

The Month at Caltech

The Alfred P. Sloan Laboratory of Mathematics and Physics, which houses Caltech's new 12,000,000-volt tandem accelerator, was officially dedicated this month. Here, with the accelerator — President DuBridge; Rear Admiral Rawson Bennett II, Chief of Naval Research; Dr. James R. Killian, chairman of the corporation of MIT; and Alfred P. Sloan, president of the Sloan Foundation, which financed the new building.



A crew of photographers invaded the campus last month to film a typical day at the Institute for a U. S. Information Agency movie on "Higher Education in the United States" which will be shown abroad. Here photographers move in on Hallet Smith, chairman of the division of humanities, lecturing on the Shakespearean theater.

Archibald MacLeish
(right) poet, playwright,
and Harvard lecturer,
in an unscheduled
seminar with Hallett
Smith, head of the
humanities division at
Caltech, and other
faculty members,
during his three-day
stay on campus as one
of the YMCA's
Leaders of America.



1960 Nobel Prizewinner Donald Glaser (PhD '50)
made a flying visit to the Caltech campus this month
on his way to Stockholm to claim his half of the prize.
Here, physics professors, plus acting dean of the fac-

ulty Beadle, turn out to greet him and his brand-new
bride — Professors Sands, Lauritsen, Bacher, Feyn-
man. Cowan, the Glasers, Smythe, Beadle, DuMond,
Walker, Neher, King, Anderson, and Leighton.

December, 1960



Spherical balls rolling on a specially contoured surface exhibit the orbital behavior of a small satellite or space ship in this analog computer which simulates the earth-moon system. The center depression represents the earth.

Students' Day

Some sample exhibits set up for the eleventh annual Students' Day on December 3 when more than 1,000 high school students and teachers from all over southern California visited the Caltech campus.



In Caltech's geochemistry laboratory, Irene Goddard, analytical chemist, demonstrates to students how studies of the oxygen isotopes in ice reveal the temperatures of past eras, the flow of glaciers, and their age.



Graduate student Stewart Smith shows how seismic waves are recorded with the portable seismograph used in the study of local earthquakes.

The World's Smallest Motor

Ever since *Engineering and Science* ran his article on micro-miniaturization, "There's Plenty of Room at the Bottom," (February 1960) Richard P. Feynman, Caltech professor of physics, has been besieged by inventors of miniature motors. This, Feynman brought on himself, for he had ended his article by saying:

"It is my intention to offer a prize of \$1,000 to the first guy . . . who makes a . . . rotating electric motor which can be controlled from the outside and, not counting the lead-in wires, is only 1/64th inch cubed."

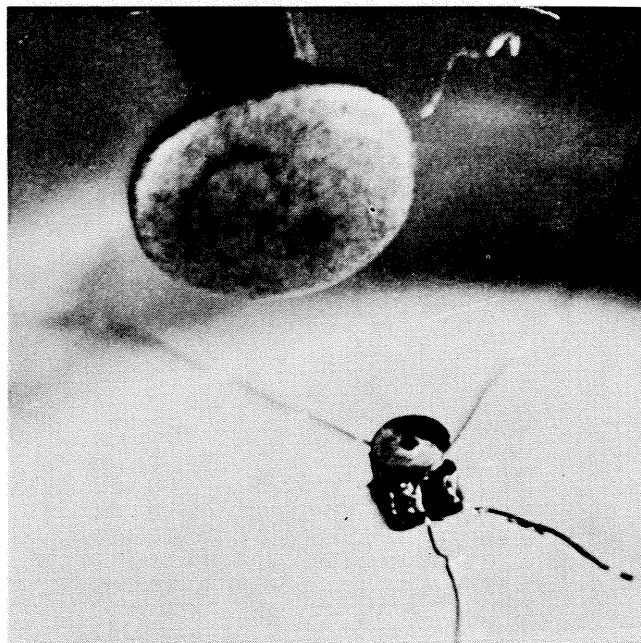
So — after that it was a rare day when Feynman was not interrupted in his lab by someone eager to show him what usually turned out to be a *very* large small motor.

Last month, when William McLellan (Caltech '50) walked into Feynman's lab with *his* small motor, it looked like the same old story, because McLellan was carrying his invention in a big grocery carton.

O.K., said Feynman wearily, he'd look at the thing — but there was no money in it for anybody. It had been his *intention* to set up a prize, but he never got around to doing it.

That was all right with McLellan. It was the challenge that had set him to work on the problem anyway. Then he took a microscope out of the grocery carton and let Feynman look in it to see the motor he had built.

It had taken McLellan 2½ months of lunch hours



The McLellan micromotor, photographed under a microscope. The huge object above it is a pinhead.

to make it, at Electro-Optical Systems in Pasadena, where he is a senior engineer. The motor was 1/64th of an inch cubed in size, or about as big as a speck in your eye. It weighed 250 micrograms, had 13 parts, was built with the aid of a microscope, a watchmaker's lathe, and a toothpick, and it could be controlled from the outside. As Feynman watched, McLellan set the rotor going.

Feynman and McLellan spent the better part of the afternoon operating the motor. It was after he got home that night that Feynman's conscience began to bother him. After all, the motor was *exactly* what he had asked for.

"So," he says, "I sent the guy a check for a thousand bucks."

Elated as he is over the little motor, Feynman is now having worried thoughts about a *second* prize that he offered in his *E&S* article — another \$1,000 "to the first guy who can take the information on the page of a book and put it in an area 1/25,000 smaller in linear scale in such a manner that it can be read by an electron microscope."

Daily, he expects to meet the man who has accomplished this spectacular feat. And, daily, the thought haunts him — because, in the meantime, Feynman has been married, bought a house and, what with one thing and another, hasn't got another spare \$1,000.

This, then, is a public appeal by *Engineering and Science*, to all inventors who are now at work trying to write small and collect the Second Feynman Prize — TAKE YOUR TIME! WORK SLOWLY! RELAX!



William McLellan shows Students' Day visitors scale model of his motor 100 times larger than the original.