David Turnbull Rece

Japan Prize Established to Complement

David Turnbull, Gordon McKay Professor of Applied Sciences Emeritus, Harvard University, was awarded the Second Annual Japan Prize on April 19, 1986 in Tokyo as part of Japan's Science and Technology Week. The Prize was established in 1985 by the Science and Technology Foundation of Japan to promote "public penetration and enlightenment with regard to the contributions being made by science and technology to advance the common goal of all people in the world—prosperity and peace for mankind."

The Prize recipients are selected by the Japan Prize Examination Committee from recommendations submitted from around the world. Turnbull was selected from 133 materials technology candidates.

Turnbull, 1979 recipient of the MRS Von Hippel Award, was recognized by the Japan Foundation as a great figure among materials scientists, making excellent contributions to amorphous materials as well as other areas. The Prize carried a citation, gold medal, and cash award of 50 million yen (approximately $250,000).

Text of "Introduction of Prize Laureate David Turnbull" offered by Masao Yoshiki, Chairman, Second Japan Prize Examination Committee.

While Dr. David Turnbull is a great figure in the field of materials science, he is, by character, a man of humility and deepest integrity.

Professor Turnbull delivers his acceptance speech.

Professor Turnbull speaks to attendees at the Japan Prize banquet.

It is clear to everyone concerned that the development and progress of amorphous materials in the modern world would not have existed without his leading theories.

Despite the fact that glass as a material has been with mankind since ancient times, it was only a quarter of a century ago that amorphous alloys and semiconductors, which are similar to glass in the random configuration of atoms, have come to play an important role in the world of science and industry.

Amorphous materials are making a remarkable impact on various fields of modern industry such as large-sized and inexpensive solar cells, materials that can reduce the iron loss of present transformers several times, steels which are less corrosive than conventional stainless steels, materials of greater strength, materials for extremely large capacity magnetic memory, long enduring magnetic heads, and catalysts which are several hundred times more active than crystalline alloys.

Dr. Turnbull had predicted theoretically what kind of alloy would easily transfer to the glassy or amorphous phase during the process from molten to quenched state. (This experimental confirmation was first demonstrated by his friend, the late Dr. Pol Duwez, using the gold-silicon alloy.) This prediction by Dr. Turnbull was the natural result of his new theory concerning crystal nucleation, a creative experiment which showed that minute metal droplets do not solidify until reaching very low temperature, and his deliberations about the movement of atoms in liquids and their viscosity.

Dr. Turnbull has been continually developing leading principles, one after another, concerning the condition of formation, atomic structure and properties of glasses not only for metals but also for polymers, ceramics and semiconductors. Together with the experiments conducted in cooperation with co-researchers, his contribution to the manufacturing technology of amorphous materials is incalculable.

Additionally, he discovered phenomena of atoms' abnormally fast diffusion along lattice defects called "dislocation" and along grain boundaries in ordinary materials consisting of polycrystals to provide directions for the manufacture of high density ceramics. Also he established a mechanism of crystal growth which is as famous as Dr. F.C. Frank's and made a direct contribution

continued

https://doi.org/10.1557/S0883769400054853 Published online by Cambridge University Press

ives 1986 Japan Prize

Nobel Prize in Science and Technology

Professor Turnbull (left) receives the Japan Prize from Konosuke Matsushita (center), President of the Science and Technology Foundation of Japan.

Professor and Mrs. Turnbull with His Imperial Highness, the Crown Prince (left).

to the manufacture of dislocation-free crystals applied to IC chips.

Dr. Turnbull is esteemed by many scientists as a representative Harvard scientist and one of the long-time editors, along with Dr. F. Seitz, of the prestigious series of "Solid State Physics."

Science and Technology Week

Japan Prize Week, which coincided with Science and Technology Week, consisted of five days of receptions and lectures beginning April 18. Prize laureates made courtesy calls to the Japan Academy, Science Council of Japan, Prime Minister Nakasone, Governor of Tokyo, Governor and Mayor of Kyoto; attended a reception at the U.S. Embassy; and had an audience with His Imperial Highness Emperor Hirohito.

The Japan Prize

During the First Japan Prize Awards Ceremony, April 1985, His Imperial Highness Crown Prince Akihito stated,

"The fruit of science and technology is a product of the 20th Century. The Nobel Prize, founded in 1901, is awarded for outstanding works in the fields of physics, chemistry, medicine, physiology, literature, peace and, later, economics, but it does not include science and technology. The Japan Prize may also serve to complement the Nobel Prize in the field of science and technology.

In response to the high expectations of our country, our cherished hope is to develop the Japan Prize into a truly international honor, with peace for mankind *as our underlying goal.*"

Two to three fields of science and technology are selected for the honor each year. The first Prize (1985) recognized laureates in the fields of information and communication (J. Pierce, United States) and biotechnology (E. Katchalski-Katzir, Israel). The two fields honored in 1986 were materials technology (Turnbull) and medical technology (W.J. Kolff, United States).

https://doi.org/10.1557/S0883769400054853 Published online by Cambridge University Press