

scientific priority, Merton alone continues to deserve exclusive credit.

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CERN's Early History Revisited

As a member of the group of historians charged to write the history of the founding of CERN, John Krige (PHYSICS TODAY, September 2004, page 44) is certainly competent "to read the birth of the laboratory through the lens of US foreign policy." I read his well-written article with great interest. It particularly underlines the important role I. I. Rabi played. As former director general of CERN, I can perhaps add a few comments.

At the 1950 United Nations Educational, Scientific and Cultural Organization (UNESCO) meeting in Florence, Italy, Rabi's initiative was undoubtedly an important milestone in the founding of CERN. However, his declaration essentially summarized the efforts of two earlier initiatives. Several eminent physicists, including Edoardo Amaldi, Pierre Auger, Lew Kowarski, Francis Perrin, and, later, Werner Heisenberg, had recognized that Europe would be competitive in nuclear physics only if the countries joined forces, so the physicists had proposed a European research center.

The other, less well-known initiative came from the political side. One essential driving force was the Swiss writer Denis de Rougemont, who, after spending the World War II years at Princeton University, returned to Europe and founded the Institute of European Culture at Lausanne, Switzerland. French, British, and German politicians met there and proposed the creation of a laboratory where scientists from all of Europe could work peacefully together. De Rougemont told me that he considered himself one of the founding fathers of CERN, and he showed me documented evidence. CERN became the first laboratory founded with the two objectives of promoting science and bringing nations together. The Joint Institute for Nuclear Research in Dubna, Russia, and the synchrotron radiation laboratory SESAME near Amman, Jordan, were modeled after CERN.

Rabi's initiative would hardly have been possible without the considerable preparatory work done before the Florence meeting. Indeed, he deliberately limited his part in CERN's founding to the formulation of the declaration. He later said, "With the adoption of this resolution, I bowed out, since this was to be a European affair."

Another motivation drove Rabi. He considered CERN a peaceful compensation for building the nuclear bomb. This was revealed when I invited him to speak at CERN's 30-year anniversary celebration in 1984. Here are excerpts from his comments:

CERN was founded less than 10 years after the bomb was made. I feel that the existence of the bomb and its success had a large part in making CERN possible. . . . I am not at all surprised at the great achievements of CERN. I expected that. I was sure that Europe, which was the cradle of science, once brought back into the path, would achieve some very great things. . . . I mentioned Los Alamos and the atomic bomb, which is an expression of the power of [the] personalities [involved]. They are here now before you, and it is important to keep them occupied fulfilling the ideals of science. . . .

I hope that the scientists at CERN will remember that they have other duties than exploring further into particle physics. They represent the combination of centuries and centuries of investigation and study and scholarship to show the power of human spirit. So I appeal to them not to consider themselves as technicians . . . but . . . as guardians of this flame of European unity so that Europe can help preserve the peace of the world.

By bringing together scientists from Europe and the rest of the world, CERN has lived up to this objective better than its founding fathers expected.

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In addition to I. I. Rabi, Edoardo Amaldi also was a significant figure in the founding of CERN.

Amaldi traveled to Cambridge, Massachusetts, in July 1946 to present a paper at a conference. There he met accelerator physicist John

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Albert Einstein to Paul Ehrenfest¹

Translated and annotated by Bertram Schwarzschild

Einstein writes to his close friend just four months after the armistice that marked Germany's defeat in World War I. Demonstrations, often violent, by right- and left-wing extremists frequently disrupt the capital and its university. Food shortage is exacerbated by the British naval blockade, which continues until the Versailles conference that summer. As a professor of theoretical physics at the University of Leiden in neutral Holland, the Vienna-born Ehrenfest has escaped all this misery. During the war, Einstein was one of the rare academics in Germany to openly oppose the country's militarism.

The letter's final sentences refer to the only experiment of Einstein's career—carried out with Wander De Haas in 1915. By looking for a torque when they suddenly reversed the magnetization of a magnetized object, Einstein and De Haas were, in effect, measuring the electron's Landé g factor—and they got it wrong by about a factor of two.

