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NOTES ON THE APPLICATION OF THE FLUORINE-DATING METHOD TO THE DATING OF SOME FOSSIL HUMAN REMAINS OF CHINA

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(Abstract)

Several new finds of fossilized human remains have been made in China during the last few years. As most of the materials were incidentally discovered and collected by amateur collectors, the stratigraphical position of the fossils and their relation with the associating vertebrate fossils were mostly unknown or doubtful.

On the suggestion of Prof. W. C. Pei, I have made a study to identify the relative ages of these materials. The results are briefly summarized here.

(1) Skull of the "Tseyang Man"

Skull of the "Tseyang Man" was discovered in 1951 in Tseyang, Szechuan, by the railway constructors during the construction of the Chentu-Chungking Railroad. The associating mammalian fossils, according to the preliminary study of Pei (Pei, 1953) include *Cervus*, *Bos*, *Sus*, *Rhinoceros*, a small *Equus*, *Stegodon*, *Mammutheus* (?) etc.

Judged from the mammalian fossils, the geological age of the Tseyang fauna may range from early to latest Pleistocene. The quantitative fluorine analysis made on some of the representive mammalian bones give the following results:

Samples	*Fluorine Content* (%)
Mammalian bone (1)	1.11
Mammalian bone (2)	0.75
Mammalian bone (3)	1.16
Mammalian bone (4)	1.32
Mammalian bone (5)	0.71
"Tseyang Man" skull	0.79

The figures indicates that the Tseyang materials includes, most probably,

mammalian fossils from two distinct stratigraphical horizons, and the human skull came from the later one.

(2) Fragmentary piece of Human femur - Hsiatsaohwan, Anhwei

A fragmentary piece of human femur was collected in 1954 at Hsiatsaohwan, Shihhung, Northern Anhwei (Young and Chow, 1954; Woo and Chia, 1954). The bone fragment was collected at the ground surface on the bank of the Hsiatsaohwan River. From the same locality vertebrate remains of early or middle Pleistocene age were also collected, either on the surface or *in situ* (Young, 1954; Chow, 1954). There were arguments as to whether the human femur fragment is from the same bed as the other vertebrate remains or not. The fluorine analysis gives the following data:

Specimens	*Fluorine content* (%) *Sample* I	*Sample* II
Limb bone, *Trogontherium sinensis*	2.38	2.95
Chelonian bone (1)	1.29	1.96
Chelonian bone (2)	2.21	1.92
Human femur	0.30	

The above data indicate clearly that the human femur is geologically much later in age than the other vertebrate fossils.

(3) Sjara-osso-gol

From the well-known paleolithic site at Sjara-osso-gol, Ordos, where the so-called Ordos-tooth, a single incisor tooth supposed to be of Neanderathal type, was found, several pieces of human limb bones were collected at the ground surface from the same locality (Licent, Teilhard & Black 1927). The problem of the geological age of these limb bones and their stratigraphical relation with the human incisor and other mammalian fossils have been left unsettled. The following data indicate that the age of these limb bones are much younger than the other mammalian remains.

Specimens	*Fluorine content* (%)
Mammalian bone, from Choei-Tong-Keou	2.17
Mammalian bone, from Sjara-Osso-Gol	1.10
Femur ("Ordos Man?")	0.38

(4) *Sinanthropus* locality at Choukoutien.

The same method of dating was also applied to testify the relative age of the mammalian remains from the different horizons at the *Sinanthropus* locality

at Choukoutien, and the result obtained is not very satisfactory. The range of variation is very great in the percentage difference of fluorine content for the fossils from the different horizons and among the materials supposed to be from the same stratigraphical horizon. This further confirms the report of Oakley that this method is not applicable to the fossils found in the deposits near stalegmite and travertin as the *Sinanthropus* locality at Choukoutien.

