

PHIMSY

A physicist on a physicist

The other day I overheard one of the editors ranting about *The Associate Professor* (Simon and Schuster, \$3.95), a novel about a physicist named James Knudsen written by a physicist named Robert Pease. Since I read a few books in high school and since some of the editors here are refugee professors, I figured I knew enough about books and professors to qualify as reviewer. When I asked the editor to let me review it he says, "Sure, Phimsy, this should be up your alley: It's all about characters who are props, like the brooms in your closet."

Well, I read the book, but it didn't make much sense. I understood that it was about an associate physics professor and his job problems (who doesn't have 'em?), but I really couldn't see what it was supposed to mean. The book is in five chapters, each one a day in the academic week. Every day the professor's problems are greater. He has troubles with his boss about lateness (who doesn't?) and tenure. He is worried about all the new forms to fill out and the scary computer system his university uses for recording his lateness. He is also worried about a certain student who wears tight sweaters (something worth worrying about). And he tries to worry about his students' questions, but he can't build up much interest in them—either the students or the questions. Nothing seems to be his field: He reads *PHYSICS TODAY*, "which was more his speed" than *The Physical Review* and *Reviews of Modern Physics*, he cannot concentrate during faculty lectures, and he is unable to help a colleague because of his own preoccupations. There is an undercurrent of anxiety that failure is imminent.

I don't want to give the ending away, partly because it baffled me: I wasn't sure what happens to Knudsen. (The ranting editor said this was precisely the point: "Phimsy, the book deals with dehumanization in an educated society that is instrumental in creating and supporting a technological bureaucracy responsible—although

it denies the onus of that responsibility—for its own inhumanity. In short, the author presents, in a flat style that reflects the enervated consciousness of its characters, the effects of the computer age on those most closely related to its development. This is a particularly new phenomenon and therefore has no 'ending.'")

This seemed too complicated for me. I thought Knudsen was just another lonely man in a lonely society who was afraid to approach a girl whose grades in physics equaled her bra size.

Our readers abroad

"If you write that, Phimsy," a Brookhaven physicist told me, "it will ruin our relations with our Russian colleagues."

"But they don't read *PHYSICS TODAY*," I protested.

"Of course they do," he insisted.

To prove my point I consulted our foreign-reader list and found I was wrong. The USSR has 25 subscribers. Altogether foreign subscribers to *PHYSICS TODAY* total 5203 and make up about 10% of our total readership (a few more than 50 000 copies are mailed each month). The list shows that *PHYSICS TODAY* goes to 96 countries (including the US); for comparison, the United Nations has 122 members.

Canada, as you might expect, has the greatest number of foreign readers, 1169, followed by Japan with 651, the United Kingdom with 619, France with 410 and West Germany with 329. If you put it on a per-capita basis, Canada leads again with 72.6 readers per million inhabitants. Then follow Switzerland (36.6), Israel (36.4), Sweden (21.2), Denmark (13.8), Holland (11.9), Australia (11.8) and the UK (11.4). The US per-capita ratio is 216.6.

We go to all continents and across all economic boundaries. Eastern European Iron Curtain countries (excluding USSR) have 85 *PHYSICS TODAY* readers. In Africa there are 86 (including 34 in South Africa, 12 in



NOW 300 L/M—WAS 283 L/M
Welch Duo-Seal No. 1376B
1 x 10⁻⁴ TORR

Now all Welch Duo-Seal® vacuum pumps have increased capacities.

33 years of vacuum pump design and manufacturing technology now enables Welch to sizably increase the capacity of all two-stage Duo-Seal pumps. Size and appearance remains the same, but pumping speeds are increased up to 19% over previous models.

In 1933, Welch pioneered the internal vane design of mechanical vacuum pumps, long since proved to be the most efficient, vibration-free, quiet, long lasting, trouble-free vacuum pumps ever marketed. Although many other manufacturers have switched to the internal vane design, only Welch produces Duo-Seal pumps, the pumps with the patented Duo-Seal gas discharge design, which eliminates repumping gases.

Now, every two-stage Duo-Seal pump gives the added bonus of increased capacity, increases of up to 19%, depending on the model which fits your needs.

