

## SHORT NOTE

# “HONEYCOMB” ON MARS, POSSIBLE PRESENCE OF THE *PALEODICTYON*-TYPE NETWORKS? A WORKING HYPOTHESIS

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**Abstract.** Apparently, there is a striking similarity between Mars honeycomb textures and *Paleodictyon*-type networks. Therefore, a working hypothesis on this issue should be considered to decipher this enigma, with might have a direct impact on the water presence possibility in the geological past of the Red Planet.

**Key words:** “honeycomb” structure, Mars, *Paleodictyon*, hypothesis

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## 1. INTRODUCTION

Recently, NASA published a sensational photo transmitted by the Curiosity rover from the Valle Grande area on the planet Mars\*. According to Gohd (July 14, 2026), “Curiosity has revealed an image that is planet’s surface. Polygonal shapes, nearly identical to one another, make up a pattern almost like a Martian wallpaper or carpet” (Fig. 1a). Albulescu (August 1, 2026) in Ziare.doc, shows that “Strange geological polygonal shapes have been discovered on the surface of the Red Planet, leaving scientists without answers. Curiosity captured a 360° panorama on June 19 and 20, 2026, showing (...) honeycomb-like shapes known as polygonal fractures, each approximately 4-8 cm in diameter (Fig. 1b)”.

NASA experts believe that “a variety of processes could have produced the honeycomb textures. These include cycles of hot and cold temperatures on the Red Planet or the compression of water from Martian sediments when the surface was buried.” Careful analysis of the NASA photo highlights a very interesting aspect, given the existence of some ends of rock beds with apparently parallel stratification

(Fig. 1a, white arrow) on which the polygonal, honeycomb-like network is arranged.

The above-mentioned observation leads to a comparison of this texture with that of the *Paleodictyon* ichnogenus, a biogenic sedimentary structure mainly located in flysch deposits, such as, for example, those of the Eocene Tarcău Sandstone Formation, in the Buzău Valley, in the Eastern Carpathians of Romania (Fig. 1c, d).

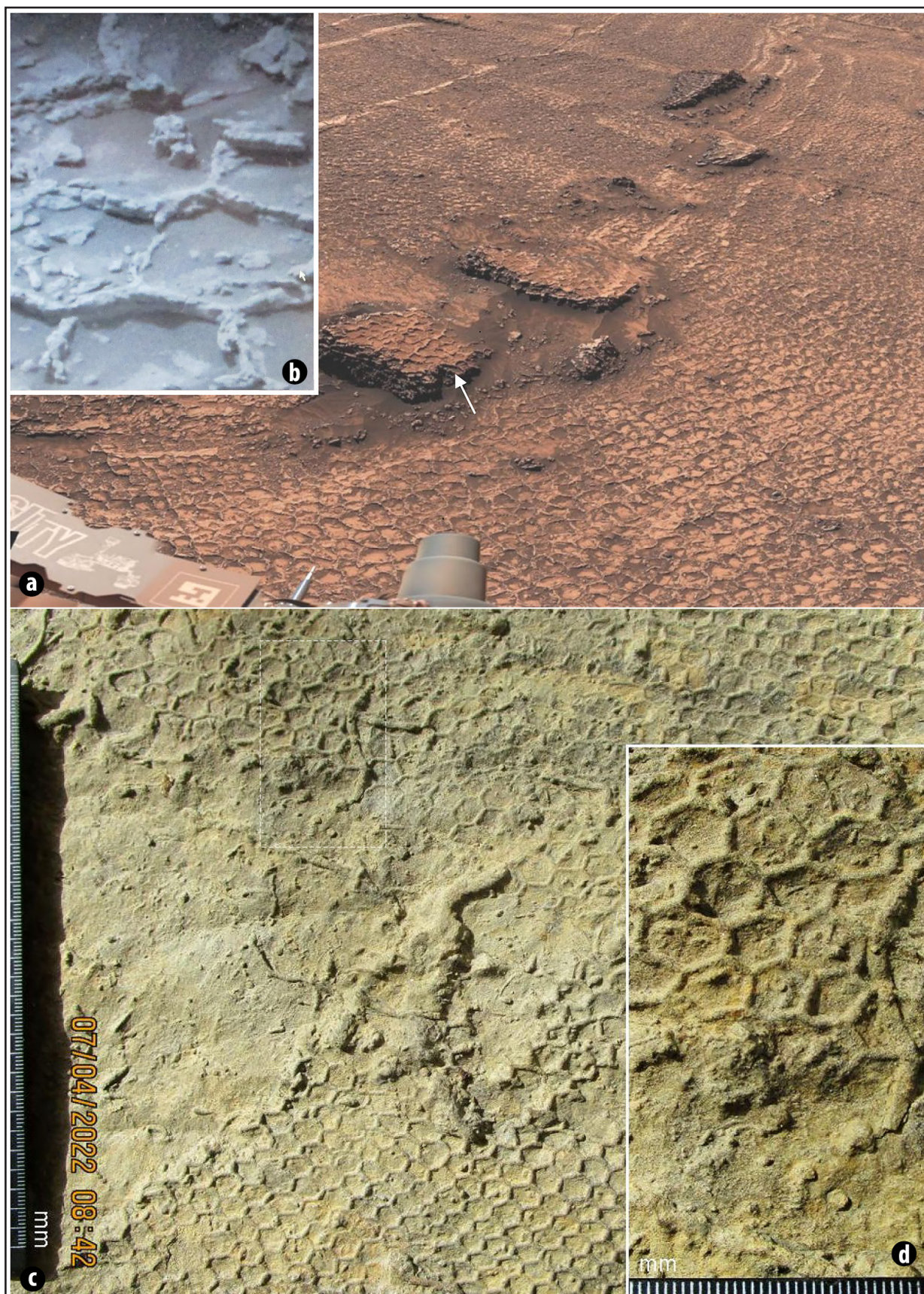
## 2. ABOUT *PALEODICTYON*

A synthesis dedicated to the ichnogenus *Paleodictyon*, carried out by Uchman (1995), reveals the following essential aspects:

