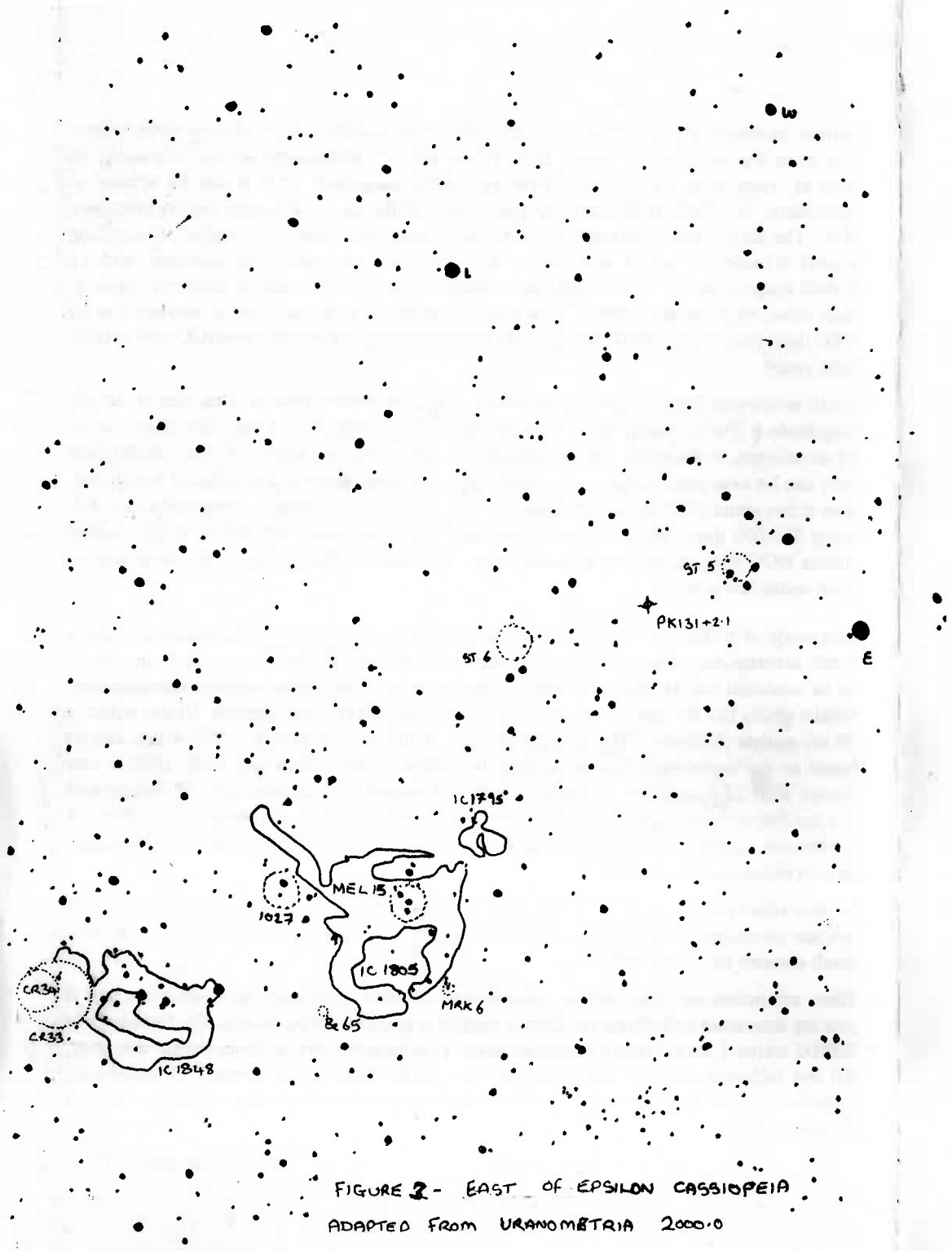

FIGURE 2 - EAST OF EPSILON CASSIOPEIA
ADAPTED FROM URANOMETRIA 2000.0

Cassiopeian Clusters

by Mark Humphrys

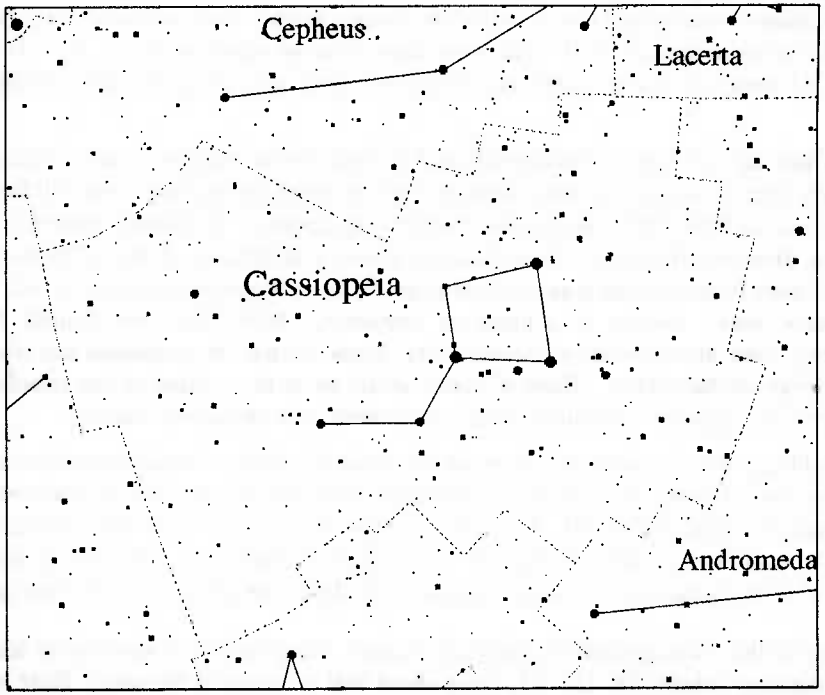

Figure 1

Cassiopeia is one of the easiest of the constellations to identify in the night sky, with its distinctive lop-sided `W' shape (Figure 1). Lying in the plane of the Milky Way, it contains a rich display of stars, and star clusters. In the Uranometria 2000.0, over 80 deep sky objects are plotted; well over 3/4 are open star clusters. In this article I will describe some of these clusters and how to find them, along with some other objects to be seen on the way. Some of the clusters can be seen with binoculars. I have been able to make out several of the brighter clusters with my little 7x20's, but to really see the details you'll need a telescope.

Referring to Figure 2, start at the western end of the constellation with the 2.3 magnitude star β (Beta) Cassiopeiae and look for ρ (Rho) and σ (Sigma) Cassiopeiae. The former is a variable star with magnitudes between 4.1 and 6.2, while the latter is around magnitude 4.9. In between these two stars lies the first object, the rich star cluster NGC 7789. It contains well over 900 members within a diameter of 20 arc-minutes. With 7x50 binoculars I can only make it out as a smudge of light, but with larger aperatures many individual stars will be resolved.

