gin, unusual virulence, and unprecedented epidemiology. If scientists do not conclude from this juxtaposition that it would be good to face up to ignorance in areas in which we have no experience, instead of engaging in facile speculation, I hope the public will.

I am not claiming that the mystery disease is a result of genetic manipulation, since obviously no one knows its cause. But I wish to point out that to pretend to know more than we do about causes and prevention of disease can only discredit science and scientists. (At this writing, infectious and toxic agents have in turn been ruled out as causes of "Legionnaire's Disease" and today's newspaper talks about Fort Detrick and possible unknown varieties of infectious agents.)

A further point: *if* a recombinant (and perhaps short-lived) coliform organism ever were to produce an outbreak of an epidemic, it might well be nearly impossible to identify or to culture as the cause in the presence of all the other, normal strains of *Escherichia coli* that grow in us.

Davis suggests that medical history shows such risks must be taken and implies that the high child mortality rate of a century ago was reduced through medical intervention. This is not true. Almost nine-tenths of the decline in the combined death rate from scarlet fever, whooping cough, diphtheria, and measles in children under age 15 occurred before the introduction of specific therapies or vaccinations; and similarly with tuberculosis, cholera, typhoid, and most other infectious diseases. The most probable reasons for these reductions were improvements in nutrition and public health measures—better housing, clean water, and so forth. The specific medical measures of the last three to four decades only clipped the tail off the asymptotic curve. This is not to underrate the importance of every life saved. Furthermore, those risks were taken to cure known diseases, not to create new ones.

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Computers: Reassuring, but Dispensable

Paul Chernoff's insightful letter on understanding mathematical proofs (23 July, p. 276) includes a remark that is perhaps misleading. He states that Shanks spent years calculating pi to 707 decimal places and implies that it was only after the advent of computers that the last 200 digits were found to be wrong. But it did not take computers to inspire verification. As early as 1854 Shanks' approximation was verified to 500 decimal places. In 1945 it was found to be in error past 527 places. D. F. Ferguson, of the Royal Naval College and the University of Manchester, extended the result to 808 places, cowardly resorting to the mechanical calculator to obtain the last 300 or so. In 1949, George W. Reitwiesner and his colleagues verified the work, extending the approximation to 2035 figures on the Electronic Numerical Integrator and Calculator (ENIAC) at the Aberdeen Proving Ground. The computer was convenient and reassuring, but hardly indispensable to uncover the error.

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Open Debate

I can only assume that Frank J. Munger (Letters, 30 July, p. 358) had no opportunity to express his "concern for freedom of information" while National Science Foundation (NSF) officials physically barred a member of our staff from attending a meeting of the former advisory committee for research, of which he was a member, since the meeting was held behind closed doors, in violation of the Federal Advisory Committee Act.

I must also assume that he was unaware of the nearly unanimous criticism of the committee's operation, as reflected in letters from past committee members, which the committee reluctantly agreed to supply but which were not included in their report.

Munger also calls for "open debate" on issues such as "fewer but larger grants," which Nicholas Wade correctly reported in his article (News and Comment, 28 May, p. 872) was among the suggestions offered by NSF officials as a potential way of cutting administrative costs.

Unfortunately, such open debate in the scientific community would require access to information on plans and problems, which NSF has been so unwilling to provide in the past. Thanks, in part, to such discussion of the issues, NSF has, in recent weeks, come closer to being the open-door, nonsecret organization that it should be.

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