

um-239, but the amount of plutonium was too small to be measured.

Another group composed of Joseph Kennedy, Glenn Seaborg, Arthur Wahl and Segrè, pursuing the same goal, succeeded in producing measurable amounts of plutonium, which indeed proved to be a slow-neutron fissioner.

By 1942 Segrè had made early contributions to the Manhattan Project and his remarkable knowledge and scientific genius were called upon as he led some of the pioneering work at Los Alamos. There he worked on the spontaneous fission of uranium and plutonium isotopes with his assistants, including Clyde Wiegand and me.

The history of the atomic bomb is too well known to repeat here. (For Segrè's own account of the discovery of nuclear fission, see *PHYSICS TODAY*, July, 1989, page 38.)

In 1947 Segrè was appointed a professor of physics at Berkeley, and within a few years he and his group, of which I was again a member, began a series of nucleon-nucleon scattering experiments on the recently completed 184-inch cyclotron.

Later we produced polarized protons and used them in numerous scattering experiments. Eventually two subgroups under Segrè worked toward the discovery of the antiproton. The success in 1955 of the subgroup that included Wiegand, Tom Ypsilantis, Herbert Steiner and me resulted in the awarding of the 1959 Nobel Prize, which Segrè and I shared.

In 1952 Segrè became the editor in chief of the *Annual Review of Nuclear Science*, a position that he held until 1977. During this interval he edited *Experimental Nuclear Physics* (Wiley, 1953) and wrote *Nuclei and Particles* (Benjamin, 1953); *Enrico Fermi, Physicist* (U. Chicago P., 1970); and *From X Rays to Quarks: Modern Physicists and Their Discoveries* (Freeman, 1980). In 1984 he produced another book, *From Falling Bodies to Radio Waves: Classical Physicists and Their Discoveries* (Freeman). His retirement in 1972 was simply the beginning of a new period of writing and publishing, and of lecturing in California, Italy, Israel, England and elsewhere.

The many honors that were showered on Emilio Segrè recognized him as a world-class figure in physics and also as a humanist. Segrè was a bridge connecting the inception of nuclear physics to the present world of particle physics with its enormous accelerators. He knew almost all the great figures in 20th-century physics, and he shared that knowledge

through his books and teaching. As a lecturer, Segrè made a forceful impact on his American students—on me for one, in more ways than I could have ever anticipated. I have written this obituary with a sense of humility on considering the accomplishments of so gigantic a figure in physics.

OWEN CHAMBERLAIN
University of California
Berkeley, California

Edoardo Amaldi

Edoardo Amaldi died suddenly of a heart attack on 5 December 1989. With his death the world of physics has lost not only an outstanding researcher and teacher but also a great statesman of science who influenced in an extraordinary way the rebirth of physics in Europe after World War II.

Amaldi was born in Carpeneto (Piacenza) on 5 September 1908, and graduated from the University of Rome in 1929 with a thesis on the Raman effect, carried out with the guidance of Franco Rasetti. Except for some sojourns abroad, Amaldi remained in Rome for the rest of his life. During six decades of active research he moved, in succession, from molecular physics to atomic, nuclear, cosmic-ray and high-energy physics, and finally to the study of gravitational waves.

Amaldi was a member of the famous group of Enrico Fermi—probably the first “large” physics group—that made so many remarkable discoveries in neutron physics in the pre-World War II days. The group induced radioactivity in most elements up to the heaviest, first using fast neutrons and then with thermal and resonance neutrons. In 1955, simultaneously with the discovery of antiprotons in a counter experiment at the Berkeley Bevatron, nuclear emulsions were used by a Rome-Berkeley collaboration between Amaldi's group and the group of Gerson Goldhaber, Emilio Segrè and a visitor, Gösta Ekspong, to establish the antiproton annihilation process. Amaldi's scholarly knowledge of the history of physics was brilliantly exhibited in his encyclopedic reviews of the development of neutron physics, including several chronicles of the long road to the discovery of fission. His interest in history also spawned a review of magnetic monopoles and biographical sketches of his fellow student Ettore Majorana, and of Bruno Touschek, Fritz Houtermans and others.

After Fermi, Bruno Rossi, Segrè and other physicists left their country because of Mussolini's racial



Edoardo Amaldi

laws, the survival of physics research in Italy owed much to Amaldi's efforts. During the German occupation of Rome he organized resistance and sheltered both old and young colleagues. He and Gilberto Bernardini supported the famous basement experiment of Marcello Conversi, Ettore Pancini and Oreste Piccioni in which they discovered the leptonic nature of muons.

In the fall of 1945 Amaldi established the very productive Centro di Studio per la Fisica Nucleare at Rome University. Together with Bruno Ferretti, Amaldi always emphasized the importance of fundamental research, but he also helped the development of nuclear technology in Italy. He strongly supported the construction of accelerators, in particular the pioneering electron machines in Frascati. Amaldi also had a leading role in the remarkable development of experimental and theoretical physics in Italy immediately after the war. His outstanding personality kept divergent groups together and fostered national and international collaboration.

Amaldi played a vital role in the creation of CERN. He participated in its development not only because of his urge to return European physics to the forefront but also because he expected CERN to become an example of a successful collaboration between European nations. Due to Amaldi's influence, Italy was the first country to pledge financial support for the study of this project. As secretary general of a provisional organization formed in 1951 to establish a high-energy laboratory, Amaldi strongly influenced the decision to build at a site near Geneva the largest feasible proton accelerator, based on the newly invented principle of strong

WE HEAR THAT

focusing. In 1953, the provisional organization became an "interim organization," with Amaldi as secretary general until ratification of the CERN proposal by 12 West European countries in September 1954. Due to Amaldi's courage and insight, the organization started provisional laboratories and even began to excavate the site. Although the enactment of these measures was not legally within Amaldi's power before ratification, much time was saved by his actions. There were eight days between the lapse of the interim organization and the start of the permanent council when Amaldi had personal responsibility for all of the project's properties and liabilities. The British representative, Sir Ben Lockspeiser, remarked, "Now we have another task: keeping Amaldi out of jail."

