IN BRIEF

At the Eastern Analytical Symposium to be held in November, **Paul C. Lauterbur** of the University of Illinois at Urbana-Champaign and **Richard N. Zare** of Stanford University will be among those receiving 1997 EAS Awards. Lauterbur will be honored for achievements in magnetic resonance and Zare for accomplishments in analytical chemistry. The awards are sponsored by a group of organizations that include several sections of the American Chemical Society.

The Franklin Institute honored **Federico Capasso** in May by awarding him the John Price Wetherill Medal for "his pioneering contributions to the technique of bandgap engineering and its innovative use in solid state electronics, optoelectronics and semiconductor science, and in particular, for his invention and experimental demonstration of the quantum cascade laser." Capasso is the head of the quantum phenomena and device research department at Bell Laboratories, Lucent Technologies, in Murray Hill, New Jersey.

OBITUARIES

Clyde William Tombaugh

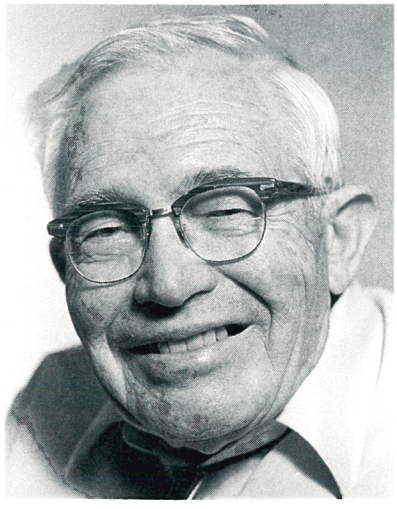
Clyde Tombaugh, known for his discovery of Pluto in 1930, was born on 4 February 1905 in Streator, Illinois, and died of congestive heart failure on 17 January 1997 in his home in Las Cruces, New Mexico.

In 1928, Clyde, an amateur astronomer who had made his own 8-inch telescope, sent some of his drawings of Mars to Lowell Observatory in Flagstaff, Arizona. Although all he wanted was suggestions for improving his observing technique, the Lowell administrators recognized Clyde's skills and hired him as an assistant observer to participate in a systematic search for a ninth planet.

Clyde's first tasks were to bring a new telescope on line and to develop an observing procedure for seeking a distant planet. He systematically photographed overlapping regions of the sky when they were on the meridian so that relative motions would be perpendicular to his line-of-sight, causing greatest displacement. Matched pairs of images, separated by several days, were searched for moving objects. Asteroids, with relatively large displacements, were noted and excluded from the search.

Although Percival Lowell had predicted the expected location of a planet, based on the orbital positions of Neptune and Uranus, Clyde was committed to carrying out a systematic search of the entire ecliptic. The search had been under way for ten months before he found Pluto. The discovery, announced on 13 March 1930, was somewhat disappointing because Pluto was so faint that it would have had to be extremely dark or dense to have been massive enough to exert the reported perturbation on Neptune's orbit.

After receiving the Jackson-Gwilt Medal from the Royal Astronomical Society in 1931 for his discovery, Clyde started his undergraduate education at the University of Kansas in 1932. He continued to work at Lowell during the summer and returned there full-time after earning a BA in astronomy in 1936 and an MA in astronomy three years later.



CLYDE WILLIAM TOMBAUGH

The fact that Pluto was not as bright as it should have been to be a giant planet motivated Clyde to continue a systematic search for other bodies. This photographic program, centered on the ecliptic, covered 75% of the sky and would have detected any planets as large as Earth within 100 astronomical units (the average distance to Pluto is 40 AU). The null result from this systematic study has shaped the thinking of the astronomical community for more than 50 years.

During World War II, Clyde taught navigation at Arizona State College. In 1946, following the war, he became an astronomer at the Ballistics Research Laboratory at White Sands Proving Grounds in New Mexico, where he developed tracking systems to determine the flight paths and characteristics of rockets. In 1955, he moved to New Mexico State University, at first as an astronomer in the physical sciences laboratory and eventually as a professor of Earth science and astronomy. From 1953 to 1958, he directed a photographic search, carried out in Ecuador, for natural Earth-orbiting debris. Again, a systematic search yielded a null result. This time the result was welcome; near-space was not hostile to manned activity. At New Mexico State, Clyde developed a program to provide a systematic set of planetary images to support the NASA Mariner and Viking missions to Mars and Voyager mission to the outer planets.