Berlin, 22 March 1919

Dear Ehrenfest,

Shame on me for taking so long to respond to your [the familiar *Diene*] heart-warming invitation. It was because I didn't know whether to say yes or no. I am mightily drawn to visit you. On the other hand, traveling is dreadful, especially for someone with queasy intestines. . . . I would really like to get to know Bohr, with his marvelously intuitive gift. But it can't be done. . . . I'm way behind in the lectures I'm giving here, partly because of my Zürich lectures, and partly because many lectures here had to be canceled because the university was shut down by disruptions. Finally, I'm passionately preoccupied by a problem in general relativity that won't leave me in peace, day or night.

I'm very disillusioned with politics right now. Those countries [the Allied powers] whose victory I thought, during the war, would be by far the lesser evil, now show themselves to be an only slightly lesser evil. On top of that, there's the thoroughly dishonorable domestic politics: the reactionaries with all their shameful deeds in repulsive revolutionary disguise. One doesn't know where to look to take pleasure in human striving. What makes me happiest is the [prospective] realization of a Jewish state in Palestine. It seems to me that our brethren [*Stammgenossen*] really are nicer [*sympathischer*] (at least less brutal) than these awful [*scheusslichen*] Europeans. Maybe it can only get better if the Chinese alone survive; they lump all Europeans together as "bandits."

I find Schouten's thoughts on relativistic precession very clever, though not entirely compelling. . . .² A very good experimenter in Zürich (Dr. [Emil] Beck) finds that the gyromagnetic effect measured by De Haas and me is only half as big as required by theory [and later experiments].³ The man is to be taken quite seriously. To settle the matter, the experiments should be repeated.

Warm greetings from your

Einstein

References and notes

1. *The Collected Papers of Albert Einstein*, vol. 9, D. K. Buchwald et al., eds., Princeton U. Press, Princeton, NJ (2004), p. 15.
2. Jan Schouten's 1918 paper deals with what is now called the geodetic precession of a gyroscope orbiting in the curved spacetime around a massive body.
3. For discussion of the experiments and the motivating theory, see *The Collected Papers of Albert Einstein*, vol. 6, A. J. Kox et al., eds., Princeton U. Press, Princeton, NJ (1996), p. 145.

Cockroft. That visit planted the first seed of the enterprise that was to become CERN.¹ Around the same time, several others voiced their ideas for a European laboratory. Notable among those ideas was Louis de Broglie's proposal, presented at the European Cultural Conference in Lausanne, Switzerland, in December 1949,² to set up a new European lab-

oratory so as to halt the exodus of physics talent to North America.

The year prior to the Florence resolution, 1949, was crucial. Amaldi's research group in Rome examined the various aspects, including energy and costs, of the accelerators to be built at the proposed European laboratory. During that work, Amaldi frequently exchanged

letters with Gilberto Bernardini, who was at Columbia University and in close contact with Rabi.³ After lengthy discussions with Amaldi and other scientists—notably the United Nations Educational, Scientific and Cultural Organization's director of exact and natural sciences, Pierre Auger—Rabi drafted a resolution calling on UNESCO to help develop regional research facilities "to increase and make more fruitful the international collaboration of scientists." He presented that resolution at UNESCO's Florence meeting in June 1950.

Amaldi and Auger took on the task of advancing the Florence resolution. At the executive committee meeting of the International Union of Pure and Applied Physics held in Cambridge, Massachusetts, in September 1950, Amaldi suggested that IUPAP should consider how best to implement the Florence resolution. On 12 December 1950 Auger convened a meeting of important physicists and science administrators at the European Cultural Centre in Geneva. Amaldi and Gustavo Colonnetti, then president of the Italian Research Council, were invited from Italy. As a result of the meeting, Colonnetti immediately donated 2 million lire (approximately US\$ 3200). Additional contributions from Belgium and France brought the funding to a modest total of about \$10 000, enough to initiate the first steps in developing a large particle accelerator.

