at one time had a negative redox potential[7]. The faecal pellets probably produce a reducing micro-environment which facilitates the formation of glauconite within them.

The presence of glauconite suggests that the Quilon carbonate sequence was formed on a continental shelf under neritic environment and that the depth of deposition did not exceed 400 fathoms[8]. A reefal condition is indicated by the biocalcarenite associated with the glauconitic limestones of the Padappakara area. The Miliolidae and the Peneroplidae which occur in abundance within these carbonates are known to occur in the oceanic depths up to 5 fathoms and at a water temperature of 21.5° C to 31.4° C[9]. From these it is concluded that the glauconitic Quilon limestone of Early Miocene age of the Kerala coast was deposited on a shallow marine shelf with local reefal conditions.

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STUDIES OF INTERFERON PRODUCTION BY MFS-8 CELLS

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MOUSE fibrosarcoma (MFS-8) cell line was established[1,2] and characterized for its morphology, growth rate, karyology, etc. The cell line was studied for its susceptibility to different arboviruses[3], and it was observed that very few arboviruses multiply, produce CPE and plaque in it. In the present study MFS-8 cells were studied for their ability to produce interferon by stimulation with three different viruses *viz.* Sindbis, Chikungunya and Sendai. This was compared with another mouse cell line L-M[4,5] (a strain derived from NCTC clone L-929).

TABLE 1

Interferon induction by three viruses in MFS-8 and L-M cells

Viruses	Multiplicity of infection	Interferon (IU/ml) MFS-8	Interferon (IU/ml) L-M
634029	0.2 PFU/cell	<10	ND
Chikungunya	1 PFU/cell	179*	< 5
AR339	0.2 PFU/cell	<10	ND
Sindbis	1 PFU/cell	33	660
77597	0.00001 HAU/cell	< 5	100
Sendai	8 HAU/cell	<10	ND
Uninfected TCF		< 5	< 5

PFU = Plaque forming units; HAU = Haemagglutinating units; IU = Interferon units; * = Titres expressed as IU/ml. Approximately seven units in our system were equivalent to one unit of Standard mouse interferon (G-002-904-511); ND = Not done.

The monolayer cultures in 4 oz. bottles were infected with Sindbis, Chikungunya and Sendai viruses at two different multiplicities of each virus (table 1). The virus was adsorbed at 37° C for 1 hr, the inoculum was removed and the cells were washed, refed with minimum essential medium (MEM) and 5% calf serum. Uninfected tissue culture fluid (TCF) of MFS-8 and L-M cells was also taken, processed and assayed along with other interferon preparations. The TCF was collected after 18 hr and dialysed against 0.2 M KCl/ HCl buffer at pH 2.0 for 24–72 hr, redialysed against Hank's BSS at pH 7.2, for 24 hr. The samples were then assayed for interferon activity by plaque reduction method in MFS-8 and L-M cells with VSV as a challenge virus. Similar assay was also carried out in Vero cell line in order to rule out particle mediated interference phenomenon.

Uninfected tissue culture fluids of both the cell lines did not contain endogenous interferon. MFS-8 and L-M cells were capable of producing detectable amounts of interferon in response to viral stimulation (table 1). Multiplicity of infection was found to be a critical factor. Among the two different multiplicities of infection (MOI) tested in MFS-8 cells; 1 PFU/cell was optimal. When the virus susceptibility of L-M cells was studied by using Sindbis, Chikungunya and Sendai viruses it was observed that none of these viruses could produce CPE or multiply in it. However,

in MFS-8 cells, Sindbis and Chikungunya multiplied but Sendai did not multiply[3]. From these results it appears that the susceptibility and the ability of interferon production (by MFS-8 and L-M cells) are different phenomena and there is no correlation in these two properties.

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ON THE OCCURRENCE OF A PLEISTOCENE OSSIFEROUS GRAVEL AT NAGPUR, CENTRAL INDIA

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DURING field investigations of the Nagpur area in December 1981, a Middle-Upper Pleistocene Ossiferous Gravel was observed in an east-west trending nala, about 9 km south of the City. Although several Pleistocene localities have been recorded along the Narbada Basin, *e.g.* Hoshangabad, Narsingpur and Jabalpur[1-3], there is as yet no documentation of Pleistocene mammals in the Nagpur region. The present finds include a large number of stone tools of palaeolithic culture along with several limb bone fragments and molars of *Equus* and *Bos*. The vertebrate remains are silicified and permineralised (figures 1–2b).

The vertebrate remains were recovered from a ossiferous gravel which overlies the Lameta beds exposed in the same nala. While the remains of stone tools and isolated bones are fairly common, dental material is less frequent. The gravel is composed of a partially unconsolidated assemblage of rolled Deccan Basalt boulders, fragments of chalcedonic silica and silicified *Physa*—bearing Intertrappean rocks. An interesting find from the same gravel is that of a fossil wood probably derived from the Kampthi Sandstone. Petrified woods have been reported earlier[4].

The gravel was obviously a widespread sediment of the Pleistocene, blanketing all older deposits. At

Figures 1–2b. 1. *Equus* upper molar, **2a.** *Bos* occlusal view, **b.** Lingual view (Bar represents 1 cm).

Takli, the tusk of an elephant was reported[5] in a conglomerate and the authors correlated the conglomerate with the ossiferous horizon of Jabalpur[6,7].

The Ossiferous Gravel appears to have good potential for Pleistocene vertebrate palaentology and archaeology. Lateral extensions of the bone-bearing horizon are being investigated in Nagpur and surrounding areas for a more detailed study.

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