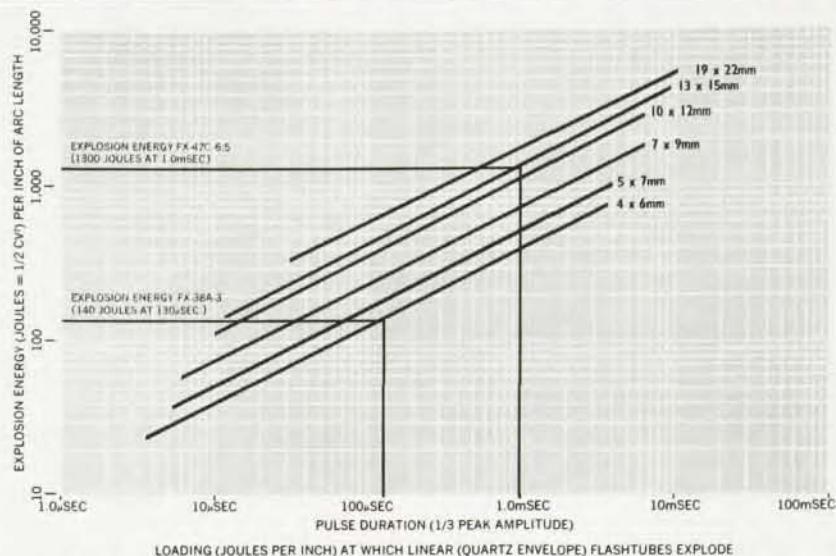
If you use vacuum, check on the Duo-Seal line. Welch maintains a staff of vacuum specialists who are at your service to help you select the right pump for your needs. Write The Welch Scientific Company, 7300 N. Linder Ave., Skokie, Illinois 60078 or call 312/677-0600.

WELCH
SCIENTIFIC

ONCE OVER LIGHTLY

Vol. 1, No. 3

PRODUCTS TO GENERATE, DETECT & MEASURE LIGHT



FLASHTUBE LOADING CHART

As determined experimentally by our staff, the above chart indicates (in joules per inch of arc length) the loading at which linear quartz flashtubes will explode. For a flashtube with a specific bore size and arc length, this explosion point is a function not only of the energy input per flash but also of flash duration. For optimum performance in free air at a given pulse duration, it is recommended that the energy per flash into a flashtube not exceed 70% of the explosion level. By operating below the 70% level, the life of a flashtube is increased substantially. For flashtube operation in a cavity, the energy input per flash should not exceed 40% of the explosion point. A copy of the chart can be found in Data Sheet 1002-B, Linear Xenon Flashtubes.

WITH AN EYE TOWARD SAFETY

More industrial firms, government and university laboratories are using Model 580 Radiometer and Model 580/585 Spectroradiometer System to detect, measure and monitor hazardous levels of ultraviolet, visible, infrared and laser radiation. These systems offer a convenient means for detecting and measuring both continuous and pulsed radiation over the spectral range from 0.2 to 1.2 microns (ultraviolet to near infrared). Safety engineers can then issue precautionary procedures and equipment to protect personnel operating in the area.

The Model 580 Radiometer, designed primarily for use with monochromatic sources such as lasers, has a wide dynamic range for measuring both low-level diode lasers as well as high-power solid-state

lasers with peak powers as high as 10 GW. The Model 580/585 Spectroradiometer measures broad-band (chromatic) light sources. With a monochromator grating system, the power and energy of a source at a given wavelength can be measured and then repeated at various wavelength settings over the spectral band of interest. The 580/585 can also operate into an external X-Y recorder for a direct plot of output vs. wavelength.

Write for data sheets and application notes on these two systems. You may find them enlightening.

SGD-444 PHOTODIODES ARE BETTER THAN EVER

Our engineers have once again proven their mettle by coming up with significantly improved versions of our popular SGD-444 series of photodiodes. Thus, we have been able to eliminate the confusing ABC suffixes which previously characterized the diodes with varying levels of response time, maximum voltage, NEP and D*. Now all SGD-444 diodes have capabilities and parameters equal to, or better than, the previous top-grade A-suffix diode.

The major improved SGD-444 specs for this large-area, 1.0cm² photodiode include a reduced maximum operating voltage of 150 volts (we determined higher operating bias levels are not required in 95% of the applications), a 10-nanosecond rise time, typical leakage current of 0.5 microamps at 100 volts, NEP equal to 5.9×10^{-13} watts, and quantum efficiency greater than 70% over a range from 0.6 to 0.9 microns. Take pen in hand, if you're interested, and request a copy of the new SGD-444 Series

data sheet and detailed applications note.

FLASHTUBE NEWS FLASH!

Six new tube types have been added to the standard line of high quality EG&G linear xenon flashtubes. They are: FX-98-3 (5mm bore, 3" arc length, 400 joules); FX-81-4 (10mm bore, 4" arc length, 3000 joules); FX-47C-3 (13mm bore, 3" arc length, 2250 joules); FX-47C-12 (13mm bore, 12" arc length, 9200 joules); FX-77-4 (19mm bore, 4" arc length, 7700 joules); and FX-77-8 (19mm bore, 4" arc length, 15400 joules).

Complete ratings on these types as well as updated information on older linear types are given in the recently data sheet 1002-B, Linear Xenon Flashtubes. It's yours for the writing.

ON COOLING PMT'S



Temperatures as low as -30°C can be achieved with our new, completely self-contained, Photomultiplier Tube Cooling Chamber, reports our man icily. It requires no pumps or dry ice, yet can effect very cold temperatures for minimizing dark current and the resultant shot noise.

