

Meaning of a Theory

If Arnold Labrentz (*JCST*, May 1985, p. 455) or anyone else were to walk into a room and find a 22.4-liter container of helium at 273° K and 1 atm of pressure, he could easily determine, using the kinetic and molecular theory of gases (as expressed by the ideal gas law, $PV = nRT$), that the container contained, has contained, and will continue to contain one mole of helium. This theory is not used to predict the amount of gas in the container, at least not in so far as "to predict" means to foretell the future. And yet the kinetic and molecular theory is a well established, legitimate scientific theory.

The insistence of Arnold Labrentz and others that the theory of evolution, or any other theory, must be predictive is an error. In general, a theory is considered scientific if we can say, "If statement one is true, then statement two is also true." Statement one is some expression of the theory of interest. Statement two may be some prediction of the future, or it may be some mathematical or logical deduction based on the theory.

I would suggest that readers who are interested in this topic see "The Scientific Status of Evolutionary Theory" by Mary B. Williams in the April 1985 issue of *The American Biology Teacher*.

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Glass Blowing for All

Williams College has had a January Winter Study Program since 1968.

During that month the students concentrate on one course. These range from intense traditional academic offerings, to less conventional technical courses, to travel abroad.

The glass blowing course has been offered for about 10 years. I have taught it about 8 years, sometimes alone, sometimes with another member of the faculty. It has been offered to 12 students and to 24 students. A given student works at the glass blowing torch for three hours on each of four days each week. Each student is provided with a torch and a complete set of glass-blowing tools. We provide them with Pyrex tubing and Pyrex rod of various dimensions. The students who take the course have had no background in working with glass and include both science and nonscience majors.

There are about a dozen standard items, for example, butt seals, T-joints, and ring seals, that each student must attempt. Beyond these required items, students may construct anything that they wish. I provide them with a number of examples of things I have made and that other students have made in the past. I also provide them with some colored glass that is compatible with the Pyrex. I have available

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a number of readings and I give one lecture on the properties of glass. At the end of the month they take a multiple choice test on this material. The students have made flowers, birds, scientific condensers, bicycles, and a variety of other decorative items. Each year the course is over-subscribed; we have to limit it, depending on availability of equipment.

Contact me for additional information about the course.

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Chautauqua Course

I would like to publicly express appreciation to Argonne National Laboratory and its Division of Educational Programs for joining with the University of Dayton Chautauqua Field Center in providing a short course entitled "Elementary Particle Physics: Current Status and Perspectives." This three-day course held earlier this year at Argonne was attended by some 100 college and university physics teachers from 21 states. It served as an excellent symposium on the current state of particle physics. Tours of the facilities of Argonne and of Fermi National Accelerator Laboratory (Fermilab) were included with the course.

Edmond Berger of Argonne organized the scientific program, which included presentations by Chris Quigg of Fermilab and the University of Chicago, John LoSecco of Caltech, Melvyn Shochet and Jonathan Rosner of the

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