CRYOGENIC
Temperature Controller

Model 5301

Accurate temperature control in Research Dewars, Cryogenic Freezers, Tensile Cryostats for physics, chemistry, metallurgy and other scientific fields where the process, temperature and/or control requirements change frequently. System features control stability better than .01°K from below 0.3° to 320°K with less than one microwatt power dissipation in the sensor. Three mode control: Proportional, rate and reset with internal parameter controls, allowing to tune the controller to thermal characteristics of the system. 100 watts output, short circuit proof, DC for minimum interference to other low level instrumentation.

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PROGRAMMER

Model 5350

The Model 5350 Programmer is an electromechanical function generator, consisting of a digitally controlled servo-system driving a 10 turn potentiometer at a wide range of sweep rates. The Programmer finds application in the process control field with other instrumentation, whose output is controlled by a resistance or resistance ratio, such as powersupplies, magnetic generators, audio or RF oscillators as well as temperature, deposition-rate, vacuum and similar controllers.

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ness and their enthusiastic attempts to communicate their awareness and to force the reluctant established order to change peacefully. In my opinion, the youth helped start a revolution in human thought that, I hope, will bring about a transformation of our materialistic society into a humanistic society. It seems that such a transformation can be greatly aided by vigorous interdisciplinary studies until every field of human endeavor, physics too, is totally permeated with humanistic ethics.

Anatol Zinchenko
Indiana University
Bloomington

BS accreditation

I was very pleased to read William Silvert's letter (March, page 9) proposing accreditation for graduate physics departments. Something of this sort is sorely needed at the bachelor's degree as well as at the graduate level.

At a university that, even in palmier days, had trouble recruiting from the better US undergraduate programs I have seen some remarkable specimens, and I would like to offer that the real abuse is at the BS level. Most persons who possess a PhD seem to have a fairly respectable education, but there are institutions where one can get a BS (and sometimes an MS) without learning anything at all about physics.

One point, however, is that an accreditation scheme must reflect the real quality of the output, and not merely represent the fulfillment of certain paper requirements. A good example of this problem is the accreditation scheme in metallurgy, where several weak southern schools are accredited, whereas Yale is not.

M. B. McNeil
Mississippi State University
State College

The humble cathedral

In his recent letter (March, page 13) Robert Karplus quoting from Thomas Von Foerster's review of both of our books asks if it is well that students should " . . . 'stand, perhaps in awe, before the "cathedral-like" structure of physics,' as Von Foerster expects from Cooper's text." Since this statement has now been printed twice in *physics today*, I feel obligated to explain, before somebody gets the wrong idea, that it was not my intention to make anyone stand in awe of anything—just the reverse.

I do admit that a photograph of the flying buttresses of a well known cathedral appears on the cover of my book and that there is a certain use of a metaphor (with which I was much taken at the time) relating the structure of physics to that of a cathedral. I would like to add, however, that I personally do not stand in awe of cathedrals—even the most magnificent. They are sometimes impressive, occasionally beautiful and often open, so that they can be entered, looked at, understood and even enjoyed. It was not ny intention, nor did it occur to me, that anyone should regard them otherwise.

I wrote my book in the fond hope that with it the reader could enter for himself (to use that metaphor a last time) our humble cathedral, to find there a structure as well fashioned, as comprehensible and as pleasing as that of any actual cathedral, and to be able to reassure himself of its earthly origins by "touching the stones themselves."

Leon N. Cooper
Brown University
Providence, R.I.

Roentgen correction

The encyclopediae tell us that Roentgen discovered his rays while physics professor at the University of Würzburg, not the University of Giessen, as mentioned in "We hear that," March, page 75.

Harald W. Straub
Bethesda, Maryland

Impedo duality debate

There is a well known but rarely mentioned historical analog for the much contemplated questions of wave-particle duality and determinism in quantum mechanics (see "Dualism in Quantum Theory," by Max Born and Walter Biem, August 1968, page 51 and "Quantum Mechanics and Reality" by Bryce S. DeWitt, September 1970, page 30). In the days of Galileo it was agreed that a moving body was endowed with something a resting body lacked, something akin to Phlogiston, Electrification or Chaloric. The something was commonly called "Impedo." But further description of Impedo presented complication. Two schools of thought arose. An English school took the description of Impedo to be mv (inertia and velocity conjointly) while the rival German school proported mv^2 the proper description.

Surely one must prove right and one in error, because a single quantity, Impedo, can not have two clearly different descriptions, behaving to satisfy one description in certain situations and the other description in other situations. As Edward Routh[1] has written: "It is