

OH EMISSION REGIONS AND EXTRATERRESTRIAL INTELLIGENCE

(Research Note)

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In a stimulating review paper BARRETT (1967) has tentatively broached the possibility that the galactic 18-cm hydroxyl emission might actually be part of a communications network among extraterrestrial civilizations. The high-intensity, puzzling ratios of individual lines, narrow bandwidths, origin from regions of small angular size, strong polarization, and possible time variation are the sort of properties one might associate with interstellar radio communication. The possibility that 18-cm emission is of intelligent origin has been raised before (SHKLOVSKII and SAGAN, 1966). However, I wish here to indicate one difficulty with this suggestion. Most of the hydroxyl-emission regions have been found to be associated with large H II regions. This may be an effect of observational selection (ROBINSON and MCGEE, 1967); but in any case, it is clear that at least some OH-emission regions are closely associated with large H II regions – the result of ionization of the interstellar gas by O and B stars. Such stars have main-sequence lifetimes of $\leq 10^8$ years. While we are in no position to make dogmatic assertions on biological time-scales, such short time periods do seem too small for the origin of life and the evolution of technical civilizations substantially in advance of our own.

For main-sequence lifetimes $\sim 10^9$ years or more, spectral types later than about A0 are required; such stars do not produce large H II regions. There are Bok globules associated with the outer boundaries of H II regions (see, e.g., Bok and Bok, 1957), but these are generally held to be stars in the process of formation rather than highly evolved objects; and SHKLOVSKII (1967) has proposed that OH-emission regions are identical with protostars. Thus, barring such unlikely possibilities as the travel by advanced civilizations to H II regions in order to set up interstellar masers there, the suggestions that the OH emission is due to extraterrestrial intelligence seems rather untenable.

References

- BARRETT, A.H.: 1967, *Science* **157**, 881.
BOK, B. J. and BOK, P.F.: 1957, *The Milky Way*. 3rd ed., Harvard University Press, Cambridge, Mass.
ROBINSON, B. J. and MCGEE, R.X.: 1967, *Ann. Rev. Astron. Astrophys.* **5**, 183.
SHKLOVSKII, I.S.: 1967, paper presented at the XIII General Assembly, International Astronomical Union, Prague.
SHKLOVSKII, I.S. and SAGAN, Carl: 1966, *Intelligent Life In The Universe*. Holden-Day, Inc., San Francisco, pp. 389 and 396.