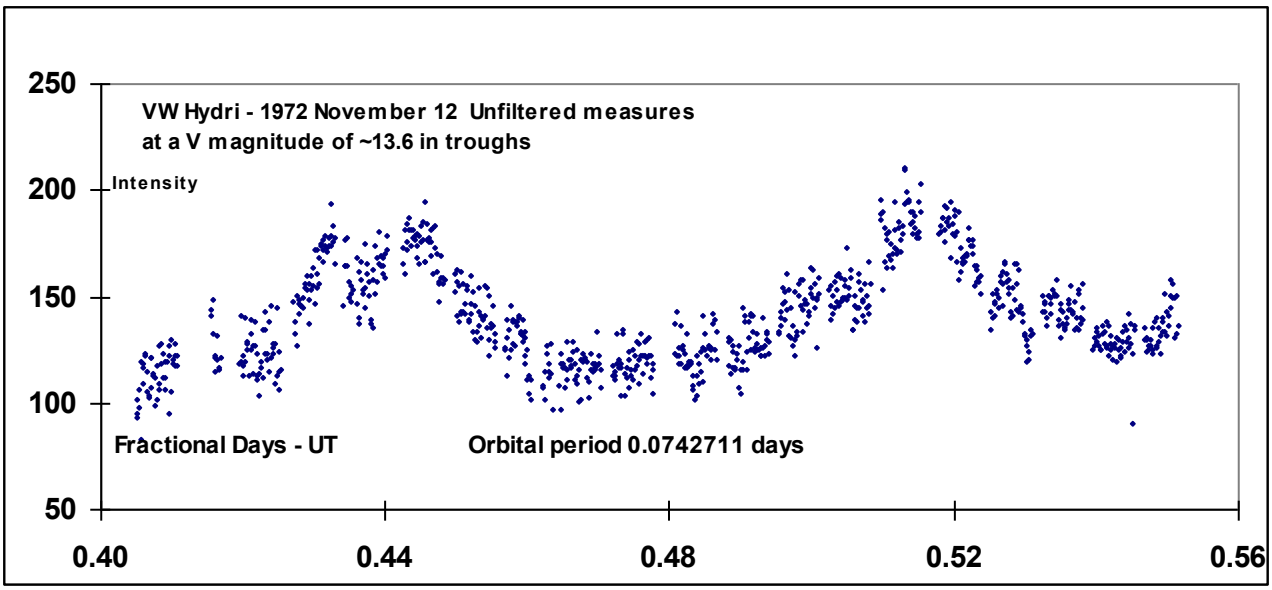
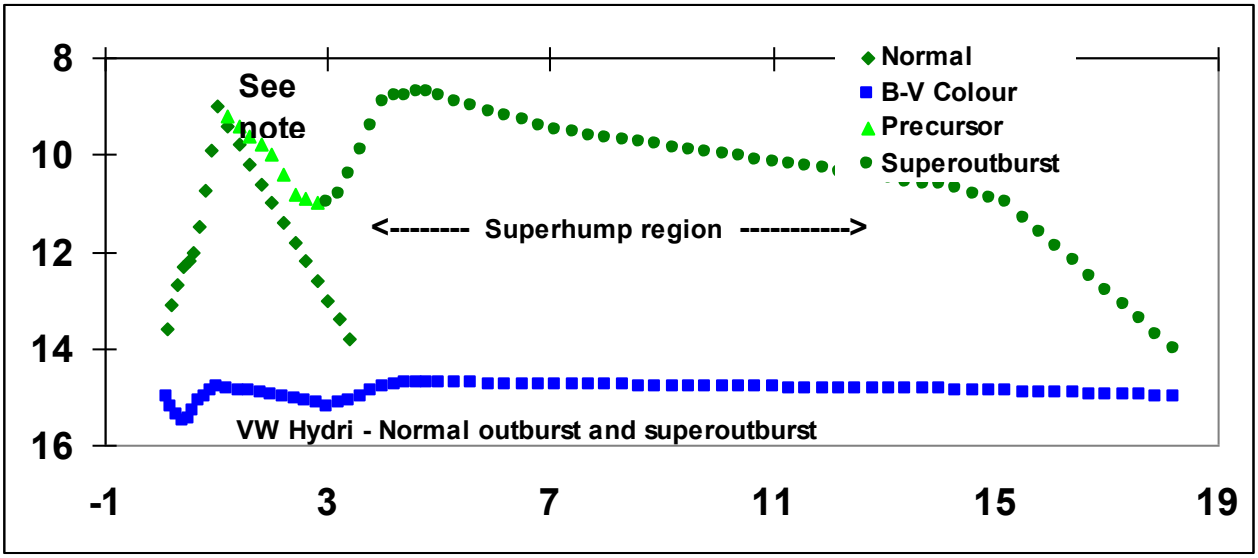
VW HYDRI



