often very good as most sacs or capsules were still swollen after treatment in H_2O_2 and prior to the drying of the residues in an oven. It appears, therefore, that during approximately the last 7 000 years water of Lake Purrumbete remained either fresh or as the upper salinity range recorded for *Daphnia* spp. viz. 5.8°/₀₀. (Barton (pers. comm.) suggested that by using intensity of magnetization correlation with one of his ^{14}C dated core PD, level around 5 m in core PC studied here is approximately equivalent to 6 140±110 yBP). As mentioned before, the absence of shells of the freshwater gastropod *P. niger* and the bivalve *Sphaerium* sp. in the samples suggest that the shore of the lake was never close to the coring site and that the height of the water column above this site remained higher than 35 m at all times. This would also explain the absence of the benthic ostracods *Gomphodella australica* (Hussainy 1969) found today in the lake by Timms (1973) in collections between 0.5-1 m, *Candonocypris novaezelandiae* (= *C. assimilis* in Hussainy 1969b, Timms 1973) recorded down to 33 m by Timms (1973), and of the free swimming ostracod *Newnhamia fenestrata* King 1855 inhabiting waters near the shore of the lake at present.

No fluctuation of water level, resulting from changes of climate, has been registered during the last 7 000 years of the lake history, probably due to a connection of Lake Purrumbete to the Curdies River which would have permitted exchange of water and salts.

CONCLUSIONS

The four maar lakes are situated in a subhumid area close to a semi-arid area today. Any change in evaporation and/or precipitation in the area is likely to affect levels of lakes, especially those which have closed basins, such as maars. Unfortunately, at present a change of this ratio cannot be properly assessed for a number of reasons. First of all, it is not possible to plot an accurate water level curve from known past salinities for various phases of the lakes as it appears that the amount of total dissolved salts (TDS) did not remain constant in all the lakes; the waters of Lakes Bullenmerri and Gnotuk which now have a similar volume of TDS (Currey 1970) must have mixed at some stage. Prior to mixing the TDS volume in Lake Bullenmerri must have been different as water salinity is thought to have been between 3.26-7.92°/₀₀ but then water depth is considered to have been less than half of today's between 7 100 and 7 400 yBP. Another example applies to water depth of Lake Keilambete thought to have been below 6 m at about 5 300 yBP when salinity was between 19 and 45°/₀₀. It appears that TDS are either lost or introduced into the lakes by percolation and via the water table. Finally, it is not possible to assess how much of the TDS volume is lost periodically by precipitation of salts especially in Lakes Keilambete and Gnotuk.

Although at present no hydrological budget can be calculated for the four maar lakes, the synchronous fluctuations of water levels and salinities, recognized mainly from fossil ostracod data, in Lakes Bullenmerri, Gnotuk and Keilambete should inform on climate in central Victoria during the last 10 000 years. Data for the lakes is schematized in Fig. 11 and comments are given below. It is interesting to note, however, that Lakes Gnotuk and Keilambete, which have similar salinities and faunas today, registered almost identical changes of ostracod faunas at most times. Water levels and salinities, are inferred to have responded to changes of climate. Unfortunately, it is not yet possible to state how these changes related to either evaporation or precipitation.

The following sequence of events is deduced from the foregoing analyses:

(a) During about the last 100 years, lake levels for the three maars (Lake Purrumbete is not discussed here) have decreased drastically (Currey 1970; Bowler 1970, 1981).

(b) At 300 yBP and around 600-750 yBP, there were fluctuations of salinity to higher values in Lake Keilambete.

(c) At 1 300-1 800 yBP there is a discrepancy for Lake Gnotuk with high salinity values whereas the other lakes have a high water level (Keilambete with a suspected very low salinity).

(d) At around 2 000 yBP a change in water level in Lakes Keilambete and Bullenmerri is supported by ^{14}C dated trees which were drowned (Yezdani 1970, Bowler 1970). [Fig. 11 indicates that water level rose before the particular tree existed at Lake Keilambete. This discrepancy is caused by the approximation in dating events but, after consideration of the limits of error for ^{14}C dates, the above statement is still considered valid.]

(e) During the 2 000-3 000 yBP period lake levels were low in all three lakes.

(f) At about 3 000 yBP there was a change in level in Lakes Bullenmerri and Gnotuk; it is noticeable a bit later in Keilambete.

(g) Between 3 000 and 3 600-3 800 yBP lake levels fluctuated in Bullenmerri and Keilambete.

(h) Between 3 800 and 6 400-6 500 yBP water levels were high in all three lakes. The highest lake level occurred between 5 700 and approximately 6 400 yBP.

(i) The changes in water levels recorded at about the same time in Lakes Gnotuk and Bullenmerri before 6 400 yBP are not detected in Lake Keilambete.

(j) Between 7 400 and 8 000 yBP water was high in Lake Bullenmerri also presumably in Lake Keilambete. It appears not to be the case at Lake Gnotuk.

(k) There was a drastic change of water level for Lakes Keilambete and Gnotuk at 8 300 yBP. This corresponds to a probable change in level seen by a change of fauna in Lake Bullenmerri at the same time.

(l) Before 8 300 yBP salinities in Lakes Keilambete and Gnotuk were the highest ever recorded in the lakes for the last 10 000 years. Lake Keilambete water level and salinity seem to have fluctuated more.

Lakes Gnotuk and Keilambete appear to be more sensitive recorders of "climatic change" since salinity fluctuated more drastically and frequently there. This is a direct result of their smaller volume of water and shallower water depth compared to Lake Bullenmerri.

These 2 lakes (Gnotuk and Keilambete), dried up during the very arid phase prior to the last 10 000 years and this would explain the flat bottom topography of each lake as pedogenesis must have prevailed during that period. (This phase is already documented for Lake Keilambete in Bowler and Hamada (1971)). Lake Bullenmerri did not dry up during that period (Dodson 1979).

It is interesting to note that at times the similar Lakes Gnotuk and Keilambete did not register identical and synchronous salinity changes. The total dissolved solids content of the water of Lake Gnotuk must have changed fairly drastically after each flooding from Lake Bullenmerri. Lake Keilambete therefore should prove to be the most reliable and accurate recorder. However there are also difficulties in interpreting changes of salinity for Lake Keilambete since some salts must have been lost during the high water levels with lake overflow.

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