Back to β Cassiopeiae and slightly north eastwards, some 2.5°, is NGC 129, 14 arc-minutes in diameter with over 50 stars. North-westwards from β Cassiopeiae lies a string of clusters, the brightest of which are NGC 7788 and NGC 7790. The latter is the larger at 5 arc-minutes containing 25 stars, while the former is only 3 arc-minutes, very compact; overall it is about magnitude 10. The other clusters in the string are Be 58, Fr 1, H 21, and K 12. As these are much smaller and fainter you may have a harder time tracking them down.

If you line up α (Alpha) Cassiopeiae and β Cassiopeiae and travel in a straight line outwards from β roughly the same distance that separates the two stars you will find M52, also known as NGC 7654, near to the border with Cephus. It contains around 120 stars within a diameter of around 12 arc-minutes, giving a brightness of about 7th magnitude. In binoculars I can only see it as a nebulous patch, but in larger telescopes you will be able to resolve stars. Nearby is a patch of nebulosity, NGC 7635, the Bubble Nebula, extremely faint, about 3-4 arc-minutes in size. Look for the 7th magnitude star which lies at one edge of the nebula. There is some debate as to the origins of this nebula; some classify it as a supernova remnent, while others think it is a planetary nebula.

Backtracking to α Cassiopeiae, the next cluster is IC 1590, a small open cluster, about 1.5° east from the star. It is centred around an 8.5 magnitude star. The cluster itself lies at the heart of a nebula NGC 281. Irregular in shape and about 23 x 27 arc-minutes in size. It has an overall magnitude of about 8. It is visible in binoculars. How much detail can you see? With larger aperatures can you make the dark lane cutting into its lower half?

