

letters

fuel reprocessing plants, worldwide K^{85} , worldwide H^3 (from nuclear power) and nondefense AEC facilities, the nuclear-power contribution becomes substantially higher, although by the year 2000 it is still an order of magnitude less than the dose from fallout. Estimated doses in 2000 from K^{85} and H^3 , if they continue to be released to the environment, are 12 and 8400 man-rems, respectively, with approximately one-half of the tritium coming from the nuclear-power industry. Release from fuel reprocessing plants in 2000 is estimated to be 65 000 man-rems. Those values are taken from the most recent draft of "Estimates of Ionization Radiation Doses in the United States, 1960-2000," prepared under the direction of the Office of Radiation Programs of the Environmental Protection Agency.

THOMAS B. COCHRAN
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Sexagesimal reciprocals

I was fascinated by the recent letters that tried to represent the fine structure constant by a product of the form

$$2^i 3^j 5^k \pi^l$$

where i, j, k and l are low-order integer fractions, because of the similarity to a totally different problem. Whenever possible, the Babylonians reduced division to multiplication by means of reciprocal tables. In the sexagesimal system, numbers of the form

$$2^i 3^j 5^k$$

all have "regular" (that is, terminating) reciprocals when i, j and k are integers. Several years ago, when I set out to calculate all the 11-digit regular sexagesimal reciprocals (as an aid to the cuneiformists) I had to estimate how many there would be. I found the number (3338) by essentially the same geometrical scheme that Asher Peres used in your November issue (page 9) to estimate the number of solutions for the fine structure constant. The results of my calculations are found in the *Transactions of the American Philosophical Society*, 55, part 8 (1965).

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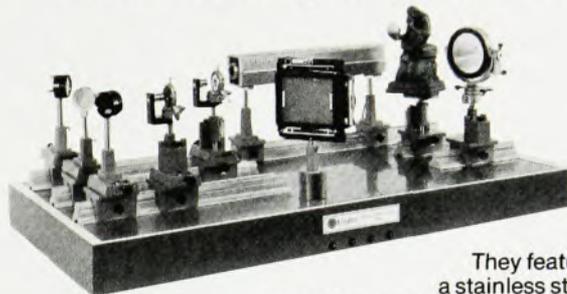
Unemployment understated?

I am astonished at the extent to which the employment problem in physics has been understated among even the pessimists in your letters column.

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The true dimensions of the problem can be described as follows:

- ▶ Initial aerospace and defense cutbacks (huge in terms of purchasing power) have been replaced in government budgets by expenditures involving a much smaller proportion of physicist's salaries.
- ▶ Disenchantment in industry with R&D, helped along by the carping criticism of "instant ecologists," Naderite fanatics, and the nationwide switch in emphasis from long-term planning to short-term results, has been proceeding apace.
- ▶ At reduced levels of effort, overhead and administration takes up more of the R&D budgets, leaving even less for physicists.
- ▶ Mainly in government, but also in industry, R&D executives with a degree are seeking to survive personnel cuts by returning to the lab. As their rank will usually make this attempt successful, a net influx to physics from administration results.
- ▶ A substantial fraction of physics manpower is employed in serving other physicists, in the instruments industry, reference services, and to a small extent in scientific societies, allowing a low-gain chain reaction to proceed.
- ▶ But the really explosive unemployment chain reaction is that provided by the universities. Less jobs eventually mean less students, and given the financial situation of the universities this means less professors. But for the smallest likely cut in the number of students, the number of surplus professors is enough to take care of all the jobs the remainder of the students aspire to. Whoever wins in that competition, physics loses.

The postdoctoral holding pattern, not meant for prolonged situations, has almost outlived its usefulness as a buffer. New employment opportunities, unless you are talking of the Harvard PhD's now working in garbage collection and as a charwoman here in Boston, will not exert a measurable influence. Notice periods, compulsory vacations, use of physicists as their own technicians and secretaries, have already given us all the time delay they can. Unemployment will therefore now start in earnest.

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Breakdown of reason

Reading W. David Shambroom's rather incoherent letter in the August issue, (page 11), one wonders whatever happened to reason at Harvard? Shambroom studiously ignores the