considered in the light of the findings of glaciologists, demonstrates the truth of this statement.

The greenhouse effect, attributed to mankind's flooding of the atmosphere with carbon dioxide, chlorofluorocarbons, methane and so on, is supposed to bring about a large rise in the temperature of the atmosphere, which will cause the melting of icebergs and the polar ice caps and the retreat of mountain glaciers. In less than 100 years this great volume of added water will supposedly raise sea level by anywhere from 0.5 to 2 meters above its present level and flood large areas of lowlands, like Louisiana or Bangladesh. As empirical proof, the proponents of this theory cite a possible increase in air temperature of 0.4 °C, based on temperature measurements going back as much as 100 years, and an observed increase in atmospheric carbon dioxide of about 25% during the same period. All well and good.

Based on this information and the results of computer models we are supposed to spend billions of dollars to reduce the use of fossil fuels, reduce irrigation (water vapor is a greenhouse gas), drive smaller, more dangerous cars, reduce air conditioning, reduce the use of power, stop eating meat (cows produce megatonnages of methane) and embark on a war against termites (termites also produce megatonnages of methane), to name just a few of the expensive steps proposed to reduce the sea level rise.

But when the glaciologists look at their data, here are the findings: Fred B. Woods of the Office of Technology Assessment published a paper[1] stating that the proportion of glaciers that are advancing increased from about 5.7% in 1960 to more than 57% in 1980, hardly a sign that things are getting warmer. *Science* had a paper[2] on the growth of the Greenland ice sheet as determined from satellite measurements of surface elevations at more than 5900 points on the Greenland ice cap between 1978 and 1985: The elevation of the ice increased by approximately 0.2 meters a year. Charles R. Bentley of the University of Wisconsin, Madison, who has been studying the Antarctic ice pack over the past 30 years, has reported that as far as he can determine, the accumulation of snow there is outpacing the rate at which ice is melting or is discharged into the ocean.[3] He thinks, based purely on this, that the sea level should be *falling* at about 0.4 mm a year.

So actual field data do not support the global warming theory, which is predicated on primitive and unverified computer models. While verifiable models are being developed, we can devote our funds to something useful, like filling potholes, repairing highway bridges or improving education. There is nothing like taking a little time before placing all of our bets on a theory that, more than likely, is so inadequate as to be completely wrong when applied to the real world.

References

1. F. B. Woods, in *Arctic and Alpine Research in 1988*, U. Colorado, Boulder (1989), p. 404.
2. H. J. Zwally, A. C. Brenner, J. A. Major, R. A. Bindschadler, J. G. Marsh, Science **246**, 1587 (1989).
3. C. R. Bentley, Trans. Am. Geophys. Union **70**, 1002 (1989).

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Was Stan Ulam Lost in 'The Lost Café'?

Peter Lax reviewed in PHYSICS TODAY (June 1989, page 69) *From Cardinals to Chaos*, the republication of the memorial issue of *Los Alamos Science* dedicated to Stanislaw Ulam. The book is a magnificent homage to a unique and very complex person; however, the interesting opening essay by Gian-Carlo Rota, "The Lost Café," strikes me as written about somebody else and not the Stan that I had known since our Harvard days half a century ago.

I visited the Ulams when they lived in Wisconsin. I do not remember any impression of Stan "tortured" and at "the end of the world" in a "nonexistent" ambience, as Rota describes. I remember that there were financial problems connected in part with Stan's brother Adam's education, but also that Stan enjoyed immensely the company of the French physicist Leon Brillouin, whom the fortunes of war had also brought to Madison.

Another discrepancy has to do with Stan's condition before and after his operation for encephalitis. Rota states that after the operation Stan had difficulty with a quadratic equation—that is, with high school mathematics. Being a chemist, I never had much occasion to discuss mathematics with him. I remember, however, that the last time I saw him, a couple of years before his death, he bragged of still being able to recite the alphabetical roll call of his high school class. Well, memory may be that selective, but I doubt it.

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Rota sees a lack of "*Sitzfleisch*," the stick-to-it-iveness needed for hard work, as an aftermath of the operation. But he contradicts this later, when he mentions that "for about two years" Stan and Cornelius Everett "worked frantically" on the "Super." If this was not *Sitzfleisch*, I don't know what is.

Another argument of Rota's is that Stan's dressing standards changed from "meticulous" to "visibly careless" after the operation. It should be noted, however, that this change coincided with Stan's move from Europe and New England to the West and that there was a general liberalizing of American customs during the postwar period.

Stan often talked about the operation. He liked to tell how his Polish tastes came to the fore as he lay recovering: Though semiconscious, he insisted that he be served that delicious staple of the Polish diet, potatoes! When I asked him about any aftereffects of the operation he said that within a few months there were none. I have no reason to doubt him.