Star hop to the 3.4 magnitude η (Eta) Cassiopeiae. Stop here for a moment to look for a faint planetary nebula, PK 122-4.1, lying about half a degree to the west. Next stop is γ (Gamma) Cassiopeiae, with its two outer-lying patches of nebulosity, IC 59 and IC 63, both within 30 arc-minutes of the star. The nebulosity may be the result of the star ejecting material from its outer layers. Two degrees north west from the star lies NGC 225, an open star cluster about 14 arc-minutes in diameter, containing around 20 stars of 9th magnitude and fainter. Burnham's Celestial Handbook indicates that the stars form a `W' shape; can you make this out?

Further north westwards lies χ (Chi) Cassiopeiae. To the north there are three star clusters in a group, NGC 133, NGC 146 and K 14. NGC 133 is the furthest north of the three, about 7 arc-minutes in diameter containing about 40 stars around magnitude 10 and fainter. NGC 146 is a similar size containing 50 stars between magnitudes 11 to 15. Again K 14 is about the same size. You should see them in the same field of view. 1.5° north-east from γ Cassiopeiae lies another open cluster NGC 381, a compact 5arc-minutes in diameter, containing about 40 faint stars.

Move eastwards to δ (Delta) Cassiopeiae and the next four star clusters. The first one, about 1° north-east, is NGC 581, better known as M103, containing around 40 stars with an overall magnitude of 7.5. I can only make out a splodge in the 7x20 binoculars and a slightly brighter splodge with the 7x50's.

Further eastwards about 1.5° is NGC 654, NGC 659 and NGC 663. At low powers these will lie in the same field of view. NGC 654 is about 5 arc-minutes across, containing 50 stars of magnitudes 11 to 14. With an overall magnitude of 8 it can be spotted in binoculars. NGC 659 is the smallest and faintest of the trio, and I could see no indication of it. The largest and brightest is NGC 663 and again is visible in binoculars. Containing around 80 stars of mag 9 and fainter, it is about 11 arc-minutes in diameter, with an overall magnitude of 7. Although these clusters look as if they are in close proximity to each other, they are not related. The distance to M103 and NGC 654 is estimated to be 8000 light years, while NGC 663 is 2600 light years and inbetween lies NGC 659 at 6000 light years.

South-westwards from δ Cassiopeiae about 2° lie two more clusters. Star hop to the 5th magnitude ϕ (Phi) Cassiopeiae. To the north-west lies NGC 457, a very rich cluster some 10 arc-minutes in diameter. Its magnitude is 7 and it contains about 100 stars; its brighest stars can be seen in binoculars. It is thought that ϕ Cassiopeiae is a member of the cluster; if so it lies about 9300 light years from us. Its absolute magnitude is computed to be -8.8, about 275,000 times more luminous than the Sun! North-west about 0.5° is the smaller cluster NGC 436, containing about 40 stars. Both these clusters lie in the same field of view under low powers.

Eastwards of ε (Epsilon) Cassiopeiae lies another area of clusters and nebulosity that is worth investigating (Figure 3). Two nebulae, IC 1805 and IC 1848, are in close proximity to, or surround star clusters. IC 1805 is an extremely faint 90 arc-minute diameter loop within which lies the star cluster Mel 15, containing about 20 magnitude 7 stars within a 20 arc-minute diameter. The brighest portion of this nebula is NGC 1795 which can be found to the north-west. On the eastern boundary of the nebula lies NGC 1027, a star cluster with 12 magnitude 8 members with a diameter of 8 arc-minutes. 1° further east lies another nebulous patch, IC 1848, very faint and extensive, covering an area 90 x 45 arc-minute. Look out for the 7th magnitude star on its western edge. On its eastern edge lie two clusters Cr 33 and Cr 34.

Several other clusters to look out for in this area are ST 6 and ST 5. Inbetween these two lies the planetary nebula PK131+2.1, and near to the boundary of IC 1805 are the very small clusters Be 65 and MRK 6.

There are numerous other nebula, galaxies and clusters to be found in Cassiopeia, and if you are interested in looking for them I suggest a good star atlas such as the Uranometria 2000.0 which I have found invaluable since acquiring the first volume earlier this year. All the technical information in this article can be found in Volume 1 of Burnham's Celestial Handbook, another book which makes me wonder how I used to manage before I obtained a copy.

FIGURE 2 – STAR CLUSTERS IN CASSIOPEIA