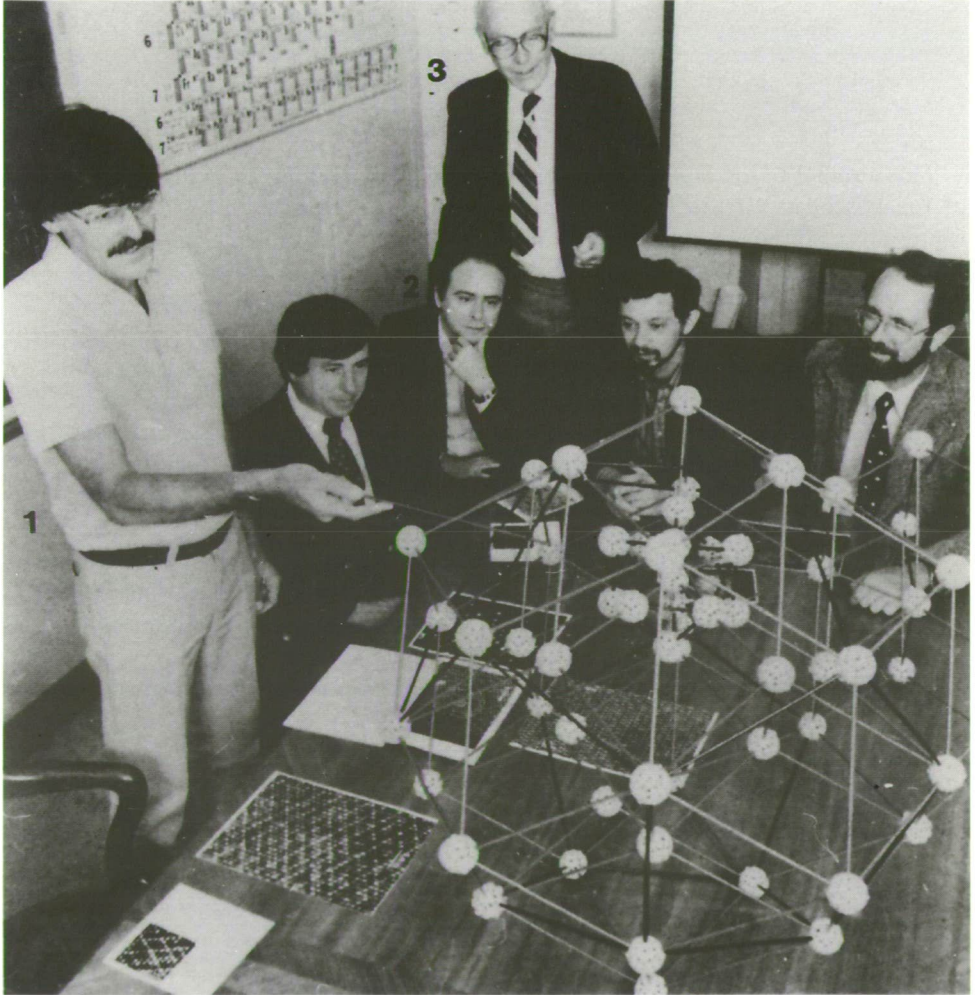


THE TENTH ANNIVERSARY OF THE DISCOVERY OF QUASICRYSTALS



Group of scientists with three of the discoverers of quasicrystals, Dan SHECHTMAN (1), Denis GRATIAS (2) and John W. CAHN (3). The picture was taken from a NIST publication (1988), and it does not include Professor Ilan BLECH. The picture was made available for us by courtesy of Dan SHECHTMAN, the reproduction was made by Dr. I. BAGI.

TO THE TENTH ANNIVERSARY OF THE DISCOVERY OF QUASICRYSTALS

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It was ten years ago that SHECHTMAN, BLECH, GRATIAS and CAHN published rapidly cooled AlMn alloy that gave diffraction patterns with full icosahedral symmetry. This discovery indicated an extremely intensive research in several fields of Crystallography, Physics, Mathematics, etc.

Several handbooks have been published and synopsis have been organized on this problem and with its inter- or better say multidisciplinary character and connections. The number of the papers published on the new results is enormous, it is extremely difficult to enumerate only the most important steps in this field of research during the last few years. Some selected examples may be mentioned as follows.

1989 – Symmetry of structure. An interdisciplinary Symposium (Abstracts in two volumes, edited by GY. DARVAS and D. NAGY).

