

LETTERS

Oppie's Colleagues Affirm His Leadership in Manhattan Project

As former members of the wartime Los Alamos laboratory, we were appalled by Lawrence Cranberg's letter (PHYSICS TODAY, September 1999, page 78), questioning J. Robert Oppenheimer's leadership.

Oppenheimer was a brilliant leader of Los Alamos. He had an unusually quick mind, understanding any new fact immediately and assimilating it in the overall picture of the project. At all times he was fully informed on all of the scientific developments, whether theoretical or experimental, in physics, chemistry, or metallurgy, that were relevant to the success of the project. He knew what was happening in the machine shops, and where Los Alamos was in terms of procuring whatever was needed. He was aware of both the latest successes and the most important unresolved questions. And he kept us all informed.

To keep the scientific staff current on the project's progress, Oppie established three levels of continuing communication. First was the governing board of about ten people who made the decisions on the scientific program. Second was the coordinating council of about 60 people, including group leaders and other senior scientists, where the participants reported their recent successes and ongoing problems. Often a person from a quite different part of the lab would make useful suggestions. And third, he established the general colloquium, open to about 300 people, including all the PhDs and a few others who were informed of the progress and prospects of the laboratory.

The result of this openness was that we all felt that we were part of the lab and that each of us was personally responsible for its success. The ability to foster this esprit, to get the very best from every mem-

ber, is what makes a great leader of a large project, not the leader's individual contributions to the solution. Oppie made those as well.

But his greatest contribution was his insistence on this freedom of communication inside the laboratory. This was much against the wishes of General Leslie Groves, the overall project leader, who wanted information strictly compartmentalized. General Groves was a very difficult boss who was not very fond of scientists in general and Oppie in particular. Perhaps the best evidence that Oppie was, in fact, a very good leader of Los Alamos is that Groves kept him despite the difficulties in their personal and professional relationship.

Cranberg suggests that Los Alamos was merely needed to solve the engineering problems once the chain reaction was established. That is, in fact, what we believed when Los Alamos started work in March 1943. But it turned out not to be true. In the spring of 1944, one of the Los Alamos groups discovered that plutonium-240 has a strong tendency to fission spontaneously. This meant that a plutonium bomb would explode before it was fully assembled, and would then explode with only a small fraction of the design yield. This discovery was science, not engineering, and was not accidental. Oppie had established groups to investigate any phenomena that might prevent an atomic explosion. Spontaneous fission did raise a potential problem. Other groups did not find any troubles.

Because of this potential problem, we had to find a way to assemble the bomb very rapidly indeed. The way to do this was by implosion, which already had been suggested by Seth Neddermeyer in 1943. He had immediately been given a group to study it. Unfortunately, instead of assembling material, so far the group had only been able to shatter it.

A solution was offered by a British physicist, James Tuck, who had used explosive lenses to convert a divergent explosive wave to a plane wave. Oppenheimer immediately reorganized the laboratory.

Famous physicists such as Luis Alvarez, Ed McMillan, and Bruno Rossi, and many less well-known scientists, were assigned to ensuring that implosion could yield a spherically symmetric assembly. And Oppie recruited the greatest scientific expert on explosives in America, George Kistiakowsky, to direct the work.

All of this is to answer positively Cranberg's statement "it is hard to say exactly what credit belongs to Oppenheimer."

Enrico Fermi was one of the great scientists of the 20th century. One of us, Hans Bethe, was Fermi's student for a year and has tried to follow his method of research ever since. Fermi and his small group achieved the first man-designed chain reaction in uranium on 2 December 1942. His German competitors were still far from this result in 1945. Before the war, Fermi and his group in Rome had made an exhaustive study of the action of neutrons on numerous nuclei, uncovering many principles that are now fundamental in nuclear physics. Fermi was the world master in inspiring small groups of ten or so scientists. He never wanted to lead a big laboratory.

Let Fermi and Oppenheimer each be remembered for their great achievements: Fermi as a great scientist, Oppenheimer as the leader of a great scientific laboratory.

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The Nitty Gritty on Compatible Families

The article by Robert Griffiths and Roland Omnès (PHYSICS TODAY, August 1999, page 26) is an attempt to provide an interpretation of quantum mechanics that eliminates the concept of measurement. It provides excellent reasons for getting rid of measurement. However, it also raises troubling questions.

As Griffiths and Omnès emphasize
continued on page 72

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