(Simpson thinks $R = 100$ is a convenient choice.) The equation is, of course, the same as Calloway's, with the unit of time taken as $A_{\max}/R = A_{\text{std}}$. It can also be put into the familiar form

$$A_n = A_{\text{std}}\, e^{n\lambda},$$

with $\lambda = (\ln R)/N$. (With Simpson's choice of $R = 100$, $A_n = 0.01\ A_{\max}e^{n\lambda}$, $\lambda = 4.605/N$.)

The following table shows the ages of the members of a set for which $A_{\max} = 70$ years, $R = 100$, and $N = 10$. (Note that the Calloway unit of time for this case is 0.70 year.)

n	A_n (yr)	n	A_n (yr)
1	1.10	6	11.0
2	1.75	7	17.5
3	2.80	8	28.0
4	4.40	9	44.0
5	7.00	10	70.0

A. HERSCHMAN
The Physical Review,
Brookhaven National Laboratory, Upton, Long Island, New York 11973

Computer-Time Allocation

In suggesting that a computation center, like a library, should provide its services free, Anthony Ralston (Letters, 29 April) has oversimplified a complex and increasingly important problem.

The demand for computing on any university campus is virtually unlimited if the service is free. When a university's computing power is multiplied by an order of magnitude, the new facilities are saturated within 2 or 3 years. Therefore, computing services must be allocated—the price mechanism being, of course, only one of several possible mechanisms. To simplify the problem, the "library" principle may be applied up to a limit: say everyone could be allowed $100 worth of free service per year. Allocation would then limit only large users. Some such policies are already in effect on many campuses.

The real question about large users, however, is not whether the accounting should be done in dollars or hours but who should make the allocations. One alternative is to create a process on the campus for weighing the competing claims of quantum calculations for large molecules, research in artificial intelligence, statistical analysis of the business cycle, and concordances of Goethe's works. Spare me from participation in that process!

A second alternative is to have the value of computing judged in relation to its value to the research projects it is supposed to serve—that is, as part of the regular foundation and government processes for making research grants. Chemical computing would then be evaluated by chemists, construction of concordances by humanists. There needs to be (and already is, of course) a substantial allocation for the development of computer science itself. This alternative is in the spirit of "program budgeting" or "cost-benefit analysis," now popular in the federal government.

It may be objected that the problem of balancing the chemist against the humanist simply reappears at a higher level—at the level of the federal budget for NSF and the Humanities Foundation. So it does, but that is unavoidable, and it is better that we make use of existing arrangements for these political decisions than that every campus duplicate such arrangements.

HERBERT A. SIMON
Graduate School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh, Pennsylvania

Safety: A Parallel

Many individuals who have been following the accounts in *Science* of the current controversy over automobile and traffic safety will, I believe, be interested in reading "Bursting boilers and the federal power," by John G. Burke [*Technology and Culture* **7**, No. 1, 1–23 (winter 1966)].

The story in a nutshell is this: "Marine boiler explosions . . . provoked a crisis in the safe application of steam power, which led to a marked change in American political attitudes. The change, however, was not abrupt but evolved between 1816 and 1852" and culminated in Congress passing "the first positive regulatory legislation and [creating] the first agency empowered to supervise and direct the internal affairs of a sector of private enterprise."

I found Burke's detailed account of the story to be fascinating reading against the background of current events.

CHURCHILL EISENHART
9629 Elrod Road, Rock Creek Hills, Kensington, Maryland