In May 1951, Auger and Amaldi called a meeting of experts from Sweden, Belgium, Norway, Britain, the Netherlands, France, and Switzerland at UNESCO headquarters in Paris. They wrote a justification for the collaborative European project: The anticipated cost exceeded what any single country could afford. The experts also discussed the accelerator energy and budget and called for an intergovernmental conference, which met under the auspices of UNESCO in December 1951.

Not everyone readily accepted the idea of a European laboratory. Niels Bohr, James Chadwick, and Hendrick Kramers, eminent members of the European physics community, questioned the practicality of starting a new laboratory from scratch.⁴ However, Amaldi and his UNESCO colleagues would not be dissuaded; during a meeting in the fall of 1951, they blended the opposition's ideas into a modified version of the project.

Amaldi played a decisive role in dispelling the last doubts of a somewhat reluctant British government.

Amaldi held the post of secretary general of the organization before Felix Bloch succeeded him to become CERN's first director general. Although Amaldi was an early candidate for that position, he turned down the offer. On Bloch's insistence, Amaldi briefly served as vice director, from late 1954 to early 1955. He returned to Rome in 1954 and continued to influence CERN's development by serving in various capacities from 1957 to 1975. He also was on CERN's history advisory committee from 1980 until his death in 1989.

CERN has developed into the largest physics research center in the world, where approximately half of the planet's particle physicists do research. Amaldi's dream of reestablishing a center of excellence in Europe has been fully realized.

References

1. C. Rubbia, *CERN Report*, CERN-91-09 (1991), p. 9.
2. E. Amaldi, in *Proceedings of the International Conference on High Energy Collisions in Hadrons*, CERN Yellow Reports, CERN-86-07, vol. 1, p. 415.
3. Reference 2, p. 421.
4. Reference 1, p. 12.

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Krige replies: The letters from Herwig Schopper and Sameen Ahmed Khan are reminders that many actors were engaged in launching CERN; all contributors need to be given due credit. In volume 1 of our *History of CERN* (North Holland, 1987), I and coauthors Armin Hermann, Ulrike Mersits, and Dominique Pestre evaluated at length this aspect of the laboratory's origin. I would recommend that volume to Khan, who seems unaware of it.

It was not my intention to repeat those arguments in my article, nor shall I belabor our very different perceptions of the precise roles of people like Denis de Rougemont and Edoardo Amaldi. My aim was rather to show that I. I. Rabi, in particular, had a foreign policy agenda when he took the floor in Florence. He wanted to suggest that the US would not look favorably on a laboratory that included a research reactor, as did Brookhaven—a project being actively promoted by the French but that would necessarily exclude Germany.

More fundamentally, in line with the aims of the Marshall Plan and the Schuman Plan, he wanted to reintegrate and relegitimate West German physics by including that country, which had barely gained limited sovereignty, as part of a supranational European laboratory equipped only with accelerators. My aim was not to attribute credit but to situate CERN squarely in Rabi's and the US State Department's agenda for the postwar reconstruction of Europe in the early cold war era.

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Reader Rights Polymer Prize Slip

I was pleasantly surprised to read that Thomas Russell is about to receive the "Polymer Prize in Nuclear Physics" (PHYSICS TODAY, March 2005, page 82). I had already known of his most deserved selection as the winner of the 2005 American Physical Society Polymer Physics Prize, but I must admit that I had failed to realize its connection to nuclear physics. However, upon further reflection, I am now convinced that Professor Russell's contributions must be so unique that he will be not only the first recipient of this prestigious new prize but undoubtedly also the last.

As a long-standing advocate of the pervasiveness and importance of polymers to both the physical and the biological world, I am delighted to see that the nuclear-physics community apparently agrees. I hope this new prize will serve as an impetus for the long-delayed establishment of similar polymer prizes in fields such as astrophysics and gravitational physics—and I look forward with great anticipation to nominating Professor Russell as their first recipient.

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[Editor's Note: We thank Andrew Lovinger for pointing out our error.]

Correction

March 2005, page 40—Charles Rhodes and his group are at the University of Illinois at Chicago. ■

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