

The carbonaceous megafossils, multicellular tissues and sexual reproductive organs from the Changzhougou Formation (1800 Ma) in China

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In 1997-1998, hundreds of specimens of carbonaceous megafossils have been found from the ~ 1800-million-year old Changzhougou Formation of the latest Palaeoproterozoic Changcheng Group (~1600-1800 Ma) in the middle Yanshan Range, North China. They are discoid, ellipsoid and sausage-like, and could be compared with *Chuaria* Walcott, *Shouhsiennia* Xing (*Ellipsophyta* Zhen) and *Tawuia* Hofmann. Obviously, this is the most ancient geological record for the *Chuaria*-*Tawuia* assemblage of the carbonaceous megafossils

To adopt HF acid-resistant maceration for carbonaceous fossil bodies, coupled with scanning electron microscope and petrologic section, the authors made a preliminary research on the histology for some circular and ellipsoid megafossils, namely *Chuaria*- and *Shouhsienia*-like forms. From the fragments of them, following three types of multicellular tissues have been found: colony-like, pseudoparenchyma-like and parenchyma-like. All of new data about multicellular tissues not only supply a very important basis in histology to determine the biological affinity of multicellular algal remains for the Changzhougou carbonaceous megafossils newly found, but also provide reliable fossil evidence to prove that metaphytes originated at least 1800 million years ago.

In addition, some clear sexual reproductive organs have also been seen from the above-mentioned multicellular tissues. They can be represented by the spermatangial conceptacles and the conceptacles showing some cystocarp-like structures (including a lot of carposporangia) and surrounded by vegetative parenchyma-like cells. The new data reported here, therefore, have also proved that the sexual reproduction originated at least 1800 million years ago.