From 1955 until his retirement in 1973, Clyde taught both geology and astronomy classes. His commitment was contagious, and his interest in and dedication to public education did not flag as he entered retirement. He continued to make an amazing effort to satisfy the demands of the public. In 1980, in collaboration with Patrick Moore, he published his version of the discovery of Pluto, *Out of the Darkness: The Planet Pluto* (Stackpole Books, 1980).

From 1985 to 1990, in response to his concern about poor professional opportunities for young scientists, he and his wife Patricia toured the US and Canada, presenting public lectures and raising funds for the Clyde W. Tombaugh Scholars Fellowship, to provide support for a postdoctoral fellow at New Mexico State University.

In his last years, Clyde remained involved in NASA missions, assisting the Jet Propulsion Laboratory team to publicize its plans for a feasible mission to Pluto. If and when that mission flies, the spirit of Clyde Tombaugh will go with it.

To the last weeks of his life, when he was not inflicting puns on those close to him, he was enthusiastically following new developments in the space program. He will be missed by friends and the general public, who appreciated and admired him. Always the gracious discoverer and hero to children and amateur astronomers, Clyde Tombaugh set high standards in public outreach and education for all of us to follow.

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Yuli Borisovich Khariton

Russian and world science suffered a grievous loss on 19 December 1996 with the death, at the age of almost 93, in Sarov, Russia, of academician Yuli Borisovich Khariton, the long-time scientific director of the nu-

clear weapons center known by its code name Arzamas-16 and a patriarch of Russian nuclear physicists.

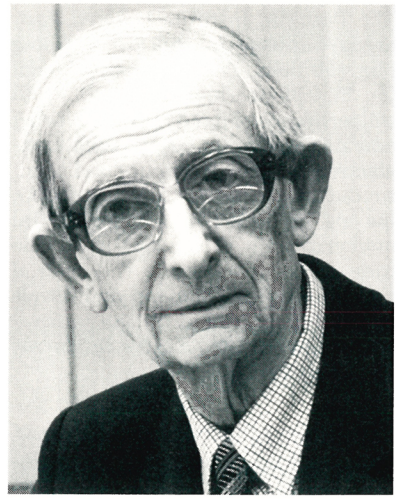
Yuli B. Khariton was born in St. Petersburg (later Leningrad), where he earned the degree of engineer–physicist in 1925 from the Leningrad Polytechnical Institute. Starting in 1921, he took part in research under Abram F. Ioffe and Nicolai N. Semenov. From 1926 through 1928, he advanced his scientific education by working at Cavendish Laboratory in Cambridge, England, under the guidance of Ernest Rutherford and James Chadwick, receiving a Cambridge PhD in 1928 for his work on "scintillation produced by alpha-particles."

For a decade (1928 through 1938), Khariton both taught at Leningrad Polytechnical Institute and engaged in research at the Leningrad Physics and Technology Institute, and later at the Institute of Chemical Physics in Leningrad, where he headed the explosives laboratory he had set up in 1931. His first important scientific paper, written in 1926 together with Zinaida F. Val'ta, became the basis for the theory of branching-chain chemical reactions developed later by Semenov.

The most important outcome of Khariton's studies of explosives was the discovery of the explosive charge failure diameter and the explanation given for its existence.

With the discovery of uranium nuclear fission, Khariton switched his research to the fission chain reactions of heavy nuclei. Between 1939 and 1941, together with Yakov B. Zel'dovich, he published a series of articles dedicated to uranium fission proceeding by the branching-chain reaction pattern. They discussed the factors governing nuclear reactor stability. In particular, they pointed to the role played by delayed neutrons in the control of chain reactions. With the help of I. Gurevich, they explored the conditions necessary for making a nuclear explosion.