- it represents a system of three-dimensional galleries consisting of a network of more or less hexagonal meshes, with exit tubes, usually preserving only the network;
- currently, the classification of paleodictyonids is based on the criterion of morphometric parameters (maximum mesh size, and string diameter) or on the biological criterion of the evolution of the hexagonal network (Seilacher, 1977, 2007);

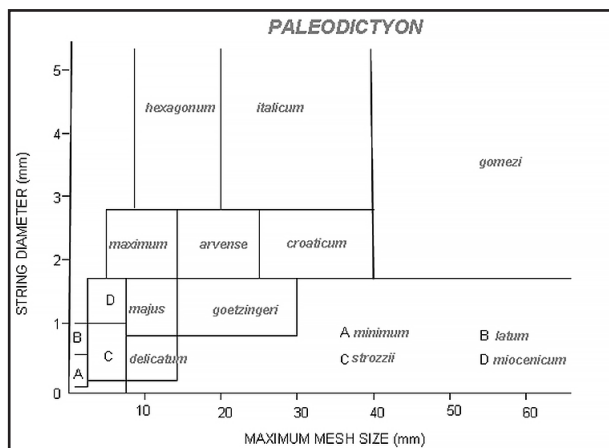
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\* NASA’s official imagery is generally public domain, meaning it is free to use, copy, and distribute without copyright restrictions.



**Fig. 1.** Mars rover Curiosity “honeycomb” structures (a – image credit NASA) and detail (b - image credit: NASA/JPL-Caltech/MSSS); *Paleodictyon miocenicum* (c) and detail (d) from Tarcău Sandstone Formation (Eocene), Buzău Valley, East Carpathians, Romania (photo T. Brustur, 2022).

- c) from the 32 ichnospecies known to date, based on morphometric intervals and eliminating synonymous ichnospecies, 13 new subdivisions of the *Paleodictyon* ichnospecies result, framed in the Uchman diagram (Fig. 2);
- d) often the hexagonal network presents flattened cords, representing collapsed tunnels;
- e) sometimes the hexagonal networks are elongated, as an effect of the direction of the bottom currents;
- f) *Paleodictyon* is a typical representative of the graphoglyptids that occur mainly in the deep-sea sediments, i.e., turbidites, being also present in shallow-water deposits from the Paleozoic and Mesozoic, while occurrences in freshwater deposits is problematic;
- g) currently *Paleodictyon* galleries have been photographed on the deep-sea floors;
- h) the range of this ichnofossil is Cambrian-Recent.



**Fig. 2.** Uchman diagram (1995, text-fig. 23) with valid ichnospecies of *Paleodictyon* defined by morphometric intervals (redrawn).

### 3. DISCUSSION AND FINAL REMARKS

Certainly, these days NASA researchers, within the Curiosity Programme, are on high alert to try to decipher the meaning of the honeycomb textures on the Martian soil surface. The incredible photograph obtained by the Curiosity rover has aroused immense interest and the results of the complex analyses will not be long in coming. Our modest

contribution, as a working hypothesis, is also joining this effort, attributing the graphoglyptid *Paleodictyon* to the star role. Indeed, until new and relevant images are obtained from Valle Grande, the similarity between the Martian forms, especially the detailed ones (Fig. 1b), and the *Paleodictyon*-type hexagonal network is quite convincing. The dimensional difference and the fragmented and corroded appearance of the Martian hexagonal network should not constitute an impediment to this hypothetical attribution. Because there are forms of *Paleodictyon* that exceed the maximum network size of 40 mm (e.g. Eocene *Paleodictyon gomezi*, see Brustur, 1995), and Martian specimens with dimensions between 40-80 mm, can be framed into the *gomezi* field of the Uchman diagram (Fig. 2, right upper corner). The deformation of the galleries in the hexagonal network on Mars may be the result of corrosion exerted by extremely strong storms in the Martian atmosphere, over a long period of time. This phenomenon is also found in fossil networks of the *Paleodictyon* type, as they can be impeccably preserved (e.g., Fig. 1d). According to Buatois *et al.* (2017) in the categories of fossil architectural design, “graphoglyptids are regular to irregular networks, these are preserved as positive hyporeliefs, representing shallow-tier farm structures produced most likely by vermiform organisms”. Being positively hypychnial forms, the apparent exposure of honeycomb textures on the surface of Martian rocks may suggest their reverse position, either due to frequent landslides or abnormal tectonic relationships.

In summary, we can consider that there is a striking similarity between Martian honeycomb textures and *Paleodictyon*-type networks, and this working hypothesis should be taken into account to decipher the enigmas that still await an answer from space scientists, especially regarding the presence of water in the geological past of the Red Planet.

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