steroids in the control of testicular and adrenocortical function. As might be expected immunisation of rabbits with an antiserum to testosterone induced hypertrophy and hyperfunction of the testis as determined by histometry and measurement of serum testosterone levels. But the weight of the accessory reproductive glands of the testosterone-immunised rabbits was lower than that of control animals; the prostatic epithelium was atrophied and the diameter of the alveoli reduced showing neutralisation of the biological action of testosterone. Elevated concentrations of luteinising hormone and follicle-stimulating hormone were detected in blood and the changes produced were similar to those induced by administration of these gonadotrophins. This increased secretion of gonadotrophins from the pituitary seems to result from binding of the testosterone to the circulating antibody making it unavailable to the hypothalamic receptors.

In animals immunised against cortisol but not those receiving testosterone, androstenedione or oestradiol there was evidence for hyperfunction of the adrenal cortex. In rabbits immunised against oestradiol there was an increased secretion of luteinising hormone and Leydig cell hyperplasia of the testes similar to that observed after testosterone administration but in contrast there was no change in follicle-stimulating hormone levels, testicular weight or in accessory reproductive glands. The findings suggest therefore that oestradiol may have a differential effect on gonadotrophin secretion in the rabbit. The results of immunisation against other related steroids were more difficult to interpret because of some degree of cross reaction of the antibody with other hormones.

This way of investigating the role of various steroids in feedback control systems and their interaction seems very promising. It will no doubt be developed further in the future if more specific antibodies to a wide range of steroids can be developed.

Plants which survived glaciation

from Peter D. Moore

THE explanation of present day, disjunct distribution of plants and animals by reference to climatic changes during the Pleistocene is a process fraught with difficulties. European biogeographers have continually been at loggerheads with their geological colleagues concerning the likelihood of certain species surviving in isolated pockets or on solitary peaks during periods of major glacial advance. In Norway a number of species show a bicentric distribution having stations on the northern and on the southern ends of the Scandinavian mountain chain, but being absent in the central area (for example, *Campanula uniflora*). Per-glacial survival in these two areas has been invoked as an explanation (Nordhagen in *North Atlantic Biota and their History*, edit. by A. Löve and D. Löve, 241, Macmillan, Toronto, 1963). Similar suggestions were put forward in the explanation of disjunct groups of arctic alpine plants in Britain, such as the Teesdale assemblage (see *Nature*, **249**, 798; 1974). In both British and Norwegian situations, however, the problem may well be one of post-glacial disjunction owing to the extent of forest cover during the climatic optimum. The survival sites may be post-glacial rather than per-glacial refugia and may represent relict fragments of plant communities which were widespread at the close of the last glaciation.

In North America, a similar problem exists in the Gulf of St Lawrence area, where the disjunct distribution of some plants has been explained as the product of survival through the Wisconsin glaciation, but once again post-glacial forest spread could have been the agent of disjunction. In the west, parts of the Yukon have never been glaciated and are thus undisputed potential refugia for those species capable of survival under periglacial conditions (see Lindroth, *Endeavour*, **29**, 129; 1970). Packer and Vitt (*Can. J. Bot.*, **52**, 1393; 1974) have now proposed that the Mountain Park area of the Canadian Rocky Mountains in Alberta may have served as a glacial refugium.

Their argument is based mainly upon the collection of disjunct arctic-alpine and alpine plant species which are found together in this area, though they claim that geological evidence also supports the idea of an ice-free area existing throughout Wisconsin times. The ice-free regions would have included some foothill areas as well as protruding mountain peaks (nunataks). The disjunct species involved include some, such as *Eriophorum callitrix*, with a mainly arctic distribution, some, such as the bryophyte *Orthotrichum pylaisii*, which occur in both arctic and alpine situations, and some, such as *Telesonix jamesii*, which are essentially alpines and occur in isolated mountain sites mainly to the south of Mountain Park. A collection of disjunct species (the authors name sixteen), however, does not in itself prove per-glacial survival. There are two alternative explanations which must be examined first, namely long-distance immigration from a distant centre of dispersal, and disjunction by forest invasion of territory once occupied by the relicts.

Long-distance dispersal is unlikely to account for all the species, since most have very poor dispersal mechanisms. If forest spread had caused the disjunction, then one would expect survival of at least some of the species at various sites between their now isolated stations, since at no time in the post-glacial period has the tree line been high enough to eliminate them from all geographically intermediate sites. They are, however, absent from these. The authors' hypothesis of *in situ* survival of the Wisconsin glaciation is thus the simplest available to explain the distribution.

One must still ask why the plants did not spread from this centre during the conducive climatic conditions of late-Wisconsin times, prior to forest invasion. It is difficult to conceive of severe genetic impoverishment occurring in populations isolated for a period (frequently interrupted) of at most 100,000 yr. One must hope that future palaeoecological studies of those species will supply more information on their glacial histories. Meanwhile, it is a matter for concern that this area is not included in any Canadian or provincial conservation programme and is currently threatened by mining.

Plumbing at the North Pole

from Peter J. Smith

ALTHOUGH the original soundings taken by Nansen (recorded in *Norwegian North Polar Expedition, 1893–96*, vol. 4, Jacob Dybwad, 1904) left no doubt that the Arctic Ocean is a deep water basin, the full complexity of the region has only become evident since modern surveys and traverses began in the later 1950s. Few would now disagree with Dawes (in *Implications of Continental Drift to the Earth Sciences*, Academic Press, 1973) when he says that "the basin is not a simple deep structure with uniform character but . . . is made up of individual basins separated by submarine ridges of contrasting morphology", although there would perhaps be less agreement on how the ridges were formed and hence on what they represent in terms of plate tectonics.

There are three ridges in the Arctic Ocean. The Lomonosov ridge is flat-topped and relatively narrow, rises to within 954 m of sea level, extends 2,000 km from the vicinity of northern Greenland and Ellesmere Island to the New Siberian Islands off the coast of Russia, and splits the total basin unequally into the Amerasian (larger)