Khariton was recruited in 1945 by Igor V. Kurchatov, the leader of the Soviet atomic project, to head activities aimed at developing Soviet nuclear weapons. Initially, these efforts were housed in Moscow in Laboratory No. 2 of the USSR Academy of Sciences (this lab is now the Russian Scientific Center—Kurchatov Institute). They gained a high priority and were placed on a broad footing after a new and supersecret atomic research center was set up at Sarov, about 400 km east of Moscow, in 1946. First known simply as Design Bureau 11 (KB-11), the center quickly developed into the Soviet counterpart of Los Alamos National Laboratory in the US, and later evolved into what is now known formally as the Russian Federal Nuclear Center—All-Russian Scientific-Research Institute of Experimental Physics (RFYaTs–VNIIÉF), but better known simply as Arzamas-16.



YULI BORISOVICH KHARITON

The history of Arzamas-16 is inseparably linked with Khariton. He not only helped establish Arzamas-16 but served as its scientific director for almost half a century (1946–92). And from 1946 through 1959 he was also the center's chief weapons designer. Under his guidance, the center found efficient ways of solving the most complicated scientific and technical problem of developing high-performance models of nuclear and thermonuclear weapons.

Khariton was noted for his direct personal contacts with a wide circle of Arzamas-16 employees. He combined a refined character, modesty, goodwill and cordiality with a willingness to be severe if required. He always insisted on the importance of knowing many times more than was necessary for solving the specific technical problem. Under his leadership, Arzamas-16 grew from a small design bureau into one of the top physics research centers in the USSR (later Russia). The center carries out studies in a wide range of topics.

Yuli Borisovich will be forever engraved on the memories of Russian nuclear scientists not only as a great scientist but also as a patriot and as a humanitarian, who greatly worried about the fortunes of mankind in the atomic age. They will never forget the words he wrote in 1995 to the memorial committee of J. Robert Oppenheimer: "Conscious of my participation in remarkable scientific and engineering achievements, which led to mankind's possession of a practically inexhaustible source of energy, today, at a more than mature age, I am no longer sure whether mankind has matured enough to possess this energy. I realize our participation in the terrible death of people and in the dreadful damage inflicted upon the nature of our home, the Earth. Words of repentance can certainly change nothing. Please God, those who come after us will find the ways, find in themselves the firmness of spirit and determination, in striving for the best, not to do the worst."

VIKTOR N. MIKHAILOV
RADY I. ILKAEV
GERMAN A. GONCHAROV
YURI A. TRUTNEV
RFYaTs–VNIIÉF
Sarov, Russia

Georges Maxime Temmer

Georges Maxime Temmer, a professor of physics emeritus at Rutgers University, died on 12 January 1997 in Princeton at the age of 74. He spent his professional life as an experimental nuclear physicist and will be remembered for several major contributions.

Temmer was born in Vienna, where he received his early education. With the rise of Nazism, he emigrated to France and then the US. He earned a BS (1943) from Queens College, and an MA (1944) and PhD (1949) from the University of California, Berkeley, under the guidance of Emilio Segrè.

After two years as a research associate at the University of Rochester, he worked at the National Bureau of Standards, in Washington, DC, where he carried out seminal experiments on nuclear orientation of rare earth nuclei with Ernest Ambler and Ralph Hudson. He joined the staff of the Department of Terrestrial Magnetism of the Carnegie Institution in Washington, DC, in 1953. Over the next decade, Temmer and Norman Heydenburg explored nuclear structure and shapes with experiments on Coulomb excitation of nuclei with low-energy alpha beams. These experiments, described in a landmark review article in *Reviews of Modern Physics* on the shapes of atomic nuclei, resulted in a vital confirmation of the theories of Niels Bohr and Ben Mottelson.

As experimental nuclear physics blossomed at university laboratories with the spread of tandem Van de Graaff accelerators, Temmer accepted an appointment as professor and director of the Nuclear Physics Laboratory at Florida State University in 1960, and then at Rutgers University in 1963.

At Florida State, he wrote a paper on the possibility of resonant transfer in nuclear reactions, a process that was very speculative at the time but became experimentally verified several years later. He also began work on