length whereas the other species rarely grow to even 50 cm. Templeman tentatively assigns these giants to *Lepidion schmidtii*, a species originally described from Sagami Bay, Japan, at a depth of 550–700 m and hitherto known only from this locality. Distributions of this kind are not uncommon in deep water species of fish. For example, the related morid species *Antimora rostrata* occurs in deep water in the North and South Atlantic and in the northern and southern parts of the Pacific Ocean.

As well as clarifying the nomenclature of these deep sea fish, Templeman has taken the opportunity to make some biological observations. *L. eques* begins to spawn in April in the Icelandic region, and reaches sexual maturity at a shorter length in the higher temperature areas of its range. Supplementary data from this study (*Tech. Rep. Fish. Res. Bd. Canad.*, No. 160, 1; 1970) demonstrates that this fish eats chiefly crustaceans, with polychaete worms as a minor item of diet. The total absence of fish in their stomachs is interesting but is probably a reflexion on the build of *Lepidion*—heavy bodied anteriorly and slim tailed, which does not suggest a fast swimming, agile predator.

CONSERVATION

Knysna Elephants

from a South African Correspondent

THE most southerly surviving herds of African elephants, *Loxodonta africana*, are those of Addo and Knysna, along the southern coast of the Cape Province. To the north the nearest elephants are found in northern Zululand, nearly 600 miles away as the crow flies.

The Addo herd, under the excellent protection of the National Parks Board, is probably comparatively safe and at present numbers some fifty-four animals. The Knysna herd, on the other hand, is teetering on the edge of extinction. As far back as 1908, it numbered less than twenty individuals (Kinloch, *Afric. Wild Life*, 22, 185; 1968), and in 1920 the herd was further depleted by a professional hunter, Major P. J. Pretorius, who destroyed five animals, bringing the herd down to thirteen individuals. Most estimates today place the number at around ten or eleven animals. Concern for this herd has been strengthened by the belief, expressed by Major Pretorius among others, that it represents a different race from the Addo one.

For some years now the Eastern Province Branch of the Wild Life Protection and Conservation Society of South Africa has been concerned with the fate of the Knysna herd. In 1968 it held a symposium on the future

of the Knysna elephants, and as a result employed a professional game ranger, Mr B. Carter, to undertake a survey of these animals. His report (*Knysna Elephant Survey*. Wild Life Protection and Conservation Society of South Africa, Eastern Province Branch, 1970) stated that there were "at least ten elephants in the forest and probably no more"; that they did not appear to represent a separate subspecies, and that, to protect elephants and humans from each other, the elephants should be fenced off in the Harkerville Forest.

At this stage the campaign met with unexpected opposition, from conservation-oriented botanists, who were upset at Carter's prediction that the elephants would eventually open up the forest into glades. Their reaction was that, given a choice between the elephants and the forest, they regarded the forest as more important, and if saving the elephants meant damaging the forests, they were not at all keen on saving the elephants. A meeting was hastily convened and held in Grahamstown on October 30, 1970, well attended by biologists and conservationists, particularly from the eastern Cape Province.

A certain amount of discussion took

place as to how many elephants there were, their population dynamics, how much they ate, whether they were being poached (a point which was not resolved), whether it would be possible and practical to confine them to Harkerville, and so forth. One of the delegates roundly stated that in his opinion the Knysna elephant did not have as high a conservation priority as the Harkerville forest itself. The eventual proposals of the meeting made little mention of elephants and instead expressed concern primarily over the future status of the entire ecosystem of the southern Cape indigenous forests (which would presumably include the elephants) and the support the Wildlife Society should give to the conservation of these.

The Wildlife Society representatives at the meeting, although agreeing in principle with its recommendations, were not prepared to speak on behalf of the society. This is perhaps not surprising, because the views expressed seem to suggest that they have not placed the emphasis correctly in their conservation attempts—in effect, that they could not see the forest for the trees (or the elephants).

Multiple Mutations in Nitrosoguanidine Roulette

IN next Wednesday's *Nature New Biology*, N. Guerola, J. L. Ingraham and E. Cerdá-Olmedo shed new light on the susceptibility of the replicating region of DNA to mutation. This work follows from an earlier publication by E. Cerdá-Olmedo, P. C. Hanawalt, and N. Guerola (*J. Mol. Biol.*, 33, 705; 1968) which showed that treatment of *Escherichia coli* with nitrosoguanidine increases the mutation frequencies of genes which are in the replication region at the time of treatment. In fact, the increased frequency of nitrosoguanidine induced mutants can be used to detect the position of the replicating region. If cultures are synchronized and treated at successive times the sequence in which the genes mutate will be related to their position on the genetic map. Guerola *et al.* tested the hypothesis that if mutation induced by nitrosoguanidine occurs selectively in the replicating region, then the multiple mutants produced will be closely linked. They examined azide resistant mutants of *E. coli* for the presence of other mutations and found a large excess of these among closely linked genes. They have eliminated the possibility that this increase is a property of the genes themselves.

Because a high proportion of all nitrosoguanidine induced mutants occur within the replication region, it is possible to estimate the length of this region as the distance between the two

outermost genes showing an increase in induced mutation frequency. The replication region has also been estimated to be 220 times more sensitive than a similar length of the rest of the chromosome.

Guerola *et al.* claim that a strain carrying a mutation induced by nitrosoguanidine probably carries fifty other base changes within a map distance of less than two minutes. If so, it is obvious that a phenotype obtained after nitrosoguanidine treatment cannot be the consequence of a single mutational event.

Treatment with nitrosoguanidine may provide a useful tool for genetic mapping in asexual organisms. In *E. coli*, coarse mapping can be achieved by sequential mutagenesis and fine mapping by an index derived from the ratio of the frequency of double mutation to the product of the frequencies of single mutations in these genes. This index is greater than one for markers closer than the length of the replicating region. Nitrosoguanidine mutation also has possibilities as a tool for isolating mutants. By selecting for mutations to a closely linked gene, relatively high frequencies of inactivating mutations may be expected. Because there are no special features in the chemical structure of nitrosoguanidine which can explain its affinity for the replicating region, it would be of interest if other mutagens could be found with a similar affinity.