My own amateur-psychologist insight would be that the operation prevented Stan from giving in to any temptation to rest on his laurels, as he had a perfectly natural need to prove to himself that he was truly undamaged.

"The Lost Café" makes very good reading. However, in view of these factual discrepancies that I was able to identify on the basis of my own knowledge, as well as additional discrepancies and important omissions for which there is no space, it must contain many others and thus should be taken as a portrait of Stan only with a large grain of salt.

KAROL J. MYSELS
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6/89

ROTA REPLIES: To answer Karol Mysels's criticisms point by point:

▷ "I visited the Ulams when they lived in Wisconsin. I do not remember any impression of Stan 'tortured' and 'at the end of the world' in a 'nonexistent' ambience."

This is a rudimentary misquote of what I wrote. I wrote that the *teaching of elementary calculus* was a torture for Stan. This in no way implies that Stan should have felt "tortured" *in Wisconsin*. Quite the contrary, he probably felt relieved at the end of each class.

I wrote that "Madison . . . was the end of the world for a worldly young European." This is *my* opinion, not that of Stan, to whom Mysels mistakenly attributes it. Similarly, the statement that the ambience was "nonexistent" is my opinion, not Stan's. It is physically impossible that Mysels should have seen my opinions of half a century later reflected in Stan's face when Mysels visited him in Wisconsin in the early 1940s.

▷ In objecting to my description of the changes in Stan's mathematical abilities after his encephalitis operation, Mysels writes that "a couple of years before his death, he bragged of still being able to recite the alphabetical roll call of his high school class."

A good memory is a mental function that is largely independent of mathematical ability. Mysels's episode supports the notion that Stan always had an amazing memory, which is not in dispute. However, even the strongest memory will not help in solving quadratic equations.

▷ Cornelius Everett did *all* the computations for the "Super," while Stan came up with the "ideas" and wrote next to nothing. All the lab reports were written entirely by Everett, and Stan often did not even bother to proofread them. Stan never did sit at a desk immersed in frantic mathematical work, the way ordinary people think mathematicians ought to behave. He let Everett do both the frantic and the nonfrantic work. He did, however, frantically pace up and down the corridors of the Los Alamos Laboratory all day long, talking to everybody and to nobody.

"Lack of *Sitzfleisch*" and "working frantically" are not logically incompatible conditions, as Mysels mistakenly claims.

▷ "Stan's dressing standards changed from 'meticulous' to 'visibly careless.' . . . This change coincided with Stan's move from Europe and New England to the West."

This is not what I wrote, and it is factually wrong to boot. Stan's dressing standards did not change until after his operation, well after his move from Europe, a change to which Paul Stein (who knew and worked with Stan in Los Alamos, both before and after Stan's operation) bore witness, and a change that I record in my essay.

Contrary to Mysels's perception, "The Lost Café" is not a biography in the pedestrian sense of the word. I fully agree that one can find many failings and a great many serious omissions in it, and I am grateful to those careful readers who have pointed them out to me. I hope to correct as many as I can find in preparing the final draft, to be published under the auspices of the Sloan Foundation. I do not believe, however, that the draft will benefit from Mysels's suggested changes.

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1/90

Grant Grievances and Meeting Merits

Rustum Roy (December 1989, page 97) is correct in concluding that for the cost-effectiveness of US scientific research to improve, the present system of research support must go. If grants were based on past performance instead of grant proposals, not only could the time and effort wasted on preparing such proposals be devoted to research, but also the most money would go to the best researchers instead of to the best "salesmen." Such a system already exists in Canada, where any faculty member engaged in research can get a small grant, but very large grants are virtually nonexistent. In Canada, in addition, research funds do *not* cover "overhead" and "summer salaries" but must be used for the direct costs of research.

I disagree with Roy, however, about the usefulness of scientific meetings. It is precisely because "the 'literature' has become meaningless as a usable resource" that attendance at meetings has become mandatory. It is through informal discussions with colleagues in the hallways, rather than attendance at the formal sessions, that one is able to keep up with what is going on in one's field.

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12/89

Corrections

May, page 79—The first sentence of the bottom paragraph of the first column should have said that the educational system in the US is highly *de*centralized.

May, page 117—In Lev Okun's letter, the book by R. S. Serway and J. S. Faughn should have been reference 1, and the book by M. G. Bowler should have been reference 2.

January, page 18—The last sentence of the first complete paragraph on the page should read, "This maneuver enabled the experimenters to use unpolarized neutrons." The second sentence in the second paragraph should read, "This field, which affected only one of the two neutron beams. . . ." ■