

Comet Watching

The discovery of new comets has always been one sphere where amateurs have enjoyed great success; the names of Honda in Japan and Alcock in Great Britain come to mind, as well as the famous Peltier in the U.S.A. – not only for having discovered several comets, but for finding a number of novae as well. Naturally many comets are discovered by professional astronomers, but this is usually during work upon some other project rather than due to deliberate searching. However, there are not many observers who do undertake comet searches, as extreme dedication and an exceptional knowledge of the sky are required. Most searchers use large mounted binoculars or rich-field telescopes (see page 19), and many hundreds of hours of observation are needed before one can begin to remember the star patterns over the whole sky and down to the chosen limiting magnitude. Similarly, great dedication is required to search the sky on every possible occasion, most especially in those regions of the evening and morning skies close to the position of the Sun where comets may creep up and catch us unawares.

Although the orbits of most periodic comets are reasonably well known and predictions usually

the effects of the comet's motion – still record the comet. In some cases it may be necessary to guide on the comet itself during the exposure, and this procedure is used for detailed photographs aimed at recording the structure of the head and tail. As comets are diffuse objects this may pose considerable problems, although sometimes the presence of a star-like nucleus helps to lessen the difficulty. Depending upon the individual object it may be possible to arrange for the drive rates on the right ascension and declination axes to compensate for the cometary motion, but in extreme cases such as very fast-moving objects recourse may still have to be made to completely manual methods.

Comets are so varied in their brightness, size and features that visual observation may make use of any form of equipment. At times the full extent of long, faint tails may be best perceived by the naked eye, or at most with low-power binoculars. On the other hand, the perception of fine details such as the jets and shells – 'hoods' – of material being shed by the tiny nucleus may require a large telescope, a keen eye and a skilled observer. Photography just cannot record the finest details near the nucleus



A 15-minute exposure of Comet IRAS-Araki-Alcock obtained by H. B. Ridley on 1983 May 10, using a 500mm f/6.3 Ross lens.

account for all the planetary perturbations, it is still important that the objects should be monitored at their successive returns. In this way the predictions and orbital elements can be checked and refined. Indeed any information on precise cometary positions is of use, and, needless to say, in new comet discoveries such positional measurements are all-important. Positions are best obtained by photography and the use of proper measuring engines – as mentioned in connection with minor planets (page 148).

Photography normally requires the use of wide-aperture optics. The field must be sufficiently wide to incorporate fairly bright stars having well-determined positions themselves, hence enabling accurate positional information to be derived from the comet. Similarly, a wide-aperture fast system is required to ensure that short exposures – minimizing

because of the usually limited resolution, the normal over-exposure in the central regions of the coma, and the short time-scale of the phenomenon. Drawings by experienced observers remain the major source of such information. Unfortunately, too few observers can gain much experience of comets because bright well-placed objects are so rare. With previously unknown comets the fact that no-one has any idea of the sort of features or activity which they may show, is one of the reasons – apart from the computation of the orbit – why there is such a flurry of activity amongst observers following the announcement.

Another aspect of cometary studies is that of magnitude estimates. Although these follow the general lines of variable star estimates (pages 56–57), there are many additional difficulties. As with minor planet work, one problem is that of obtaining accurate