1990 – Quasicrystals, Network, and Molecules of Fivefold Symmetry. VCH Publishers, Inc. New York, I. HARGITAI editor; contributors: A. L. MACKAY, M. SENECHAL, R. Z. SAGDEEV and G. M. ZASLAVSKY, PENG JU LIN and L. A. BURSILL, F. DÉNOYER, G. HEGER and M. LAMBERT, R. A. DUNLAP, D. W. LAWTHORP and V. SRINIVAS, J.-P. ALLOUCHE and O. SALON, E. J. W. WHITTAKER and R. M. WHITTAKER, M. BAAKE, P. KRAMER, M. SCHLOTTMANN and D. ZEIDLER, P. McMULLEN, H.-U. NISSEN, P. STAMPFLI, P. G. MEZEY, D., J. KLEIN and T. G. SCMALZ, A. LÉGER, L. D'HENDECOURT, L. VERSTRAETE and W. SCHMIDT, E. BRENDSDAL, S. J. CYVIN, B. N. CYVIN, J. BRUNVOLL, D. J. KLEIN and W. A. SEITZ, V. ELSER, E. BRENDSDAL, S. J. CYVIN, J. BRUNVOLL, B. N. CYVIN and D. J. KLEIN, E. BRENDSDAL, J. BRUNVOLL, B. N. CYVIN and S. J. CYVIN, D. KUCK.

1991 – Topics on contemporary Crystallography and Quasicrystals, Special Issue, *Periodico di Mineralogia*. Edited by L. LORETO and M. RONCHETTI; contributors: M. V. JARIC, H.-U. NISSEN and C. BEELI, S. MERLINO, M. EMMER, R. PENROSE, L. H. TANG, M. RONCHETTI, C. ANTONIONE, L. BATAZZATI, M. CALLERI and F. MARINO, A. L. MACKAY, L. LORETO, R. FARINATO and F. PAPPALARDO, A. L. LOEB.

M. RONCHETTI compiled the bibliography of Quasicrystals.

1991 – Symmetry and Topology in Evolution, edited by B. LUKÁCS, SZ. BÉRCZI, I. MOLNÁR and G. PAÁL.

1992 – Szimmetria – Aszimmetria, edited by T. BALOGH, MTA SZAB.



After these examples, let me make a short list of the most important results of our laboratory concerning quasicrystals in the field of Cell Biology.

- 1988 – Discovery of the quasicrystalloide biopolymer structure in living system on partially degraded exine of *Pinus griffithii* McCLELL.
- 1989 – A modified MARKHAM rotation method was elaborated to investigate the symmetries of the basic quasi-crystalloid skeleton of the plant cell wall. Highly organized biopolymer structures were described with quasi-crystalloid basic units. A comprehensive model of the biopolymer organization of the sporoderm was established. Three major degrees were distinguished at the highly organized biopolymer system of the sporoderm.
- 1990 – The first TEM picture was published about the PENROSE unit-like biopolymer unit from the partially degraded exine of *Pinus griffithii* McCLELL obtained with the secondary rotation method. The first data about the biopolymer structure of partially degraded wall of the spores of the genus *Selaginella*.
- 1991 – The first observations of the biopolymer structure of the intine. Biopolymer units of hexagonal symmetry were described. Data about the superficial molecular system of the pollen wall. Highly organized globular biopolymer units from the partially degraded and fragmented wall of *Botryococcus braunii* KÜTZ. extracted from the Hungarian oil shale were published. These units can be modelled with fullerenes, which are quasi-equivalent biopolymer structures. Quasi-crystalloid biopolymer structures were described from explosive dangerous Jurassic coal pulver. Quasi-crystalloid biopolymer structures were published from partially degraded and fragmented sclereids of *Armeniaca vulgaris* LAM. Three-dimensional modelling of the biopolymer skeleton of the plant cell wall.
- 1992 – Secondary alterations in the biopolymer structure of the exine as a consequence of the X-ray effect. The first data about the stabilizing system of the quasi-crystalloid biopolymer skeleton of the sporoderm.
- 1993 – “Negative” quasi-crystalloid biopolymer network was described from the partially degraded exospore of *Equisetum arvense* L. The radial rotation method was introduced with the alterations of the outer and inner rotation areas as a new two-dimensional method.

In resumé, the inter- or multidisciplinary principles can result several new aspects in the so-called “classic” scientific fields. The new research fields of Crystallography have opened new aspects and prospects in Cytology, and in the investigations of fossil organic material. At the recent investigation material, not only the biopolymers of the plant cell wall can be investigated with the new research concepts and methods, but also the cytoskeleton and all kinds of organelles of living systems. The discovery of quasicrystals was an extremely important contribution to this new research on recent and fossil plant organelles.