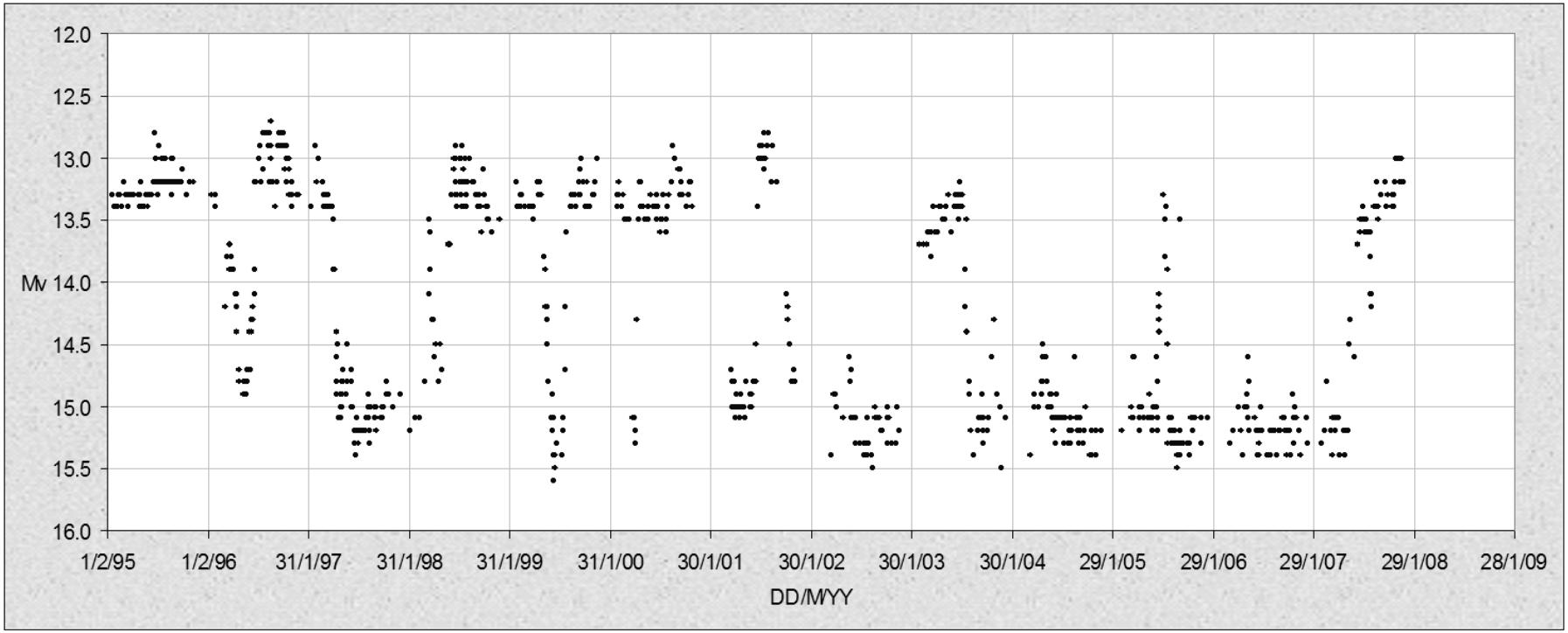
Variable Star of the Year
AM Herculis

AM Her was discovered in 1923 by M. Wolf at Heidelberg in Germany, and listed as a very ordinary irregular variable, showing variations in the order of 12-14th magnitude. In 1976 it was suggested that AM Her could be the optical counterpart of the weak X-ray source 3U 1809+50, and during that year the Chilean astronomer S. Tapia (University of Arizona) detected both linear and circular polarised light which suggested the presence of a massive magnetic field surrounding the star. The connection between star and X-ray source was established, and a new classification of Variable Star was born – the Polar! Polars are very close binary systems consisting of a highly magnetic white dwarf and a normal late type star. The closeness of the binary system results in mass loss from the secondary to primary star. The presence of a magnetic field around the white dwarf primary disrupts the formation of an accretion disc which we see in many Cataclysmic Variables. Instead the mass stream forms an accretion column, which follows the magnetic field lines towards the poles of the white dwarf and accretes mass at these points where incredible amounts of energy are released.

Unlike Dwarf Novae, Polars do not undergo outbursts. Instead they have what is termed 'high' and 'low' states. The high state relates to the star's maximum brightness (normal accreting state), whilst it's low state is the quiescent level (switched off state). The transition from high to low state is thought to be related to stellar activity in the secondary, possibly due to massive star spots or spot groups which disrupt the mass flow from the secondary to primary – although a definitive answer to this has still to be found. One thing which is certain though, is that the fade to low state and recovery to high state occurs completely at random, which makes Polars fascinating objects to observe. AM Her is the brightest in the class (V range 12.3-15.7), and is an excellent observing target for backyard telescopes both visually and CCD.

When AM Her fades it can be quick – over one magnitude in ten days. The low state isn't regular by any means, and 0.5-1.0 magnitude variations are common. The recovery to high state is just as unpredictable and can be just as rapid, and once reached it is impossible to predict whether the high state will be maintained or the star will quickly fade again. Observations should be made on every occasion to check AM Her for activity, and if suspected then observe several times per night if possible.

AM Her is circumpolar from the UK, although the field is difficult to observe during January, when it is low to the north. The field is an easy 3.5 degree star hop from the 2nd magnitude star Gamma Draconis, in PA 115 degrees. A 20cm telescope will easily show AM Her in high state, and depending where you live, this sized instrument will allow you to follow it to just below magnitude 14. A 30cm telescope will however reveal AM Her in quiescence.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