THE RADIO MORPHOLOGY AND POSSIBLE NATURE OF 3C 58.

Ma Er*
Sterrewacht, Leiden, Netherlands

Richard G. Strom
Netherlands Foundation for Radio Astronomy,
Dwingeloo, Netherlands

Observations have been made of the supernova remnant 3C 58 with the Westerbork Synthesis Radio Telescope at 6 and 49 cm. These measurements provide us with greater resolution and sensitivity than that attained with previously published data. The 49 cm map has been used for comparison with an existing 21 cm one (Wilson and Weiler, 1976) to obtain information on the spectral index, rotation measure and depolarization. The 6 cm map is valuable both for its greater resolution, and for comparing with an observation made with the same instrument eight years previously. The total intensity distribution is shown in Figure 1.

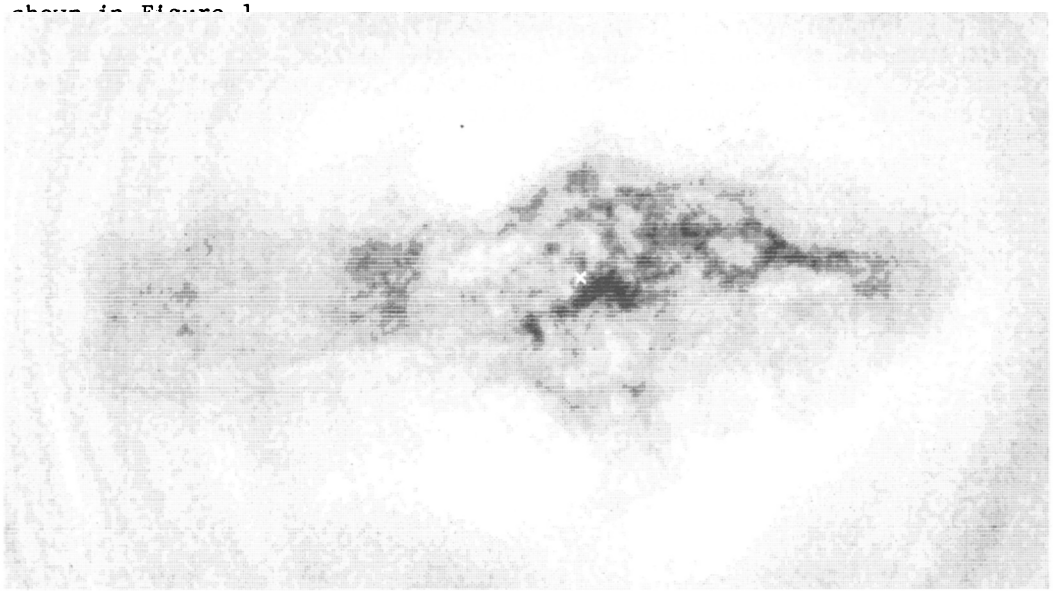

Figure 1. A 6 cm map of 3C 58 made with a resolution of 3" arc.

---

*Permanent address: Beijing Astronomical Observatory, Academia Sinica, Beijing, China.

J. Danziger and P. Gorenstein (eds.), Supernova Remnants and their X-Ray Emission, 341 - 342.

The possible association of 3C 58 with SN 1181 appears to be strengthened through the recent work of Liu Jin-yi (1982), who has discovered a 13th century star map with the 1181 guest star indicated. It is still too early to say whether the two-epoch 6 cm observations show evidence for changes, although there is a slight indication that one of the brightest features may have varied. The new 6 cm map shows that the X-ray point source (indicated by a cross in Figure 1) does not coincide with the radio peak. It lies, rather, on one of several ridges in the central region of the remnant. The two brightest peaks appear to be joined by such a bar-like structure, and are elongated roughly perpendicular to it. It is tempting to speculate that we are seeing a channel along which energy is flowing from a central compact object, and that the flow has been deflected near the bright peaks.

The intercomparison of our three frequency maps leads to results similar to those obtained by Wilson and Weiler (1976). With our higher resolution we find that the gradient in rotation measure of some 60 rad m^{-2} is not smooth, but occurs rather in two fairly abrupt jumps. As these discontinuities do not appear to be associated with features in the brightness distribution or in the depolarization ratio we conclude that they arise in the interstellar medium between us and 3C 58 rather than in the source itself.

A fuller account of this work is being prepared for publication elsewhere.

Acknowledgements.
M.E. was supported during his stay in Leiden by a grant provided by the Royal Netherlands Academy of Sciences (KNAW) from funds made available by the Ministry of Education and Science. The Westerbork Synthesis Radio Telescope is operated by the Netherlands Foundation for Radio Astronomy with the financial support of the Netherlands Organization for the Advancement of Pure Research (ZWO).

References.
Liu Jin-yi, 1982. Preprint (in Chinese).
Wilson, A.S., Weiler, K.W., 1976. Astron. Astrophys. 49, 357.