Amaldi remained deeply interested in CERN, serving as a member of the scientific policy council from 1958 to 1974 (for three years as chairman) and on the governing council from 1959 to 1971. Under Amaldi's chairmanship the European Committee for Future Accelerators decided to construct the first proton collider using intersecting storage rings, a prototype of the present-day high-energy colliders.

Amaldi was a notable educator. He strived to draw the best from everyone, setting examples and standards of hard work, which were always tempered by his unassuming attitude toward his place in the physics enterprise.

Amaldi's interests went far beyond physics. World peace and international cooperation were always at the center of his attention. He was an early participant in the Pugwash movement, whose purpose is to foster a mutual understanding between scientists from East and West in an effort to help reverse the nuclear arms race. For a long time Amaldi headed the Italian Pugwash section.

With Carlo Schaerf Amaldi founded ISODARCO, an international school for the study of disarmament and arms control problems, which is now 25 years old.

In his last years, Amaldi initiated meetings among representatives of national academies to discuss problems of arms control and international security. This initiative received particular impetus with Amaldi's election as president of the Accademia Nazionale dei Lincei. The third meeting, which was organized before Amaldi's death, took place in Rome in June and was attended by many representatives of the newly democratic Eastern Euro-



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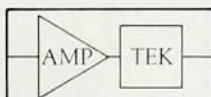
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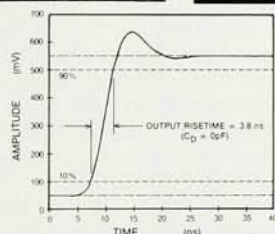
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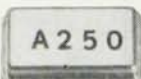
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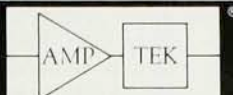
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David Korff

David Korff, a professor of computer science and former professor of physics at the University of Lowell, died suddenly on 30 August 1988, at the age of 52. Korff had achieved worldwide recognition for his contributions to the field of atmospheric light propagation.

Korff received his BA from Harvard University (1956) and his PhD in physics from Brandeis University (1963). His doctoral research, done under Kenneth Ford, was in quantum field theory. After teaching for several years at the University of Maryland, he was invited to develop a program in theoretical physics at the Lowell Technological Institute in Lowell, Massachusetts. While there he also became a consultant to Avco Everett Research Laboratory. During the last several years of his life, he founded North East Research Associates, an R&D company in Woburn, Massachusetts.

While at Lowell Korff headed a committee appointed by Kevin Harrington, then State Senate President, which formulated a plan to reorganize the higher-education system. This plan was eventually adopted by Governor Michael Dukakis of Massachusetts, and formed the blueprint for the system in place today. In addition, Korff helped develop the first doctoral program in physics at the institute. As president of the institute's first faculty union, he structured the school's merger with Lowell State College to create the University of Lowell.

Korff's research was initially in quantum field theory. While at the University of Maryland he wrote a paper proving the integral spin nature of the photon using group theoretical methods. Along with Young Suh Kim and Sado Oneida he carried out research in weak interactions and SU(3) invariance, and at Lowell he worked with Zoltan Fried and Adolph Baker on nonlinear quantum electrodynamics. In 1971 Korff wrote a key paper clarifying the atmospheric optics and optical physics of speckle

interferometry, a technique now widely used by astronomers for high-resolution imaging, and in 1975 he was the first to explain the atmospheric "isoplanatic patch," the range of viewing angles for which the optical effects of turbulence are invariant. Along with graduate students Richard Leavitt and Edward Salesky, Korff developed a cutoff-independent theory of line broadening and shifting in atomic and molecular spectra. Korff and David Shulman, a computer-science student, developed a computer code for modeling the propagation of high-powered lasers through the atmosphere that combines the effects of turbulence, thermal blooming and Raman conversion. At Avco Korff was instrumental in deriving a linear stability theory for high-powered continuous-wave CO₂ lasers. In nonlinear optics, he developed, along with Allen Flusberg, Carolyn Duzy and Eric Mazur, the Hilbert-space formulation for explaining broadband Raman amplification and Raman amplification of more than one pump beam.

In recent years Korff's efforts were in both administration and research. As president of North East Research Associates Inc, he formed a group of highly motivated scientists and computer scientists to analyze problems in atomic physics, laser physics, nonlinear optics and atmospheric propagation. Shortly before his death Korff, with Robert Myers, showed the importance of turbulence in thermal blooming. Most recently, Korff and Steven Ebstein invented a new technique using fourth-order correlation interferometry, which involves mixed pupil-plane/image-plane imaging.

Korff's love of problem solving, and in particular stochastic processes, extended beyond physics. He especially loved a good card game, and would share with his friends, in addition to his insights in optics, the "Korff system" for success at the gaming tables. David was a "guru" for many scientists, students and even for a good number of his friends. He will be missed.

ALBERT ALTMAN

*University of Lowell
Lowell, Massachusetts*

CAROLYN DUZY

ROBERT B. MYERS

*North East Research Associates Inc
Woburn, Massachusetts*

Stanley Sekula

Stanley T. Sekula, a research physicist at Oak Ridge National Laboratory, died of a cerebral hemorrhage on 5 December 1989. He was 62 years old.