

servationists, sportsmen and gamekeepers. Professor H. R. Hewer, the chairman of the Council for Nature, has described this co-operation as "a triumph of common sense", for the naturalists have agreed that predators must sometimes be killed, and the sportsmen have accepted that they can protect their game without eradicating all the predators.

The booklet contains illustrated notes on recognition, distribution, behaviour and control of twelve British predatory mammals. The need for control is clearly stated—the mink, for example, is potentially very destructive and should be eradicated; the hedgehog can cause serious losses of nests on a partridge beat, but elsewhere there is no need for control; the pine marten is virtually harmless, and although the otter can damage fishing interests it is doubtful whether it does much harm in Great Britain as a whole. The appropriate methods of control are given for each animal; the mole, which is an agricultural pest, proves particularly difficult to exterminate, and the working party has had to recommend poisoning with strychnine hydrochloride, although it had hoped to eliminate this poison from the countryside. Chapters on the law explain the methods of snaring, trapping, gassing and poisoning which can be used, and also the most humane ways of carrying these out. In a chapter prepared by the Universities Federation for Animal Welfare the best ways of killing trapped animals are described.

The working party is hoping to see *Predatory Mammals in Britain* in the pockets of all gamekeepers and sportsmen, perhaps an unduly optimistic target. In any case, these people may prove difficult to persuade. Promotion of the booklet in schools, which is planned, may help to produce a new, educated generation of gamekeepers and sportsmen.

## Radiological Committee

THE British Committee on Radiological Units has been reconstituted under the title of the British Committee on Radiation Units and Measurements by the Radioactive Substances Advisory Committee. It will be chaired by Professor F. W. Spiers, professor of medical physics at the University of Leeds and honorary director of the MRC Environmental Radiation Research Unit, and based at the National Physical Laboratory.

The committee consists of experts, serving in a personal capacity, who are actively interested in the quantitative use of radiation and radioactive substances in industry, science and medicine. It will act in an advisory capacity to government departments and other bodies, interpret ICRU recommendations, make recommendations to the ICRU and other bodies, and also set up forums and working parties for specific purposes.

## Design for Astronomy

THE Optical Group of the Institute of Physics and the Physical Society and the Royal Astronomical Society picked the right time to hold a conference on Astronomical Optics, at Imperial College last week. With astronomical telescopes promised at Kitt Peak in Arizona, Cerro Tololo in Chile, and in Australia, the next few years are bound to be full of interest in telescope design. The conference covered a wide field, some of it directly concerned with the new instruments.

One preoccupation is the possibility of replacing photographic recording by photoelectric methods. Among advantages this would confer are a higher quantum efficiency, a wider range of wavelengths covered and a linear response, as Professor J. D. McGee from the Department of Physics at Imperial College explained. The snag is that the equipment is heavier and more complex than the simple photographic plate. Professor McGee suggested four possible systems: television cameras, solid state detectors, electronographic tubes and image intensifier tubes, and went on to discuss his own speciality, cascade tubes with thin mica windows. Professor M. A. Lallemand from the Paris Observatory was hopeful that the electronic camera could achieve sensitivities ten to a hundred times greater than photographic emulsion, and offered more reliable and precise measurement. Dr M. J. Smyth from the Royal Observatory at Edinburgh described the working of the twin 16 inch photoelectric telescopes at the observatory. One telescope continuously monitors light from a reference star, while the second measures actual stars of interest within a 10° diameter field. In this way the reference beam can be used to compensate for changes of atmospheric transparency, an inherent limitation for ground based observations.

For the new large telescope projects, the Richey-Chretien optical system which gives an aplanatic secondary focus is being adopted in preference to the Newton-Cassegrain layout. Dr C. G. Wynne of Imperial College discussed what the change involves and described his own development of extended field systems which will be adopted on the new telescopes. Dr E. H. Richardson of the Dominion Astrophysical Observatory in Canada described the design of spectrographs for the Queen Elizabeth II 156 inch instrument proposed in Mount Kobau, British Columbia. Dr E. H. Linfoot of the observatories at the University of Cambridge discussed coma tolerances for photographic star images. Coma is an aberration produced when oblique rays falling on the same zone of the mirror are not brought to coincidence in the focal plane; the two mirror Richey-Chretien combination avoids comatic aberration, but suffers from astigmatism. Because of the non-linearity of photographic response, coma tends to shift the mean centre of the image of stars by a distance depending on the stellar magnitude, giving rise to systematic errors in the determination of star positions. Dr Linfoot, with Professor R. O. Redman, has attacked the problem of tolerances with a computer, and explained how his results affect telescope design.

There were several contributions concerned with astronomy from rockets or satellites. Mr R. H. Christie of AWRE, Aldermaston, has designed a system for an all-reflecting satellite telescope in which stability of image is maintained by rotation of the secondary mirror, controlled by a signal derived by a sensor placed near one image point. The advantage is that only a small mass need be moved to maintain alignment, instead of the entire spacecraft, and the telescope can be made independent of the guidance electronics of the spacecraft. Several speakers described spectrographs for rocket-borne studies, and Mr C. T. Farr from RAE, Farnborough, described a small photometer to be carried in a rocket. On the last day, Dr R. Q. Twiss of the National Physical Laboratory gave an