Standard temperature controllers are available for stabilizing the temperature of the PMT from $\pm 0.5^{\circ}\text{C}$ down to a proportionally controlled $\pm 0.01^{\circ}\text{C}$. The standard EG&G chamber, which is $7\frac{3}{4}$ " square by $12\frac{1}{2}$ " long, is adaptable to any end-on PMT with a tube envelope up to 2" in diameter and up to 6" in length. All chambers have magnetic shielding around the tube, interchangeable tube sockets, dynode resistors, a double window to eliminate fogging, and a thermal limit switch for automatic power cutoff.

Applications include scintillation counting, star-tracking systems, photometry, flying spot generators, Cerenkov radiation measurement, laser detection, industrial controls, colorimetry and timing measurements.

All models of the standard chamber are available for delivery within four weeks.



EG&G INC.

161 BROOKLINE AVE., BOSTON, MASS. 02215

Nigeria, 8 in Egypt and two to five in Malawi, Liberia, Ghana, Kenya, Tanzania, Uganda and Congo). South American readers total 197 with Mexico (64), Argentina (29), Brazil (23) and Venezuela (19) having the highest numbers. 921 copies go each month to Asia (including two to mainland China), and 154 to Australia and New Zealand. Western Europe leads the other foreign continents with 2407.

We wonder why

"Measurements were made using a 30-cm, 4-mm-bore He-Ne laser . . ."

"In the Raman effect one observes the sidebands introduced onto light following optical double-quantum transitions . . ."

"Comparison with spectra obtained using conventional mercury arc excitation . . ."

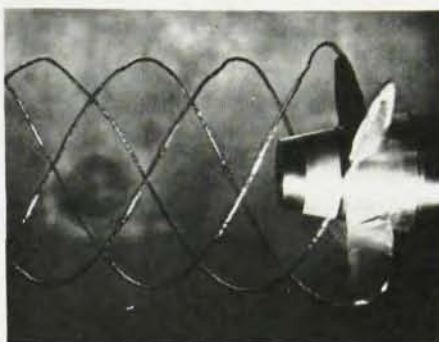
"Charge-transfer cross sections are measured using projectile ions . . ."

We often wonder why the dangling participle, that faceless, graceless breach of syntax that represents a real barrier between the writer or speaker and what he is trying to say has so great an appeal for physicists.

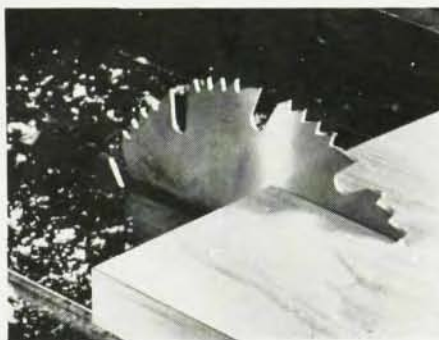
Bobbing bird beats beam problem

James Boyden of Electro-Optical Systems found it was a long way from his laser to the mountain mirror that sent the beam back to him. He needed a shutter at the mirror so that he could tell how much light was coming back in the beam itself and how much was being scattered out of the beam and then back again to the detector. An electrically driven chopper at the mirror would mean climbing the mountain every week in order to replace the battery. So Boyden found a better way. He uses one of those bobbing birds that dunks its head, straightens up, interrupting the laser beam, and then returns for another drink when evaporation cools its head, liquid runs up the neck and the system becomes topheavy again. With a water-alcohol solution in the drinking trough, the bird will bob along for two months without replenishment. □

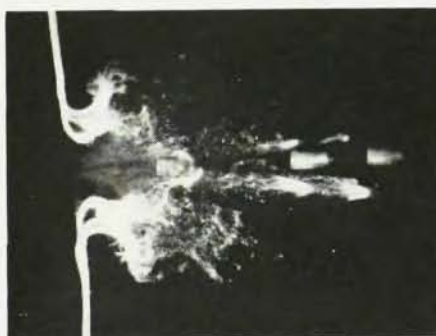
"Stop" motion with a Strobotac



A marine screw. Note tip vortex cavitation.



A table saw under variable loading.



Multiple-flash photo of a single bullet cutting a string.



Periodic Motion

Just aim the light from a Strobotac® electronic stroboscope and adjust the flashing rate until the motion appears stopped, then read speed directly. Or offset the flashing rate slightly for a slow-motion effect. Photograph it if you wish.

Nonperiodic, Repetitive Motion

Synchronize the Strobotac to the motion with an external photoelectric pickoff or other transducer. The flashing rate will follow any changes in speed and the motion will appear stopped. Observe other events in the motion by using a Flash-Delay unit to vary the time it takes the signal to trigger the flash. Photograph it if you wish.

Transient Motion

Take pictures of the event, using one or more high-intensity flashes synchronized to the event. Analyze the motion directly from the photographs.

General Radio offers a wide variety of stroboscopes and accessories to "stop" any motion. Measure speed to 1 million rpm with 1% accuracy . . . simulate slow motion . . . analyze motion . . . take high-speed photographs with a conventional camera. Prices start at \$180. Write for complete information.

GENERAL RADIO

W. Concord, Massachusetts 01781

