HIMALAYAN TAHR IN NEW ZEALAND, by J. A. Anderson and J. B. Henderson. 1961. *N.Z. Deerstalkers Assoc. Spec. Bull. 2.* 37 pp.

This booklet was prepared for the Symposium on Animal-Forest Relationships (Section of Forestry, Division of Forest Biology) Tenth Pacific Science Congress, Honolulu, Hawaii, 1961, primarily to demonstrate the organized sportsmen's potential contribution in the absence of research by the government. The writers evince an intense preoccupation with numbers of tahr, and while this naturally is of interest to sportsmen, the factor of prime importance is the response of the vegetation and the healing of erosion scars in relation to the annual kill.

Food preferences are described, apparently from direct and indirect observations, and it is suggested that the maintenance of good condition on sparse pastures is evidence of highly efficient utilization of poor foods. This is an interesting speculation which could well be investigated. Accurate body weights are not known; *estimated* weights for nine sex age classes have been given, but the figures are of limited value.

Age assessment and horn growth have been graphed (Fig. 5, p. 20) but there is no record of horns being collected; it is unlikely that shooters could age accurately in the field. There are no numbers and no reference points, graphs being smoothed or simple from lack of variation owing to paucity of data. Age assessment by means of dentition is only accurate until maturity at the end of the third year, horn growth being used to estimate age up to 19 years.

Under "Physical Characteristics" are interesting notes on hooves, pelage, and measurements of the sexes. It is noted that tahr are beardless and do not possess pre-orbital, inguinal or pedal glands, but the nuchal gland has been overlooked. The voice is a high-pitched whistle and these animals appear to reply on their keen eyesight more than hearing or sense of smell.

The "rut" occurs from late April to early July, and, with the exception of immature males which accompany the nanny-kid group, the sexes range apart; an old nanny is the leader of the family group. For the most part, tahr appear to have a monogamous mating system, the infrequency of a bull running with more than one mature nanny being attributed to a local shortage of mature bulls or, possibly, as being a normal variation. No aggressive behaviour was noticed. Mature bulls are normally found from 4,000 ft to 7,000 ft and the nanny-kid herd between 2,500 and 5,000 ft; seasonal movement is largely dictated by the snowline. Wandering bulls may be found 40 to 60 miles from the nearest known tahr country; colonization and spread appear to be "the result of slow dispersal of the early mature age groups to adjacent suitable habitat that is unoccupied".

The authors consider that females from two years and upwards appear to breed each year but their analysis of total data (ignoring yearlings of unstated sex), giving a kid : female ratio of 90 : 100 in autumn, and the apparent rareness of twins, suggests that females may indeed breed at one year. The sex ratio is considered to be 1 : 1, based on 10 embryos and 2 newborn kids having a 6 : 6 male : female ratio; this ratio is considered to be borne out by the monogamous mating pattern. Ten is a very small sample, making bias

almost inevitable, and it is doubtful if even the adult figures (unstated) would be adequate. Further a birth ratio of 1 : 1 would not necessarily continue in that proportion; elsewhere there is a suggestion that bulls run with more than one nanny because of a shortage of bulls but no suggestion of differential mortality is made to explain this.

The authors consider that the first two and possibly the third are the critical years for young tahr, but the relevant histogram (Fig. 3), has the characteristics of one based on a small, non-representative sample. The most outstanding column is the group one year and under (23%), the size of which would be dependent on the season of sampling unless an adequate sample were taken in each season. Lack of fat in young animals, put forward as a mortality factor in young tahr (p. 31), does not necessarily indicate other than active growth. A net herd increase of 2½% derived from the authors' model and regarded by them as near zero, seems to be inconsistent with the growth and spread of tahr. In view of the potential reproductive rate (with a possibility of more than one kid a year), and with the animals in very good condition, it would seem (from the percentages given) that some explanation is necessary to account for the sudden fall in survival. The late winter 45 : 100 kid : nanny figure implies the death of a great number of young to reach the 8% of total population (Fig. 3); it is stated that 80% of all young die by the end of their third winter. Die-off of immature tahr is attributed largely to "an environmental stress complex", with nutritional deficiencies, prolonged periods of snow and cold weather and lack of fat reserves as the prime causes. The "stress syndrome" has been enthusiastically supported for some years but the hypothesis seems to have been discredited recently; it is doubtful whether stress does occur in a wild population.

The authors have given an attractively presented natural history of a highly regarded game animal, but despite its obvious merits it cannot be used in scientific study or in management because of its lack of objective quantitative data. The general impression gained from the booklet is that the authors have a considerable knowledge of techniques, but that the field resources of the New Zealand Deerstalkers Association have not yet been sufficiently organized for collecting and recording information on the scale and with the detail necessary for such a study.

—M.M.D.

PATHOLOGY OF TREES AND SHRUBS WITH SPECIAL REFERENCE TO BRITAIN by T. R. Peace. 1962. Oxford University Press, London. 753 pp., illus. U.K. price 90s.

This textbook fills a major gap in the literature on tree diseases, for it is the first British review dealing exclusively with the pathology of timber and ornamental trees and also it is first textbook on European forest pathology since Hartig's in 1894. However, its content goes far beyond Britain and Europe. Certainly British work and experience have been thoroughly reviewed, but no more noticeably than foreign work. Besides describing some foreign diseases in full, extensive mention has been made of foreign works on those diseases occurring in Britain. In fact it includes diseases of trees over the whole of the temperate region, including Australasia.