

## letters

dropped by Hurricane Agnes.

The basement of Stark Hall (housing our accelerator lab, ESR lab, atomic and nuclear labs, machine shop, equipment storage rooms, and the physics clubroom for undergraduate students) was completely submerged. The water reached a height of seven feet on the first floor (housing our E & M labs, electronic labs, optics lab, introductory physics labs, equipment room, a dark room, and ten professors' offices). The devastation was tremendous and to a large degree, complete.

In addition, all the physics texts and our holdings in some 83 different physics journals, which were located in the college's brand-new Eugene Sheddon Farley Library, were completely lost.

This means we must start anew in building up our department, which was called by a well known physicist of international repute to be "the best equipped small-college physics department east of the Mississippi River." We have already begun the rebuilding task with undaunted spirit (even to the extent of offering a pair of physics courses this summer). We would be most glad to hear from any readers who might be able to help us replace any of our losses.

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### Self-pacing: a caution

Judging from current literature, contacts with fellow physicists, and from the summer AAPT meeting in Albany, "self-paced" methods in one form or another are finding increased popularity as a mode of instruction in introductory physics courses. These forms differ, often greatly, from one another, and we would like to inject a cautionary note to those conducting or planning forms of self-paced courses.

Many educational institutions that have not previously done so are now admitting students from disadvantaged backgrounds. All introductory courses, and especially self-paced courses (due partly to their present novelty), must take into account the needs of these disadvantaged students. Our observations and those of others led us to believe that most of these students will experience difficulty in a course that does not impose some structure of activity upon them. For example, the extreme version of the self-paced course in which the student is given some sort of study guide and then left mostly on his own to achieve the guide's objectives will produce disastrous results for most disadvantaged students.

On the other hand, the performance

of the disadvantaged student will often be improved, sometimes dramatically, over that of a conventional course if certain forms of self-paced instruction are used. These include clearly understandable and interesting step-by-step procedures that lead the student from one successful experience to another, suggested timetables of development along with active monitoring of student progress, and then competent, understanding, individual tutoring for those students who fall behind (as many disadvantaged students will). There will, of course, be variations in the details depending on local circumstances.

We believe the main reasons disadvantaged students experience failure are poor instruction, an unusually disordered background, and a lack of motivation. An introductory course that requires them to exhibit a high degree of self-reliance and independent study in most instances is too great a transformation for them to handle. The students already find themselves in a society whose educational system is biased against them resulting in a built-in expectation for low achievement or failure. Increasing this bias by a technique of instruction which induces further frustration is educationally unsound.

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### Equipment first?

Referring to Alfred Romer's comment, in March (page 9) on my letter in December (page 11), I had thought it would be obvious that I deliberately sacrificed historical accuracy to make my point in a humorous and succinct manner.

Suffice it to say that even in 1576, the cost of a clever individual was small compared to that of large and sophisticated equipment, while the contributions of both could be of equal importance. Except for the subsequent work of Kepler and Newton (and the previous work of Copernicus) the meticulous observations of Tycho would have added little to our understanding of the Universe. Hence, had the powers-that-be seen fit to fire Kepler to use his salary to make some minor improvement in the apparatus, the result would have been most unpleasant for the future of science as well as for Kepler. Luckily he lived in an age that seems to have been more enlightened than our own.

While my letter was meant to be fun-

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## letters

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ny, the point I was trying to make was deadly serious. Since that point appears to have been missed, perhaps I should make it again in a less oblique manner. Let me call your attention to the recent article by George A. Kolstad (February, page 23) and in particular, to table 6 of that article. We can see that in fiscal 1971, the last year for which exact figures are available, out of \$118.6 million spent by the AEC on high-energy physics, \$89.2 million went to the seven largest accelerators, and it is probably the case that the bulk of the remaining \$29.4 million went to "users" groups of the same machines. The budget of either SLAC or the AGS is almost as much as the total AEC budget for low-energy physics in fiscal 1971 and almost twice the budget for medium-energy physics. We can expect that the situation will become even more lopsided when NAL becomes fully operational, the recently performed act of euthanasia on Princeton-Penn notwithstanding. Yet, while these tens of millions of dollars are being lavished on the accelerators and their "users," many individual researchers who may need a few thousand dollars for computer time, publication costs or to hire a postdoc are unable to obtain support, and younger physicists, like myself, who want only to work at their own profession in their own country (I am now in Germany because I was unable to find employment in the US) are treated as though they were asking for the moon.

High-energy physics could undoubtedly survive, in the US, with fewer than six large accelerators. It would probably survive even without NAL. However, physics cannot survive without physicists, and it will not survive as a viable discipline in the US for any great length of time if the next generation of physicists continues to be systematically decimated so that the accelerators and their "users" can continue to be supported at the level to which they have become accustomed.

One could only wish that the science administrators and "decision makers," upon whose good judgment, according to Kolstad, we must rely and for whose attention we must constantly compete, had enough foresight to have anticipated the effect of the costs of a machine such as NAL on the rest of physics. If they were concerned with the long-range welfare of physics (not to mention that of their fellow physicists) instead of their own narrow interests, then the first priority would be preserving the pool of highly trained manpower that we now have and maintaining an atmosphere in which our brightest young people will continue to enter the field (anyone clev-

er enough to make a significant contribution to physics is also bright enough to know better than to enter a field where his chances of eventually finding permanent employment are getting smaller and smaller). This would be done even at the cost of cutting back on the accelerators' budgets and sacrificing entirely such "goodies" as summer salaries and large travel budgets. Instead, we seem to have a deliberate policy of "equipment first and people second." Those of us who are the victims of this policy can only regard it, and those responsible for it, with bitterness, anger and cynicism, which we may sometimes attempt to express in a humorous way.

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## Name for surface tension

When, in 1924, the Deutsche Physikalische Gesellschaft proposed the name "Hertz" for the unit of frequency per second, Nernst objected, saying: "I do not see the necessity of introducing a new name; by the same reasoning one could as well call one liter per second one 'Falstaff.'"

Today, in the age of quasars, no physicist will deny the convenience and usefulness of the "Hertz."

With this in mind, I herewith propose in honor of Josiah Willard Gibbs that the unit of surface tension be named 1 "Gibbs" = 1 erg/cm<sup>2</sup>.

HANS M. CASSEL

Miami Beach, Florida

## Part time for both sexes

I am strongly in favor of the suggestion of J. C. Jackson in this column (June, page 76) that faculty positions of less than full time become accepted policy at all universities. I myself have been working at less than full time this past year, and plan to continue this schedule for many reasons outlined by Jackson. I would like to participate in raising our small children and in doing my share of the household chores, while my wife, who has almost as much schooling as I have, wanted very much to get back to her career. The current financial problems at our university have made it possible to overcome the administrative problems connected with a less than full-time appointment. There is at least one other faculty member in my department working at less than full time, and between us we may be making it possible for the department to pull through the financial crisis without being forced to