MOLAR PROGRESSION AND MACROPOD AGE

In the Macropodidae the changing position with age of the molars in both jaws relative to the remainder of the skull has been described qualitatively by several authors, including Thomas (1888), Tate (1948) and Troughton (1954).

Twenty-six grey kangaroos (*Macropus major* Shaw) of both sexes and known ages up to 33 months were sacrificed, and this "molar progression" was

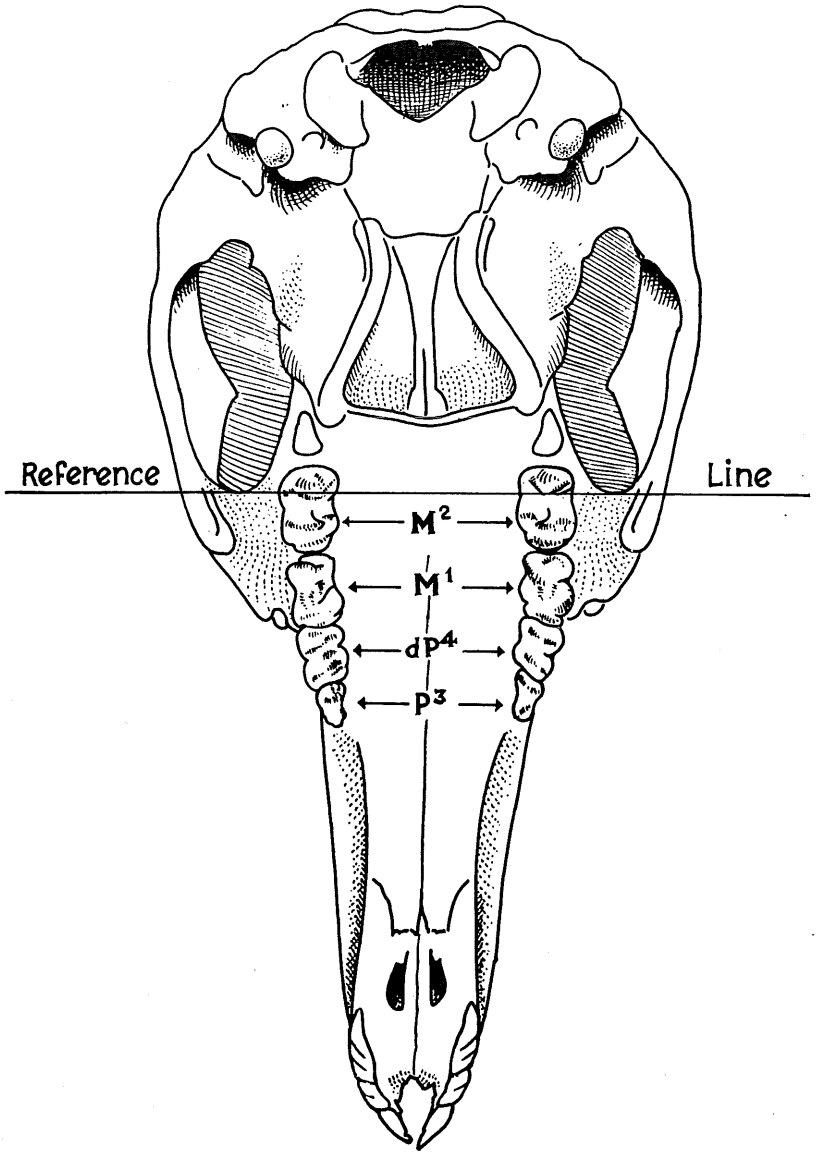

Fig. 1.—A grey kangaroo skull with a molar index of 1·7.

measured from the cleaned skulls as follows: A perspex plate etched with finely ruled lines scaled to 1/20 the length of a molar was placed over a skull held in palatal view, the palate at 90° to the line of vision. A reference line, tangential to the anterior rims of the orbits, was used. Both molar rows were considered: measurements were usually identical but where differences occurred an average was taken. A molar index (M.I.) of 2·05 would mean that the 1st and 2nd molars and 1/20 the length of the 3rd molar were anterior to the reference line. The M.I. of the skull in Figure 1 is 1·7.

The regression equation relating age to molar index in these animals was:

$$\text{Age (days)} = 219{\cdot}1 + 378{\cdot}0 \text{ (M.I.)}.$$
$$r = {\cdot}9982$$
$$\text{s.e. est.} = \pm 11{\cdot}8 \text{ days}.$$

Using additional skulls, this age criterion has been found sound for subadults (i.e. during the 2nd and 3rd years of life) of both sexes, and has also been confirmed by molar indices (Figure 2) from radiographs of live animals.

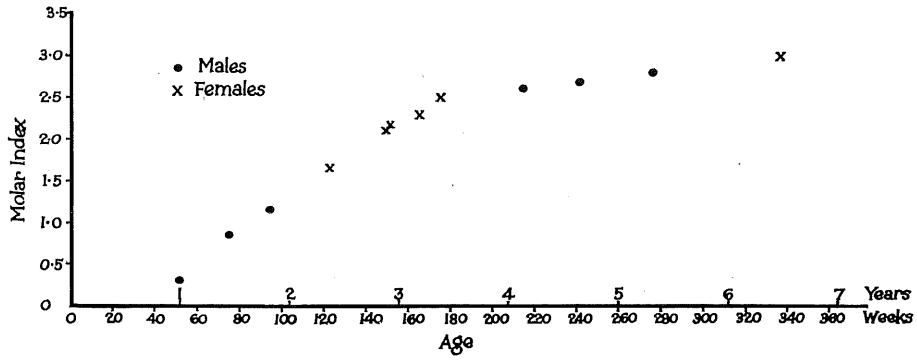

Fig. 2.—Molar indices from radiographs of live grey kangaroos plotted against known age.

The extension of this work to adults has been limited by the availability of suitable animals of known age. Figure 2, however, does illustrate what may be expected. The change of direction of the curve at the threshhold of adulthood is noteworthy. The molar index is a qualitative measure and there is no difference between sexes. Other age criteria, based on absolute measurements to be published later, diverge for sexes at an early age; these curves also tend to level out during the fourth year.

Molar indices beyond 4·0 are possible by presuming a fifth molar of equal length to the fourth; in fact, such a molar was present in four out of every 1000 skulls from a random field sample. The highest M.I. recorded from the field was 4·8; on present knowledge this animal was in its 16th–18th year.

Data on molar progression from prepared skulls and radiographs of the brush wallaby (*Wallabia rufogrisea* Desmarest), a wallaroo (*Osphranter robustus* Gould) and the red kangaroo (*Megaleia rufa* Desmarest) indicate that M.I. will be a useful indication of age in these species also.

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