The top graph shows individual 10 second measures of VW Hydri at minimum. There is a marked orbital hump which we used to determine epochs of maximum.

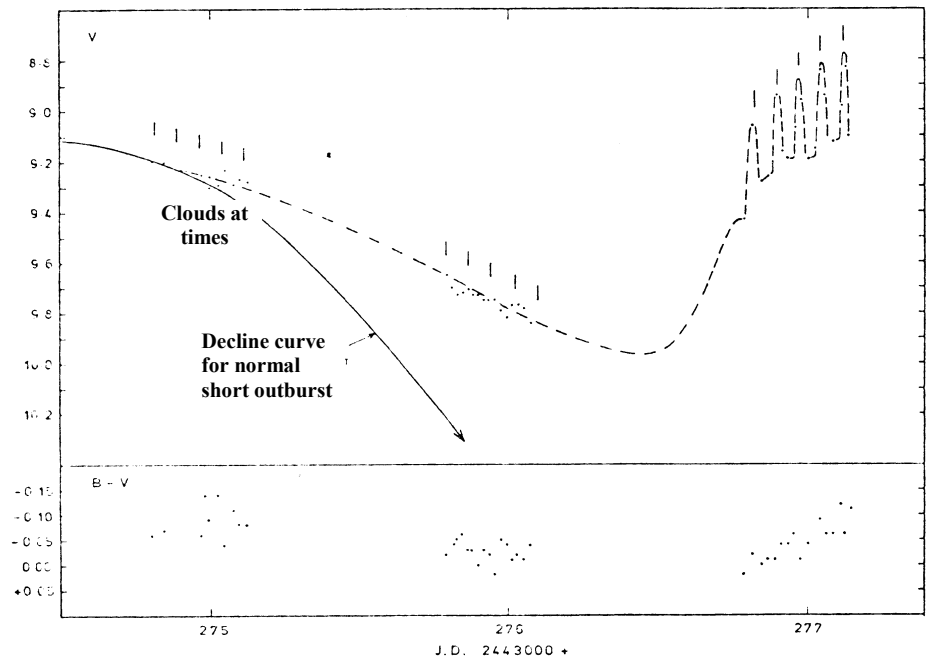


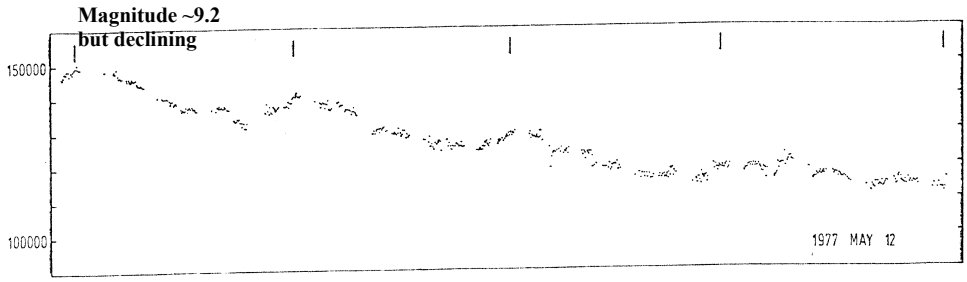
The normal outburst begins as a 'single shot event' with part of the overfull disc being dumped onto the white dwarf primary. But the primary is partially obscured as this happens and the system becomes redder—as shown by the dip in the B-V colour—with the light coming from the hot disc and the cooling infalling material. There is a noticeable slowing at V ~12 but then the accretion heating on the primary begins to dominate the system. Once maximum brightness is reached the star begins to get dimmer and cooler. A simple story.

