rhini and Platyrrhini was almost entirely bridged over both by some Catarrhini and some Platyrrhini with a middling distantia internarina — was a support for his transformistical conception of the natural development. This was incorrect, as, I suppose, I have shown: the external nose of the monkeys of the Old World always differs from the nose of those of the New World. This fact can be connected with a supposed common descent, if we admit that in a mutation period of the ancestors, the two forms of the nose came into existence.

Anatomy. — *"On the Jacobson's organ of Primates"*. By G. P. FRETS. (Communicated by Prof. Dr. L. BOLK).

When examining older stages of development of some platyrrhine monkeys, *Chrysothrix*, *Cebus*, *Ateles* (?) and *Mycetes* I always found a well developed Jacobson's organ. In some of these foetuses I ascertained the innervation by olfactoriusfibres. In embryos of 40 mm. of *Macacus cynomolgus* and *Semnopithecus maurus* no Jacobson's organ is extant, but a well-developed basal cartilage, of which the Jacobson's cartilage forms a part. Very young embryos of catarrhine monkeys have always a Jacobson's organ. I made microscopic sections through the regions of the nose of two fullgrown specimens of *Cebus hypoleucus*. A well developed Jacobson's organ was extant [1]) (Fig. 1). It terminates in the ductus nasopalatinus. A nerve-bundle (Fig. 1 *n. J. o*) is in connection with the mucous membrane. I ascertained in series of older embryos, as I said before, that the nerve for the Jacobson's organ belongs to the olfactorius, and consequently I am of opinion that I may admit, that the nerve found in the full-grown animal is an olfactorius-bundle. The nerve nasopalatinus of the second branch of the trigeminus runs through the canalis nasopalatinus and in a groove between the processus palatinus of the maxilla and the lateral part of the Jacobson's cartilage (Fig. 1, *n. np.*). A lamina praeductalis can be distinguished at the basal cartilage — before the ductus nasopalatinus —, continuations of which extend to the interior and to the front. The continuation to the interior and medially is the Jacobson's cartilage.

Of Catarrhini I examined microscopic sections of the nasal region of a young *Macacus rhesus* and a *Semnopithecus entellus*. In both I find a well developed basal cartilage; the Jacobson's organ however is missing. In *Macacus rhesus*, of which I examined a hardly interrupted series, a groove separates itself on both sides of the ductus

[1]) HERZFELD found a Jacobson's organ in Hapale.

nasopalatinus, which can be followed to a distance of 36 sections of 25 μ. and lies nearly on the spot of the entrance of the Jacobson's

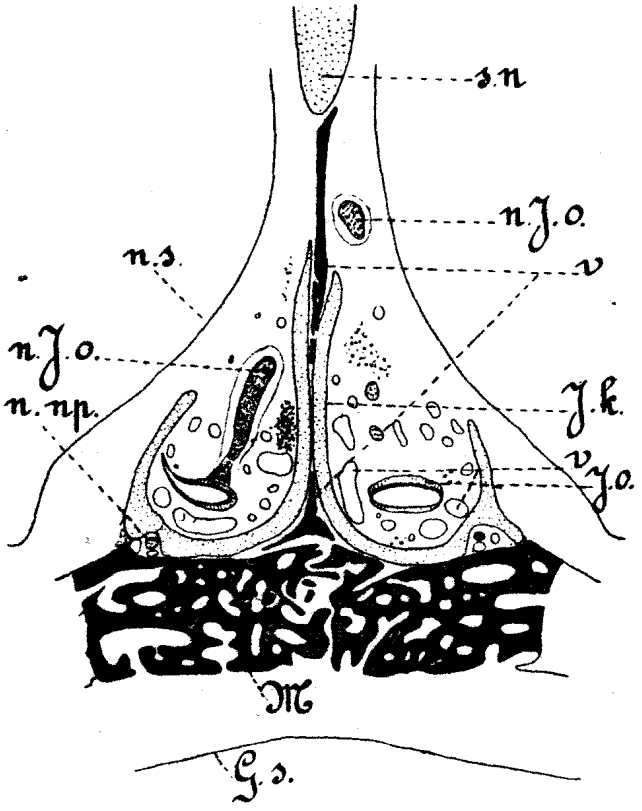

Fig. 1.

Cebus hypoleucus. Full-grown. Enlarged 25 × 2/3. *J. o.* = Jacobson's organ; *n. J. o.* = nerve for the organ; *J. k.* = Jacobson's cartilage; *n. np.* = Nerv. nasopalatinus; *S. n.* = Septum nasi; *n. s.* = mucous membrane of the medial parietis of the nose-cavity; *g. s.* = mucous membrane of the palate *V* = Vomer; *m* = maxilla; *V* = Veins.

organ into the ductus nasopalatinus of Platyrrhini. This groove may be a rudiment of the Jacobson's organ; in embryos of Catarrhines with young cartilage skeleton however, the Jacobson's organ, which is then still extant, lies more dorsal.

All the mentioned foetuses of Platyrrhini possess likewise a small *lamina terminalis* dividing the hindmost part of the nose-cavity into a reduced regio olfactoria and a regio respiratoria.

