Climate and Ecological Change in East Africa

IN 1962, Livingstone (*Nature*, **194**, 859) produced the first piece of direct evidence that 15,000 years ago the glaciers of Ruwenzori in East Africa were retreating at the same time as the Würm Glacier of Europe and the Wisconsin of America. Coetzee (*Nature*, **204**, 564 ; 1964) produced similar evidence for Mt Kenya, and Kendall (*Ecol. Monog.*, **39**, 121 ; 1969) has demonstrated climatic fluctuations in the Lake Victoria Basin. Large climatic changes in the comparatively recent past have clearly demonstrated that the vegetation and attendant faunal fluctuations must have been a marked phenomenon over most of the African continent. Indeed, it may well be that the Pleistocene overkill (Martin, *Nature*, **212**, 339 ; 1966) may be explained as much by climate as by human factors.

Climatic changes such as these may be considered to be recent in a geological sense, although in terms of present-day ecology they may be considered historic. If, however, the climate of the past hundred years in eastern Africa is examined, there is strong evidence to suggest that, superimposed on these longer term fluctuations, there are short-term changes that are of real significance to workers in the field of wildlife management today.

Western and Van Praet, on page 104 of this issue of *Nature*, convincingly demonstrate cyclical changes in both habitat and climate of the Masai Amboseli Game Reserve. The loss of fever trees (*Acacia xanthophloea*) from the basin has been noted over twenty years and especially during the past ten. The loss of this vegetation has been the cause of much concern, and Masai cattle and the elephant population have been blamed for the decline in tree density.

The whole Amboseli basin, which contained a large lake in the late Pleistocene, dried up during the Recent epoch. Western and Van Praet have found that the number of dead trees increases towards the basin centre and, because Masai cattle have been excluded since 1961, they conclude that domestic stock are not related to this tree death. Eighty-five per cent of the trees in the basin show damage from elephants, so that it might be presumed that they could be considered as being the primary cause of tree death. Seventeen per cent of the dead and dying trees are undamaged by elephants, however, so that Western and Van Praet looked for another primary factor, and demonstrate that increasing salination of the soil towards the basin coincides with high densities of dead trees. This increase in salination is associated with raised water levels and can be correlated in this closed drainage system to variations in rainfall.

Western and Van Praet show that Amboseli is sensitive to variations in water level which are indicated by alternation of hydrophytic and halophytic vegetation. Evidence from the oral history of Masai age sets clearly demonstrates that a halophytic vegetation covered the basin during the past century with a hydrophytic woodland forming in the first quarter of the present century and a strong reversal of this trend during the past ten years. These changes may well be shown to be the result of a long-term fluctuation in rainfall with a period of about 100 years. Thus in the closed drainage system of the Amboseli basin, and perhaps in similar areas such as Lake Manyara in East Africa, the primary cause of vegetation change seems to be rainfall, with elephants merely acting in a catalytic manner to accelerate changes already taking place.

Laws (*Oikos*, **21**, 1 ; 1970) has demonstrated that elephants act as important agents of change in many East African habitats especially in the conversion of woodland to grassland as has been observed in the Murchison National Park in Uganda and the Tsavo National Park in Kenya. In Tsavo these changes have been dramatic and a recent drought has led to the death of up to 5,000 animals. It has thus been suggested that the high elephant density and encroachment by man have been the primary causes for these changes. Although it is quite clear that the influence of man on the distribution of large mammals has been profound in many places, Western and Van Praet's article demonstrates the caution that must be used when interpreting vegetation changes in terms of man and animal numbers alone, for although to a large degree their influence is everywhere profound, the action of long- and short-term climatic changes may yet be shown to be a primary factor in the dynamics of these areas of variable and extreme climate.

The emergence of independent East African states with their rapidly expanding populations makes it imperative that the best possible economic use be made of the land. Vast tracts of these nations, however, fall into a semi-arid classification, so that such economic exploitation must of necessity be combined with a high degree of ecological planning and common sense. In recent years, the income that Kenya derives from tourism now heads their list of foreign earnings. This important fact clearly demonstrates that the sound management of game reserves, national parks and other amenity areas may well form the basis of future development and a sound economy.—M. C.

PROTEINS

In vitro, or Almost

from our Cell Biology Correspondent

THE clawed toad, *Xenopus laevis*, has, of late, come to occupy a new ecological niche—the laboratories of molecular biologists many of whom, I suspect, have not since their boyhood days of jam jars full of frogs' spawn and tadpoles given amphibians a second thought. The reason for this sudden interest, from such an unexpected quarter, in *Xenopus* is that Gurdon and his school and collaborators have shown recently that globin messenger RNAs and calf lens crystalline messenger are, when injected into *Xenopus* oocytes, translated with fidelity and at a reasonable efficiency. In other words, *Xenopus* oocytes provide what almost amounts to a cellular cell-free system for studying the translation of at least