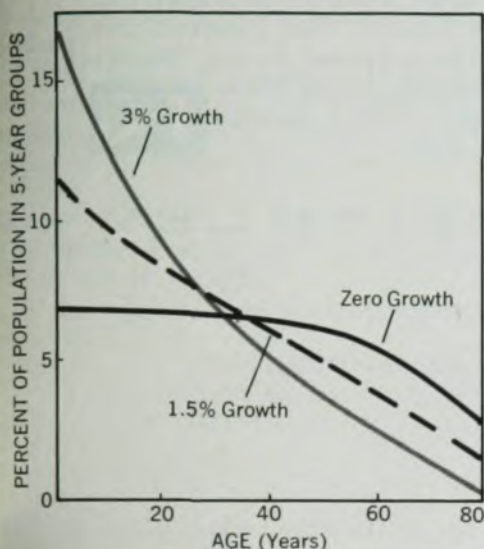


## letters

(41), which indicate a progression of "older" creative work as the research becomes more applied. Similarly, among the physicists, the experimentalists are five years older than their theoretical colleagues. It would appear clear that theoretical brilliance is less and empirical experience more of a factor in the success of businessmen and politicians than of physicists. An



**Hypothetical age distributions** under steady state with various rates of growth. The growth rates indicated are in percent per year. Figure 2

older average age of creativity clearly improves the desirability of a stationary population as opposed to a growing one, as is evident from figure 2. Of course, there are some areas in which the earlier years are most creative; athletics is an obvious example. But, considering the entire spectrum of innovative activities, fears that the age distribution of a stationary population will bring stagnation due to fewer creative people appear unjustified.

\* \* \*

Several valuable discussions with Alan Sweezy and constructive comments from Harriet Zuckerman are gratefully acknowledged. This work was supported, in part, by the Caltech Population Program.

## References

1. A. J. Coale, "Should the U. S. Start a Campaign for Fewer Births?" *Population Index*, 34, No. 4. Office of Population Research, Princeton University (1968).
2. H. Zuckerman, R. K. Merton, "Age, Aging and Age Structure in Science," in *A Theory of Age Stratification*, (M. W. Riley, M. Johnson, A. Foner, eds.) Volume III of *Aging and Society*, Russell Sage Foundation, New York (1972).

A. J. OWENS  
Lake Forest College  
Lake Forest, Illinois

## Insecurity in industrial jobs

Gertrude Scharff-Goldhaber (February, page 9) has vividly and sympathetically described the plight and frustration experienced by many physicists, who, after a short career, are squeezed out of academic positions. This description is followed by many suggestions aimed at improving employment prospects.

I wish to draw attention to the fact that entirely similar problems exist for industrial physicists. Also at least one of the escape routes mentioned by Scharff-Goldhaber, that into medicine, is blocked by nearly insurmountable obstacles. Finally, I shall add some proposals of my own.

Let me start by briefly describing certain problems in the industrial employment of physicists. The managers of various industrial and semi-industrial laboratories have recently become concerned about increases in the average age of their technical staff. It has been advocated<sup>1</sup> that average age must be kept down in order to ensure vitality and productivity adequate for institutional survival. In addition, steps to achieve this goal have been proposed and apparently are being implemented.<sup>1</sup>

It is the nature of things that it is the older physicist who must pay the price.<sup>2</sup> My experience leads me to believe that this trend will develop into a major problem for industrial physicists. I am sure that any escape of academic physicists into industry is difficult; even if at first successful, it is bound to be a short-term solution.

I believe that the problem is serious enough to warrant the suggestion that an appropriate study be made of possible discrimination on account of age in the employment of physicists. There is a Federal Law prohibiting such discrimination and this law is just as valid as that which prohibits discrimination on account of race. Any enforcement of that law, difficult as it may be, will be an important aid in alleviating some of the consequences of the present employment crisis.

