Mountain Inside Crater

Site of 1995 Eruption

















Hill of lava - foundation for walled town

## Lava Field Plateau









1739 Lava Flow

Area currently densely populated

![](_page_55_Picture_0.jpeg)

![](_page_56_Picture_0.jpeg)

![](_page_57_Picture_0.jpeg)

![](_page_58_Picture_0.jpeg)

Abb. 34. Paroxysmale phreatische Eruption der Fossa auf Vulcano am 14. 2. 1889, 16.14 Uhr. Der Auswurf von z. T. sehr großen Blöcken neben Sanden, Aschen und Dampf ist deutlich zu erkennen ("vulcanianische Tätigkeit"). Aus Silvestri & MERCALLI (1891, Taf. VII).

![](_page_59_Picture_0.jpeg)

Deposits from 1888-1890 Eruption

Older Eruption Material

Cross Section of the Inner Slopes of Vulcano

![](_page_61_Picture_0.jpeg)

![](_page_62_Picture_0.jpeg)

![](_page_63_Picture_0.jpeg)

![](_page_64_Picture_0.jpeg)

![](_page_65_Picture_0.jpeg)

![](_page_66_Picture_0.jpeg)

![](_page_67_Picture_0.jpeg)

![](_page_68_Picture_0.jpeg)

![](_page_69_Picture_0.jpeg)

## **Further reading:**

Chester, D., 1993, Volcanoes and Society. Edward Arnold, London. Decker, R. W., and Decker, B. B., 1997, Volcanoes. 3rd edition, W. H. Freeman & Co. New York. Fisher, R. V., 1999, *Out of the Crater*. Princeton Univ. Press. Fisher, R. V., Heiken, G., and Hulen, J. B., 1997, Volcanoes: Crucibles of Change. Princeton Univ. Press. Francis, P., 1993, Volcanoes: A Planetary Perspective. Oxford University Press Harris, S. L., 1988, Fire Mountains of the West: the Cascade and Mono Lake *Volcanoes.* Mountain Press Publishing Co., Missoula, Montana. Krafft, Maurice, 1993, Volcanoes: Fire from the Earth. Harry N. Abrams, Inc., New York. Sigurdsson, H., 1999, *Melting the Earth: the History of Ideas on Volcanic Eruptions*. New York, Oxford Univ. Press. Sigurdsson, H., (ed.), 1999, *Encyclopedia of Volcanoes*. Academic Press, New York. Simkin, T., and Siebert, L., 1994, Volcanoes of the World 2nd edition. Geoscience Press, Tucson, Arizona. Wright, T. L., and Pierson, T. C., 1992, *Living with Volcanoes: The U.S. Geological* Survey's Volcano Hazards Program. USGS Circular 1073.

## **Thought Questions**

**1.** On Mars and probably on Venus, the tallest mountains are volcanoes, but here on the Earth, the highest mountains are not volcanoes. List some possible reasons for volcanoes being less tall on the Earth than on some other planets. (Differences in weathering and erosion rates of volcanic rocks on different planets due to different atmospheric compositions and weather patterns. Different rock compositions. Variability in tectonic and volcanic activity.)

**2.** What actions would you take if you were told that a volcano near where you live was very likely to erupt within the next month? Would your plans change if you were told that the eruption could occur anytime within the next 100 years? If so, what would you do differently? (Would you sell your property and move to a less volcanically active area in either situation? Why?)

**3.** Imagine that a stranger comes to your farm, tells you that that mountain over there is a volcano that will erupt soon, and offers to buy your land at a very low price. What questions should you ask the stranger, and where else would you seek advice? (How did he/she come by this information (is it trustworthy)? Who does he/she work for (is there an underlying motive)? What evidence does he/she have that would come to that conclusion? One should probably seek more information from the USGS (or local Geological Survey), local government, and a local university's geology department, before making any drastic decisions.)
## **Thought Questions**

**4.** One of the best, although not perfect, ways to predict what a volcano will do in the future is to study how it has acted in the past. What evidence would you look for? (Old lava flows, pyroclastic bombs, ash layers, any ancient written or painted accounts of activity.)

**5.** Some, but not enough, volcanoes are now being monitored. That means their behavior is closely watched. Among the symptoms of unrest at a volcano are:

(a) increasing numbers of earthquakes, closer and closer to the surface

(b) slow and very small changes in height and steepness of a volcano

(c) increasing temperatures of gas, spring water, and soil around a volcano

(d) trees and other plants beginning to die on some parts of the volcano

Think of inexpensive ways to measure each of these changes. (Volunteers and/or park rangers to monitor surrounding flora, water, soil. Automated seismic instrumentation placed in proximity to the volcano, images from satellites.)

When questioned about the portrayal of volcanism in popular media and Hollywood, Professor Barker said that most movies are grossly inaccurate. However, he did give *Dante's Peak* a fairly high rating relative to all other movies (a "C" for science). Although the depiction of a mix of fluid lava flows with explosive eruptions is not accurate, it did offer a good depiction of pyroclastic flows.

## Web sites:

USGS Volcano Hazards Survey http://volcanoes.usgs.gov/

Smithsonian Institution's Global Volcanism Project http://www.volcano.si.edu/gvp

Austin's own volcano from the Cretaceous Period - Information on Pilot Knob (Go to Stop 5)

http://www.utexas.edu/research/beg/GIS/demo/vft/vftHOME2.htm

## Professor Daniel S. Barker



Dan Barker received degrees from Yale, Cal Tech, and Princeton, and has been at the University of Texas at Austin since 1963. He became Professor Emeritus in 1999. He has published one book and more than 50 papers. His teaching covered thirteen different courses on volcanoes, igneous rocks, geochemistry, mineralogy, and general geology, and he continues research on these topics. Professor Barker has taught over 5000 students and has received five awards for teaching excellence from UT. Field trips have taken him from Greenland, Iceland, and Scandinavia through France, Germany, and Italy to the Canary and Cape Verde Islands and eastern and southern Africa, and from Hawaii to Japan, New Zealand, central America and much of North America. Enthusiasm for photography and history as well as geology resulted in the images of volcanic regions sampled in this lecture.