INTRODUCTION

While carbonaceous chondrites as a more or less recognizable group goes back at least to Berzelius and Wöhler, the complete classification of chondrites had to wait until Urey, Craig, and Wiik and others immediately afterwards. Today it seems as if the task were almost done; however important facts are still without satisfactory, or even any, explanation. We would like to term the problem as the (seeming?) lack of precursors of the L and LL chondrites. We choose to take here an evolutionary viewpoint.

The chondritic structure is of course a proof that they were not melted after formation, so except for volatiles as C and H₂O they must still keep the original composition. Volatiles, on the other hand, suggest that carbonaceous chondrites would be nearer to the "primordial" status.

WIIK'S SET (30), NIPR SET (500)

Now let us go back to Wiik (1956) [1]. The Urey & Craig (1953) [2] result was that chondrites seemed to form only 2 disjoint groups, H(igh) and L(ow) for total Fe content. Wiik selected 30 very careful measurements and to the obvious question: what would be the connection with the "primitive" C's, he got and the answer that all measured C's belonged to the H group (Fig. 1). So C's may be the "ancestors" of H's (and E's?), but not of L's.

Now, this was not a necessary conclusion in one direction. A Linnaean viewpoint, that all types were independent, was also possible. However, in an evolutionary scheme (Fe/Si content is initial condition) H's can have precursors (Bérczi & Lukács, 1998, [3]), but precursors of L's were not seen. After more than 4 decades the situation is still the same (Fig. 2).

While, unfortunately, the big and homogeneous NIPR Antarctic Meteorite Catalog (more than 500 chemical compositional data, Yanai, Kojima & Haramura, [4]) does not contain carbon data, from H₂O we can more or less guess primitive and derived subgroups. It seems as if smaller petrologic types belonged to more primitive meteorites (although see Zolensky & al. [5], or [6]). Now see Fig. 3, for petrologic type (PT)≤3 meteorites of the NIPR Catalog. It seems as if L's and LL's were born as Pallas Athene, in mature state, in full armor.

PRECURSORS OF ORDINARY CHONDRITES ARE SHOWN BY THE AQUEOUS ALTERATION?

Some ordinary chondrites underwent previous aqueous alterations as many C's (Krot & al., [7]). This is not a fundamental problem as far as we do not note Semarkona LL3.0 [7], which seems to have reached after aqueous alteration the very initial unequilibrated state accepted for
could they be completely erased now? LL3's cannot go back to C2's, because of different initial conditions for e.g. Fe.

Fig. 6.

WAYS TO SOLUTIONS

We list two logical possibilities; maybe a combination of them will lead later to the proper answer. First, we may accept petrologic type 3 as the true initial stage, and derive PT 2 and 1 thence by aqueous alterations. This would be Zolensky & al.'s way [5] except that they started only from PT 2; see another paper of Bérczi & Lukács [6]. Also, we may look for LL2's in another way. Note that Hutchison & al. (1987) [8] many years ago claimed Semarkona and Bishunpur to be LL2. They are, indeed, not unsimilar to virtual "carbonaceous" LL2's: their carbon content is higher, and water is at least as abundant or higher than in LL3's (Jarosewich, 1990, [9]).