The identity of IC 4040: a case for care in the catalogues

For the past seven years I have been conducting an investigation into the numerous identity errors found in both the historical and modern literature concerning the IC galaxies. I have found a certain amount of confusion in both the historical and modern data about the original identity of galaxy IC 4040.

This survey is part of the NGC/IC Project currently being carried out by professional and amateur astronomers under Harold G Corwin of the California Institute of Technology. Some of the primary results of the project may be found on the Internet at "http://www.ngcic.com/".

The galaxy IC 4040 appears in the Index Catalogue II (ICII), compiled by J L E Dreyer and published in 1888. Dreyer assigned the identity IC 4040 to a nebula which he credited to both M G Bigourdan of the Paris Observatory and H Kobold at Strassburg. Bigourdan reported the discovery of this galaxy in the Comptes Rendus for L’Academie Des Sciences meeting on 11 January 1897, numbering it in his list as 306 and giving it a rough position of 12hr 53m 56s +28 47’ 0 (1860), which by simple precession would give 13hr 00m 41s +28 01’ 5 (2000). He described it as being a 13th magnitude star accompanied by nebulosity and that there was a 13.2 Mv star at a PA of 25°, distant 1 arcmin.

In his monumental work Observations De Nebuleuses Et D’amas Stellaires (1919) Bigourdan dates the night of his discovery as 12 April 1891. As with all of his observations, Bigourdan employed field-associated stars from which to measure separation values which resulted in very accurate coordinates for his observed objects. For IC 4040 he used a 12th Mv star, which he called (Anon. 1), and he determined its coordinates by offsetting from the star BD +29 2350 and his coordinates for his reference star were given as 12hr 55m 58.59s +28 41’ 15” 5 (1900). This star is listed in the Guide Star Catalogue (GSC) as 1995-1703 and has a modern position of 13hr 00m 47.44s +28 08’ 53” 9 (2000). It lies immediately south preceding the galaxy NGC 4907, conspicuous on the Digitized Sky Survey (DSS). Bigourdan then measured the separations, (~08.84’ RA and ~07” 57’ of arc dec.), from this star to his 306. This results in coordinates for his 306 of 13hr 00m 38.00s +28 00’ 56” 9 (2000). When these values are applied to GSC 1995-1703 they land directly on a pair of galaxies forming a small double system.

Following Bigourdan’s Comptes Rendus discovery data, the field was examined by H Kobold who published his results in the Vierteljahrschrift Der Astr. Ges XXXII-III.154, and gives to his Object 29 the following data. +12hr 53m 53s +28 48’ 8 (1860). Very faint, small, round. = B.306 7” From simple precession rates Kobold’s 29 would have coordinates of 13hr 00m 38s +28 03’ 18” and when these are entered into the DSS they land directly on a galaxy – but not the same one as Bigourdan observed.

Two pieces of information can be derived from the above. First, Dreyer appears to have accepted Kobold’s coordinates, as those found in the ICII exactly match Kobold’s data. Secondly, Dreyer could have been influenced by Kobold’s suggestion that his 29 might be equal to Bigourdan’s 306 and therefore he credited both observers with the identity IC 4040. But Bigourdan’s 306 and Kobold’s 29 are entirely different galaxies. As both cannot be IC 4040, the question becomes which is the correct IC 4040?

Modern authorities have identified as IC 4040 the galaxy listed by Kobold as his 29 and those that list Bigourdan’s 306. I feel that it is Bigourdan’s problem, no matter how inconvenient this might be.

Malcolm J Thomson, 142 Ely Street, Oceanside, California, USA.

Correction

The Editor apologizes for a mistake in the caption of this picture in the last issue of A&G. Prof. Peebles is on the left, Prof. Blandford is on the right.