conid and entoconid. Among primates such a shape and location of the centroconid is limited to these two forms. In some fossil mammals, including the condylarth *Phenacodus*, there is a subsidiary cusp on the antero-internal slope of the hypoconid which has been called a mesoconid. A slight prominence here is sometimes present in *Pliopithecus* and *Gigantopithecus*, but in them the cuspule never has a completely central position. It seems improbable that the structures here termed mesoconid and centroconid are homologous. If they are, then the centroconid must have arisen by 'slipping' toward a central position along the antero-internal crest of the hypoconid after an initial subdivision of the latter had occurred. That this could happen is doubtful. A preferable assumption may be that the centroconid arose in the *Apidium–Oreopithecus* branch of the hominoids as a neomorph, and is not to be equated with the mesoconid seen in phenacodonts, hyopsodonts and several other archaic mammalian families. In *Apidium* the $M_{\bar{1}}$ talonid is somewhat broader compared to the trigonid than in *Oreopithecus*, but this is true only for the $M_{\bar{1}}$; both differ from *Cebochoerus*, which has broader trigonids than talonids. A rather broad and flat hypoconulid in *Apidium* is suggestive of an earlier condition of development of the large area seen here in *Oreopithecus*; there is already some thickening of the posterior basal cingulum of the hypoconid which, by joining the hypoconulid area, could produce the broad posterior molar shelf of *Oreopithecus*.

In addition to similarities noted for the first molar which are largely repeated here, second molars of both show considerable reduction of the paraconid element, so that it consists only of an anteriorly bowed ridge or crescent between the apices of proto- and metaconids. Each exhibits a more distinct centroconid and elsewhere a slight mesostylid cuspule. As might be expected for an earlier form, in *Apidium* $M_{\bar{2}}$ is slightly less specialized than in *Oreopithecus*, and also shows similarities with $M_{\bar{2}}$ of *Pliopithecus*, and *Gigantopithecus*.

The third molar is the largest and longest of the molar series in both primates (although in *Apidium* its full size is obscured by the fact that it has not fully erupted). In Fig. 1 the orientation of this tooth has been altered, so that its crown can be seen in the same plane as those of the remainder of the series. This illustration shows that in both species there is a large hypoconulid flanked laterally by accessory cuspules. A long postero-internal buttress of the hypoconid runs between ento- and hypo-conulid in the specimen of *Oreopithecus* figured here (after Hürzeler). This might be an important difference from *Apidium*, were it not for the fact that this ridge is missing in some specimens of the former.

The lack of connecting links, interposed temporally and morphologically between these two primates, *Apidium* and *Oreopithecus*, renders claims of an ancestor–descendant relationship between them uncertain. However, the resemblance between the two is striking considering that they are separated in time by more than twenty-five million years. *Apidium* appears to be a primate having particular significance in determining the time of origin of the Oreopithecidae. Fragmentary as they are, when taken together, the Fayum primates indicate the possibility that cercopithecoids, pongids and oreopithecids were already distinct in the early Oligocene. Accurate conclusions about the bearing of both *Apidium* and *Oreopithecus* on the question of hominid origins will have to await the discovery of additional specimens and completion of studies now in progress.

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MISCELLANY

"The Lunar Surface"

IN proposing new, or partly new, ideas in a field where many conflicting opinions are held, one is always open to misinterpretation and, unfortunately, the review of my book "Strange World of the Moon", appearing in *Nature* of March 12, p. 718, although fair in intention, misrepresents some of the points I make.

Thus, Dr. Pagel states that 'lunavoes' "are essentially broken bubbles of gas bursting out from a contracting surface". This is true only with a considerable degree of poetic licence. Neither Spurr nor I have proposed such an idea. We interpret lunar craters as calderas of collapse, produced by the caving-in of laccolithic domes due to the withdrawal of magmatic support. Escape of gases plays an important part in the process, but the uplift is not a 'bubble'. Collapse calderas are well known to geologists and a classical study of these structures was published by Howel Williams in 1941.

Dr. Pagel states that "Mr. Firsoff attributes ray systems to erosion by running water". This is a very unlikely explanation and he appears to have confused my interpretation of the rays as ejected matter accumulated in hollows with Spurr's suggestion that the radial gullies on the lower slopes of such formations as *Autolycus* and *Aristillus* may be drainage channels produced by torrential downpours during copious eruptions of steam.

Omitting minor inaccuracies, I pass to Dr. Pagel's unexceptionable conclusion that the presence of water "on the lunar surface is highly implausible", which is precisely what I said. Liquid water could exist on the surface of the Moon only exceptionally, temporarily and in small quantities. My contention is that, surface rocks being specifically lighter than water, it may exist beneath the surface. Such investigation as I have made also appears to show that there is no physical reason for denying the possibility of local surface deposits of ice and snow surviving for long periods in certain circumstances. Photodissociation is discussed.

V. A. FIRSOFF

MR. FIRSOFF's clarification of 'lunavoes' is very helpful, and I must apologize for having confused his explanation of rays with Spurr's explanation of radial gullies. My argument against the presence of water applies equally to ice and snow, which would be dissociated by solar ultra-violet radiation in the vapour phase.

B. E. J. PAGEL