Last supper of two Indian Triassic reptiles?

from Barry Cox

DURING the winter of 1965–66, Indian palaeontologists found a pair of skeletons of the crocodile-like phytosaurian reptiles in the late Triassic rocks of the Maleri Formation in the Pranhita-Godavari Valley, Andhra Pradesh, central India. They were found so closely associated that they soon became known as 'the loving couple'. During the removal of the soft, clay-like matrix from their skeletons, it soon became clear that they had also eaten a similar last meal, for within the rib cage of each there appeared the skeleton of a smaller reptile.

These two skeletons have now been described by Chatterjee (*Phil. Trans. R. Soc. B* **291**, 163; 1980) as a new genus, *Malerisaurus*. It belongs to a group of still poorly known and poorly understood Permo-Triassic lizard-like reptiles that includes the ancestors of the lizards themselves. *Malerisaurus* was of considerable size, some 1.3 m long, and it is notable for its rather large hind-limbs. The length of the fore-limb is only 59 per cent of the length of the hind-limb, and the latter is 74 per cent of the length of the

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Life restorations of two specimens of *Malerisaurus*, showing quadrupedal and bipedal gaits.

trunk. Proportions of this kind are found today in a number of facultatively bipedal lizards, such as the frilled lizard *Chlamydosaurus*, and the life restorations of the two specimens that illustrate Chatterjee's paper show them in two alternative poses. The dentition of *Malerisaurus* suggests that it fed on the general range of invertebrates that is described as an 'insectivorous diet'.

The sedimentology of the Maleri deposits suggests that the environment of this part of India during the late Triassic

was probably very similar to that found there today, with a subtropical monsoon climate. *Malerisaurus* therefore probably lived in a densely forested, lowland environment with lakes or flood-plains.

The Maleri fauna also contains a variety of other reptiles, as well as the large aquatic amphibian *Metoposaurus*. All of these belong to groups that are widely known throughout the Triassic world, and attest to the ease of dispersal through that ancient Pangaea world-continent.

Is the Universe expanding?

from David A. Hanes

THE DISCOVERY by Edwin Hubble¹ that the Universe is not static, but an evolving entity, is surely the most important finding in extragalactic astronomy this century. Few astronomers would contest the view that the Universe is in a state of general smooth expansion. However, recent provocative statistical studies by J. F. Nicoll, D. Johnson, I. E. Segal and W. Segal² of the relationship between the redshifts of moderately nearby galaxies and their apparent brightnesses have brought this simple yet profound picture under attack.

In a general expansion, the recession velocity of a galaxy (or empirically its Doppler redshift) should be directly proportional to the distance of that galaxy. Nicoll *et al.* claim they can reject such a relationship; rather, their findings imply a quadratic relationship between redshift and distance for a moderately nearby sample of galaxies (those with recession velocities less than 5,000 km s⁻¹). Such a discovery is consistent with the predictions of I. E. Segal's³ alternative world model, the chronometric cosmology, and at

variance with the predictions of Einsteinian General Relativity. At the very least, these statistical demonstrations demand explanations in terms of unsuspected selection effects, subtly biased samples, or local anisotropies or inhomogeneities; and, should convincing explanations be lacking, they may suggest that the usual cosmological descriptions of the Universe are inadequate.

Edwin Hubble's original data suggested a linear relationship between velocity (inferred from redshifts) and distance (inferred from apparent luminosities) for galaxies. This relationship has an appealing simplicity, for in a universe in which we are in no preferred position and where there are no preferred directions — that is, in a universe where the 'cosmological principle' holds — it can be shown that such uniform expansion (or contraction) is the only permitted large-scale motion. The cosmological principle is justified both philosophically and empirically: the former in the neo-Copernican sense that we must assume that we are in no way singled out as special observers of the cosmos; and the latter in that galaxy counts and the isotropy of the cosmic background radiation suggest that the Universe is indeed

homogeneous and isotropic on sufficiently large scales⁴. There are other reasons for the faith of astronomers in the expansion hypothesis: the expansion is associated with a characteristic time (which may naively be thought of as the time since the Universe was in a state of infinite density) which is closely comparable with the ages of the oldest known stars; and the discovery⁵ of the predicted⁶ cosmic microwave background strongly suggests that the Universe has evolved from a hotter dense state. Moreover, the Hubble expansion finds a natural theoretical framework — that of Einsteinian General Relativity — which in fact predates⁷ the discovery of the expansion and which has been amply confirmed in the limited tests possible to date⁸.

For all these reasons astronomers will be unmoved, except by unequivocal tests, to adopt alternative cosmological descriptions of the Universe. Segal's chronometric cosmology is one such description. It has been characterized⁹ as a 'gravitational tired light' theory; that is, one in which observed redshifts for remote galaxies arise through the loss of energy by photons during their propagation rather than because of any systematic motions. In Segal's

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