Escape of physicists into medical careers is extremely difficult, if it is understood that a medical career is meant to imply any medical or dental practice. I have thoroughly explored this avenue and found that, even if all the necessary premedical requirements have been completely fulfilled, the doors to appropriate training remain closed. The reasons have been best summarized by a senior admissions officer at NYU medical school and are as follows:

► Age at entry is higher than usual and results in less service returned to the medical profession. This decreases the return upon dollars invested in education by the school in question.

# BRAND NEW! HIGH VOLTAGE TRIGGERS



Applications of Model TGE-2 high-voltage fast-rise pulse generators include the triggering of: spark gaps . . . ignitrons . . . and Marx generators.

The main features include:

- Fast Rise Time . . . ~ 5 nanosec.
- Extremely Low Jitter . . . ~ 3 nanosec.
- High Amplitude . . . 50kV pulse output.
- Extremely rugged construction.

TGE triggers represent years of development in the field of high energy pulse generators. They are ideal for use with our own discharge switches as well as other commercial and laboratory units. TGE's eliminate the need for elaborate triggering circuitry and may be parallel or sequentially fired with minimum interpulse jitter.

All triggers are constructed with a rugged cast epoxy housing to withstand severe shock and vibration. Available on short delivery.

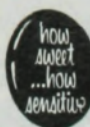
For further information on TGE's and high voltage capacitors/systems write or call:

TEL: 617 828-3366  
TELEX: 92-4427

**TOBE**  
—DEUTSCHMANN—  
**LABORATORIES**

CANTON, MASSACHUSETTS 02021





Now you can save time and eliminate the complicated set-ups normally required to make low level dc measurements. And do it the sweetest way . . . with state-of-the-art precision. The time-shaver is our all-new, all solid-state Model 180 Digital Nanovoltmeter. Simply connect it directly to your unknown potential. And . . . measure. All the way down to 100 microvolts, with  $4\frac{1}{2}$ -digit resolution.

What puts it all together is a sweet combination of features. Like automatic ranging. Remote programming.

Analog output. Floating input isolated from output. Zero suppression. And a systems-oriented BCD output for automating data acquisition that makes the 180 totally computer compatible. Plus specs that sweeten its amazing sensitivity. Like  $\pm 0.05\%$  accuracy, full scale. 30 megohms input impedance. Less than 30 nV noise, p-p. Normal mode rejection greater than 90 dB at line frequency, 75 dB at twice line frequency. And a common mode rejection ratio greater than 160 dB at dc, line frequency or twice line frequency.

Add these features and specs and you have a hands-down winner for labs, production work and systems applications at only \$2190, including BCD output; \$1995 without.

See how sweetly the Model 180 puts it all together. And get our latest "How Sweet . . ." button. Call your Keithley Sales Engineer or contact us direct. Keithley Instruments, Inc., 28775 Aurora Road, Cleveland, Ohio 44139. In Europe: 14, Ave. Villardin, 1009 Pully, Suisse. Prices slightly higher outside the U.S.A.



KEITHLEY

# THE SWEETEST WAY EVER TO TAP 30 NANOVOLTS OUT OF 100 MICROVOLTS



*The Model 180 Digital Nanovoltmeter . . . latest in the Keithley tradition of sensitive instrumentation*

Circle No. 11 on Reader Service Card



► It is difficult to judge the qualifications of an individual from his performance in the required premedical subjects, since he already has had extensive scientific training.

► The motivation of any individual who wishes to change careers late in life must be seriously questioned. Such questioning must be even more penetrating should the attempted change coincide with employment difficulties.

I shall leave it to the reader to judge how much of this reasoning might be applied to physicists seeking careers outside of their chosen profession.

#### References

1. W. D. Decker, C. M. Van Atta, *Research Management* 16, 16 (1973).
2. G. Rohringer, *Research Management* (to be published).

