5. BASIC ESTABLISHMENTS OF THE BIOLOGICAL OBJECTS MOLECULAR STRUCTURE CONTAINING QUASI-CRYSTALLOID SKELETON

Short communication

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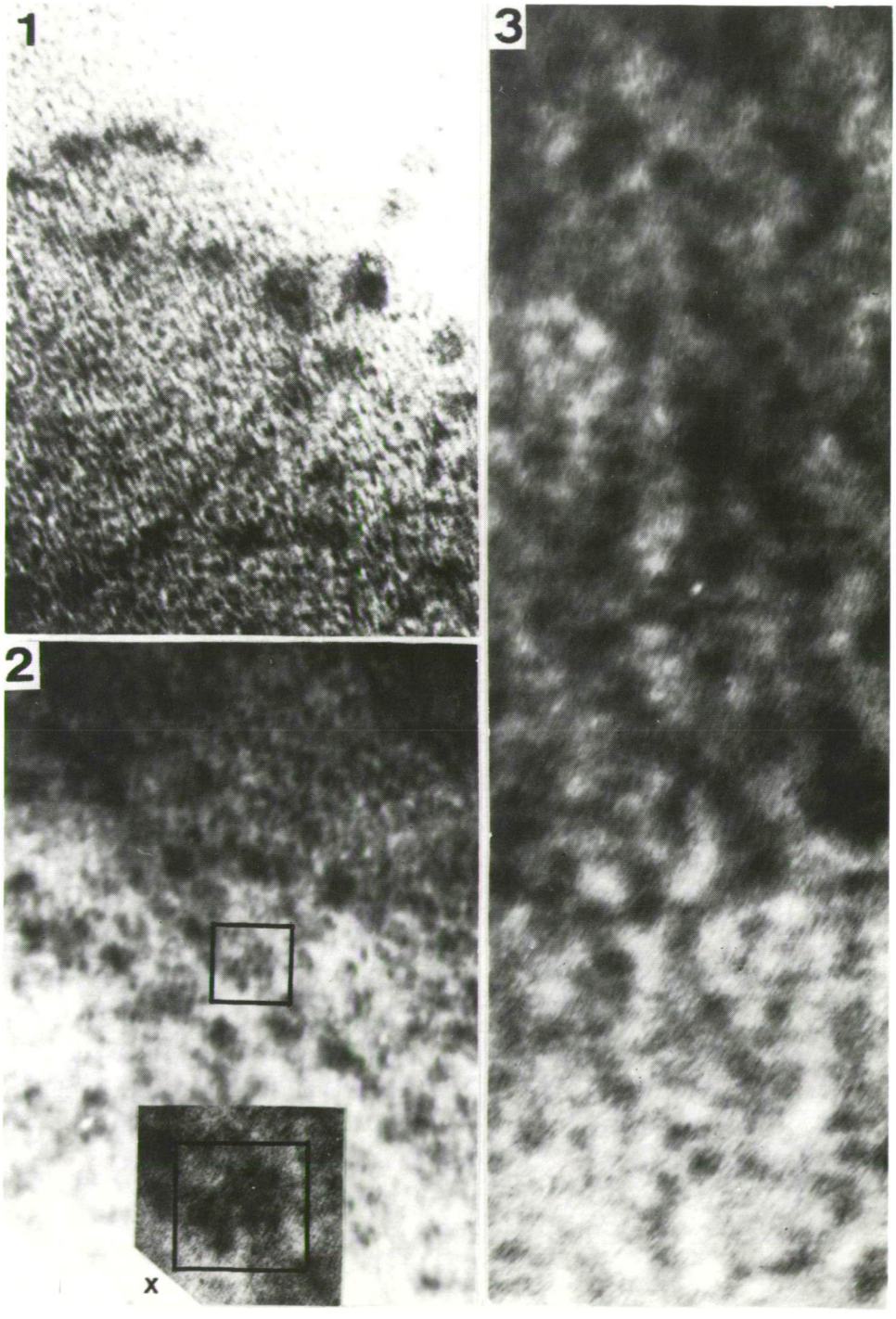
During our first observation of biopolymer structure of fossil angiosperm exines (KEDVES et al. 1974) globular units – size from 12 Å to 29 Å – were observed as units of the sporopollenin. Further smaller globular structures of 2–3 Å (p. 429) in diameter were also observed. Diameter of these units is below the resolution capacity of the TEM instrument (TESLA, BS–500). Later several experiments were made in order to establish the biopolymer organization of plant cell wall. The most important discovery was the quasi-crystalloid skeleton in the sporoderm (KEDVES, 1988). By the way, several new results of the modified Markham rotation method were published or are under publication.

We have the opportunity to take picture of 400.000 x (resolution 2–3.5 Å) with the new TEM instrument of the Biological Research Center of the Hungarian Academy of Science (OPTON 902). The previous short communication. (4.) touched – among others – the glycolipid molecular chaines on the surface. We tried to prepare enlargements of 5 million of the above mentioned negatives, and on the basis of the first attempts we established as follows.

1. These high magnificated TEM pictures (Plate 5.1., fig. 2, 3.) of partially degraded plant cell wall gave more information about the fine molecular structure that weren't available on the pictures of the magnification of 1 million (Plate 5.1., fig. 1.).

2. There is an opportunity to observe the reflection of C-atoms in the organic molecular structure too (Plate 5.1., fig. 2.). All these units are below the resolution power of the new instrument.

3. Taking into consideration that the quasicrystals were discovered in rapidly cooled MnAl Alloy in consequence of the anomaly of the electron diffraction pattern (BURSILL and PENG JU LIN, 1985, SACHDEV and NELSON, 1985, AUDIER and


1
2
3
x

GUYOT, 1986, NELSON, 1986) it is the time to declare as a methodical postulatum that:

In the case of quasi-crystalloid biopolymer skeleton contained biological objects the resolution power of the TEM instrument is irregular.

For this reason we have such molecular units or contours of the atoms in the organic molecules on the TEM negatives. The quasi-crystalloid character of the biopolymer structure creates this anomaly; to be more exact this extremely high resolution power.

Preparation of a synthetic three-dimensional molecular model on the basis of these new data is under preparation.

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◀ Plate 5.1.

1. *Pinus mugo* TURRA
   Biopolymer organization of the partially degraded tectum. Experiment No 634. Negative No 399. Magnification 1 million.

2, 3. *Pinus griffithii* MCCLELL

2. Biopolymer structure of the partially degraded exine at the border of the endexine/intine. Experiment No 681. Negative No 401. Magnification 1 million, respectively (x) 2 million.
3. High magnified (5 million) picture of the ectexine/endexine or intine border. Experiment No 669. Negative No 435. Illustrated are the light and dark globular units and its linear and helical arrangement with ramifications.

Experiment No 634: 20 mg. air dried pollen material +5 ml tetrahydrofuran. Temperature: +5—6 °C, length of time: 12 days.
Experiment No 669: 20 mg air dried pollen material +5 ml pyrrolidine. Temperature: +5—5 °C, length of time: 25 days. Experiment No 681: 20 mg air dried pollen material +5 ml diethylether. Temperature: +5—6 °C, length of time: 25 days.