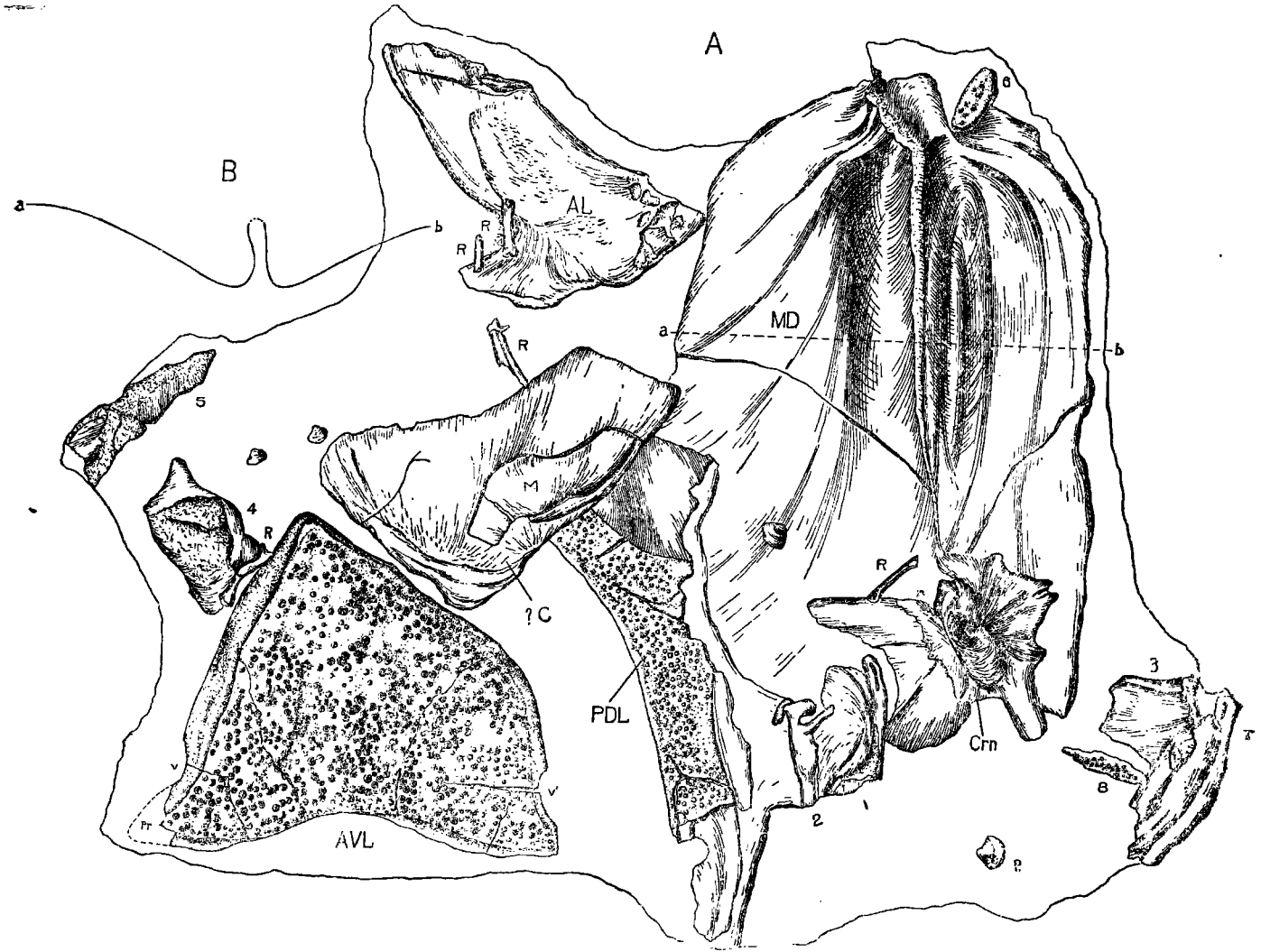

插圖 1， A. 在石灰岩中保存的樂氏江油魚的甲片 約 $\times\frac{1}{3}$。 C. 身体中軸骨甲 AL. 前側甲； AVL. 前腹側甲； Crn. 部分头甲； M. 下頜甲； MD. 中背甲； PDL. 後背側甲； R. 鰭棘； v, v' 弧形缺槽； p. 小長身貝。

B. 中背甲的橫切面，a-b 表示橫切部位。pr. 外突起； 1—8. 未鑑定的殘破的甲片。