GERHARD ROHRINGER  
General Electric—TEMPO  
Santa Barbara, California

The conclusion drawn with alarm by Nathan Dean (May, page 9) from his analysis of the future supply and demand of physicists that "we are facing a serious decline in graduate enrollment in physics" unless corrective measures are taken, highlights a basic conflict in the physics community. For the purpose of this discussion, I include industrial physicists in that community, although I recognize that this is not the sense with which it usually is understood in PHYSICS TODAY.

For tenured university physicists, the major threat to job security is a reduction in physics students. Obviously, it is in their best interests to encourage as many students as possible to take physics. For the industrial physicist, one major threat to job security is an increase in graduates. Obviously, they would hope that the number of graduates decreased. On this most basic point, the two halves of the physics community are enemies.

Many of my university friends have denied this and accused me of overreacting to the recent shortage of industrial positions. They are quick to point out that their students are receiving attractive offers from industry and that this must mean that industry has again recognized a need for continually expanding research programs. Unfortunately, what they cannot accept is that in many cases, the new graduate is at least indirectly taking the place of an older physicist. Industry does not operate on a tenure system. When younger, competent people are available at lower salaries than older, competent people, the possibility

of increased cost effectiveness does not escape industrial management. Within the university tenure system, this element of competition is absent.

I do not know any instances in which older physicists have been replaced directly by younger physicists. However, two indirect methods are commonplace. New programs are initiated or expanded by hiring fresh PhD's while older programs, possibly in another group, division, and so on are phased out with subsequent layoff of experienced people. The two events may not be done consciously; that is, it is not part of an extermination plan, but the effect on the older physicist is the same. The second follows from the first. Once laid off, the older higher-priced physicist competes against the new graduates for his livelihood. From the most practical point of view, it would obviously be easier for him to find a new job if there were fewer new graduates.

The conflict between the university community and the industrial community will not be resolved easily. One solution would be for industry to grant tenure, but we all recognize the impracticability of expecting that. Another would be for universities to eliminate tenure, but we all recognize the heresy in asking that. The only hope then may be for those who enjoy the security of tenure to accept fully the responsibilities incumbent upon them, particularly their responsibilities to the entire physics community.

WILLIAM D. DOYLE  
Dresher, Pennsylvania

### Year later at Wilkes-Barre

Last October my letter titled "Help for Hurricane Victim" (page 13) described the losses suffered by our physics department in the flooding on 23 June 1972 caused by Hurricane Agnes.

One year later, we are more than "back on our feet." We owe a great deal of thanks to so many people that we ask to be forgiven if by some oversight we have failed to send a letter of appreciation.

To everyone, from that certain Nobel Prize winner and other famous physicists to those as-yet-unheard-of graduate students who sent us journals and textbooks, from outstanding physics departments to the not-so-well-known that sent equipment and books, from the industrial giants to the government-operated research laboratories that donated in the same spirit and especially to those farsighted government officials who came to our aid in the noblest manner, we extend our warmest and most sincere appreciation.

Now, if we can all apply this same

# NO nitrogen GAS SHORTAGE

with Laser Energy's exclusive sealed plasma tube Nitrogen Laser.



Introducing LEI's unique sealed tube N2 laser dubbed the N2-50. This unique development in Nitrogen Laser technology offers features not available with other Nitrogen lasers at any price:

#### Features

True ultra-violet laser output at 337.1 nm—TEM<sub>00</sub> mode operation available • 50 kilowatts peak power—6 nsec pulse width • One milliradian beam divergence • Variable repetition rate—1-100 pulses per second • Sealed-off laser tube—no need for pumps, water supplies or gas bottles • 115 VAC operation/200 Watts input/battery operation available • Portable: Laser head—17.25" x 5.50" x 4.25" and 5 pounds light, ideal for field operation • Long life, unconditional one year warranty.

#### Application:

The N2-50 is compatible with our 337 Dye laser and will probably find immediate application in efficient longitudinal dye laser pumping, fluorescence microscopy and time resolved spectroscopy.

The N2-50 is delivered ready to use, just plug in and turn on for only \$6000.00.



320 Washington Street  
Rochester, New York 14625 (716) 385-1150