

part, facing the fossa mandibularis, is more or less convex, rounded forward, so as to be able to resist strong pressure. The tympanic plate of modern races, on the contrary, is more or less concave and much less strong. The border of the porus acusticus externus shows a very peculiar reëntering, about right angle. In the *Sinanthropus* Skull I this angle is continued in a roundly terminating fissure, which strikingly resembles such a feature in a skull of a very young, probably less than a year old Papuan child.

Presumably the unique tympanic plate has a passive significance in the vegetative organization for resisting extraordinary strong hydrostatic pressure from the parotid gland, caused by particularly powerful movements of the capitulum mandibulae and a particular diet.

Finally a geological remark seems not out of place here. Dr. VON KOENIGSWALD considers the fossil skull of the Modjokerto child to be of old-Pleistocene age, the Ngandong skulls, however, — I believe on unsubstantial grounds — as young-Pleistocene. There is much evidence for old-Pleistocene age of *Sinanthropus pekinensis*. Would not *Homo soloensis* be of the same age?

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**Physics.** — *A continuously acting cloud-chamber.* By H. BRINKMAN.  
(Communication from the Physical Laboratory of the University of Utrecht.) (Communicated by Prof. L. S. ORNSTEIN.)

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In this paper we give the description of a continuously acting cloud-chamber, permitting more than twenty expansions in a second, suitable for various experiments in nuclear physics especially for rare nuclear phenomena or such with a short lifetime and cosmic ray investigations.

§ 1. *Principle of the continuously acting cloud-chamber.*

The gas (air) in the cloud chamber is periodically expanded and compressed. During an expansion (adiabatic) the watervapour in the chamber becomes supersaturated and for certain expansion-ratios condensation takes place only on the ions in the chamber.

The local disturbance in the homogeneous concentration of the watervapour, caused by the formation of drops, is restored during the compression. By the compression the gas is heated up again, the waterdrops evaporate before they have moved from their places and the ions, still present in the chamber are moved away by an applied electric field. Then the chamber is ready for the next expansion and so on.

In order to avoid the turbulence of the gas, as is necessary:

10. to get back the homogeneous concentration of water vapour after each compression;

20. to get well defined tracks of the ionizing particles, the gas moves in radial direction between two parallel walls at short distance from each other.

§ 2. *Provisional construction of the continuously acting cloud-chamber.*

Within a metal cylinder *C* (fig 1) moves a piston *P*, driven by an electrical motor.

The amplitude of the piston determines the expansion ratio. This ratio depends on the vapour present in the chamber. We used water and water-aethylalcohol mixtures in air of about atmospheric pressure. The bottom of the cylinder *C* is the glass plate *G*; the edges are rounded off by the brass cylinder *D*. Parallel to *G* the blackened metal plate *A* is fixed, centric in *C*, on a thin metal bar *B* (across the cylinder *C*). The distance between *A* and *G* is about 3 mm; *A* and *G* must be perfectly parallel. The diameter of *C* in our provisional construction is only 90 mm, that of plate *A* is 80 mm. The amplitude of *P* evaluates to 5 mm (alcohol-water mixture).

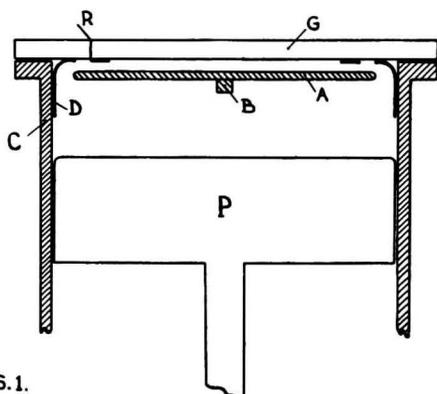


FIG. 1.

The gas between *A* and *G* moves radially during the expansion and compression. In the axis of *C*, between *A* and *G*, radioactive sources can be placed without disturbing the radial streaming of the gas.

We varied the number of expansions per second from 8 up to 20 (limited by the electric motor which we used), getting in all cases well defined cloud tracks with  $\alpha$ -particles (observed

by means of the light scattered by the waterdrops, irradiating the chamber from aside). The movement of the piston *P* was harmonic.

An electric field must be applied between *A* and a metal ring *R* on *G*, only during the compression stroke.

A new and more definitive construction of this continuously acting cloud-chamber is in preparation.

Finally I have to thank Prof. Dr. L. S. ORNSTEIN for his encouraging interest and stimulants during the development of the continuously acting cloud-chamber. I thank Dr. D. TH. J. TER HORST for his guidance constructing the provisional apparatus in the workshop of the Physical Laboratory. Mr. W. LANGENDIJK and Dr. W. DE BRAAF were so kind to help me with some experiments.