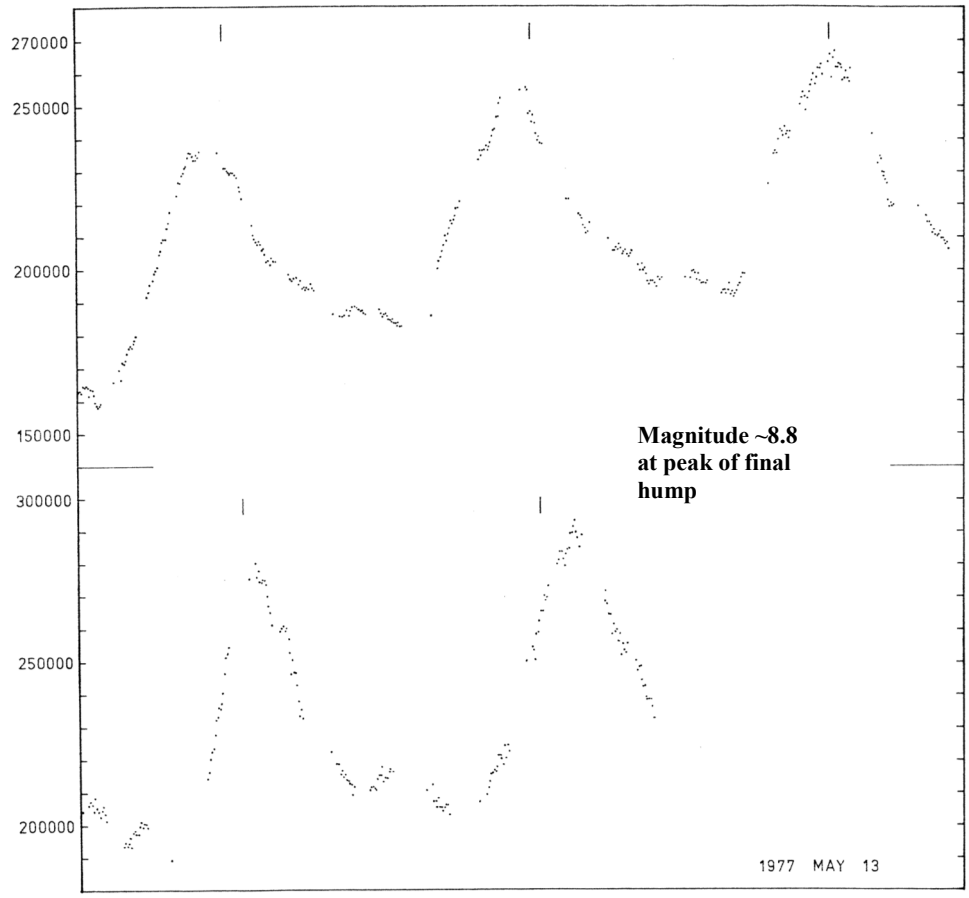
But when conditions are right—about every 180 days for VW Hydri—the normal outburst appears to trigger a continued and enhanced flow of material from the secondary star. This can be found in the brighter green triangles of the plot as enhanced orbital (obeying the orbital period of the system) humps. Normally the orbital humps are drowned out by the light from accretion onto the primary during outburst but if they are visible it shows that mass flow has increased by 30-40 times and this is what drives the superoutburst. The disc becomes distorted, it precesses and the apparent period becomes different from the orbital period by a few percent. When we first noticed this in Auckland in 1969—before the superoutbusts were modelled—we were completely bemused by how the orbital period could change like this. Our original paper on the system provided the correct period—but we had to admit that the similar appearing superhumps were something different!

See the next page for an actual set of events.

THE SUPEROUTBURST DEVELOPMENT







This composite graph from Colloquium 46, pp 29-38, 1979, shows interesting aspects of the precursor outburst which initiated the main superoutburst.

The top graph shows the observed measures fitted to the probable light curve with the normal light curve (solid line). All tick marks indicate normal phase 0.0.

The central graph shows the enhanced orbital humps with a period close to the normal period and phases to match. But the phase of the superhumps seen on the following night as shown in the bottom graph cannot be matched to them as, with only 10 cycles between, the phase shift would have been around 0.025 days, or ~0.3 cycles.

The period of the superhumps shown here is ~0.0768 days.

The disturbed light curve at the end of the 12 May run may well be the initial stages of the superhump development. At this stage the decline is beginning to slow.