The lamina terminalis is found in all mammals with a well developed olfactoria organ. It separates in the hindmost part of the nose-cavity from its lateral parietis, divides the nose-cavity into two parts situated the one above the other, and fuses with the vomer.

The independent regio olfactoria, formed in this way, which contains the olfactoria-conchae, terminates at the end blind against the frontal part of the praesphenoid.

In an almost fullgrown specimen of *Ateles ater* I found likewise an independent regio olfactoria, half a centimeter deep; it is also extant both in a museumpreparation of *Cebus fatuellus* (Fig. 2) and in a specimen of *Hapale jacchus* which I prepared myself.

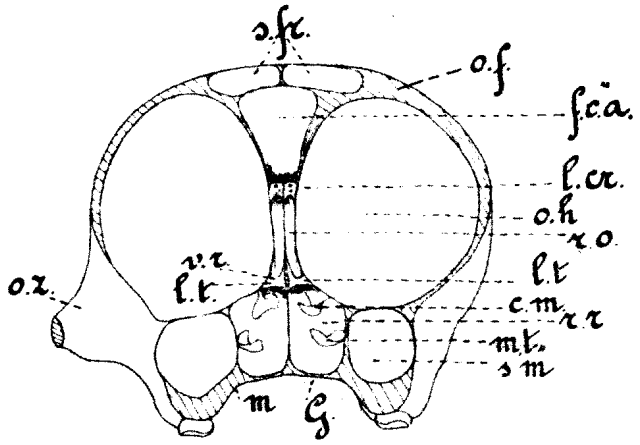

Fig. 2.

Cebus fatuellus. Museum-preparation 1906. N. 3. Frontal dish from the hindmost part of the nose-cavity, seen from behind. Enlarged $^3/_2 \times ^3/_4$. *l. cr.* = lamina cribrosa; *G* = palata; *lt* = lamina terminalis; *v. r.* = its free rim to the front; *r. o.* = regio olfactoria; *r. r.* = regio respiratoria; *mt* = maxilloturbinale; *c.m.* = concha media; *f.c.a.* = fossa cerebri anterior; *s. fr.* = sinus frontalis, *s. m* = sinus maxillaris; *o. f.* = os frontale; *o. z.* = os zygomaticum; *m* = maxilla.

Among Catarrhini embryos of *Semnopithecus* do not show a vestige of lamina terminalis. Neither does an embryo of 47 mm. of *Macacus cynomolgus* do so; in younger Macacus-embryos I found sometimes a very little independent regio olfactoria. Nor has a young specimen of *Semnopithecus entellus* a vestige of lamina terminalis; a young animal with a shedding dental system of *Macacus sinicus* possesses on the frontal parietis of the praesphenoid a little protuberance, a last remainder of the lamina terminalis.

So we see, that in Platyrrhini a Jacobson's organ is extant and a reduced independent regio olfactoria, whilst in Catarrhines both are missing. Consequently the question presents itself whether this fact can give any information about the signification of the Jacobson's organ. By cauterisation of the organ of a cat and

some rabbits v. MIHALCOVICS [1]) has tried to discover the function; the animals continued to live in the same way. Here, with the monkeys, nature has made the experiment: Plathyrrini have a Jacobson's organ, Catarrhini miss it. No communication is known to me that, e. g. in taking their food, Platyrrhini behave differently from Catarrhini. In the latter a compensation-apparatus for the missing Jacobson's organ might exist. The hypothesis about the signification of the Jacobson's organ, most generally defended, is that it might be of use as a smelling organ in the mouth by tasting food (vide e. g. WEBER [2]) p. 153). If this hypothesis were correct, it would be possible to indicate in Catarrhini the compensation apparatus. In makrosmatical mammals the regio olfactoria is separated from the regio respiratoria by the lamina terminalis. This is not the case with Catarrhini; here the cavity of the mouth is in much better connection with the olfactory region by means of the lamina terminalis, consequently a separate organ of smell communicating with the mouth cavity through the canales incisivi is not so much required, and therefore the loss of the Jacobson's organ might be compensated by the disappearance of the secluded independent regio olfactoria.

HERZFELD [3]) however communicates a fact which is very unfavourable to the above mentioned hypothesis. According to this author horse, ass, giraffe, and camel possess a Jacobson's organ, but no ductus incisivus communicating with the mouth-cavity. It is likewise known, that among Chiropteres the Jacobson's organ is often missing, — this holds e. g. for *Pteropus* (HERZFELD, ZUCKERKANDL [4]) — whilst the preparation of this animal shows that it possesses a capacious independent regio olfactoria.

In virtue of these facts I am of opinion that in the simultaneous disappearance of the Jacobson's organ and the independent regio olfactoria in Catarrhini, and the continued existence of both in a reduced form in Platyrrhini, we must see a parallel phenomenon, an indication of the general reduction of the olfactory organ.

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[1]) V. v. MIHALCOVICS. Anatomische Hefte. XI Band, S. 78, 1898.

[2]) M. WEBER. Die Säugetiere, 1904.

[3]) P. HERZFELD, Zoologische Jahrbücher, 3 Bd., S. 551.

[4]) E. ZUCKERKANDL. Sitzungsberichte. Wien. Bd. 117. Math. phys. Cl.