1.4-GHZ LUMINOSITY FUNCTION OF GALAXIES 
FROM THE LAS CAMPANAS REDSHIFT SURVEY

J. MACHALSKI, W. GODLOWSKI
Astronomical Observatory, Jagiellonian University
ul. Orla 171, PL-30244 Cracow, Poland

Abstract. A preliminary 1.4 GHz RLF at redshift of about 0.14 is derived from the 
Las Campanas Redshift Survey (LCRS) and the NVSS radio data. No significant 
evolution has been found at this redshift in comparison to the 'local' RLF.

The LCRS consists of over 26000 redshifts of galaxies with 15.0 < R(mag) < 
17.7 lying in six sky strips between declinations (−3°, −45°) (Shectman et al. 1996, 
released up to date have allowed only 15 per cent of the optical survey to be used 
for the RLF determination.

The optical positions of 11671 LCRS galaxies were searched to a distance of 
15 arc sec in the NVSS source list. 95 of about 7000 galaxies with R ≤ 17.7 mag 
were detected above the NVSS flux limit of 2.5 mJy. Additional 33 detections 
were found between 17.7 < R(mag) < 18.5. Originally LBDS galaxies that met 
given photometric criteria had been chosen at random for the multi-object 
spectroscopy. Therefore about 2/3 of the galaxies identified with radio sources are 
not in the redshift catalogue. In order to use them in construction of the RLF, 
their photometric redshift was estimated. The resultant distribution of z is shown 
in Fig. 1(a).

The far infrared (FIR) identification of galaxies allows to select 'starbursts' 
from among all galaxies. Using the IRAS Faint and Point Source Catalogues, we 
were able to identify 30 of 128 radio-detected LCRS galaxies. All of them but one 
have q > 1.9 [q ≡ log(L_FIR/L_20cm)] (Fig. 1b), i.e. they can be assumed to be 'pure' 
starburst galaxies. Other 22 galaxies likely have the same type. Oppositely, LCRS 
galaxies with an upper limit q < 1.1, as well as these with the degree of polarized 
1.4 GHz flux exceeding 10 per cent of the total, can be considered as the 'AGN' 
type, powered mostly by nuclear processes.

Preliminary RLFs were determined for all LCRS galaxies, as well as for 'star-
The resultant functions are shown in Figs 2(a), 2(b).
The volume of space sampled is radio limited for the radio luminosities below $L \approx 10^{22.6}$ W/Hz. Above $10^{22.6}$ W/Hz the limiting volume is always determined optically and reaches redshifts $z \approx 0.26$. Consequently the RLF is well determined between luminosities $10^{22.4}$ to $10^{25}$ W/Hz. The resultant preliminary RLFs appear indistinguishable from the 'local' ones at $z \approx 0.02$ (Condon 1989). Presently available NVSS data are insufficient to check whether any evolution of galaxies at $z \approx 0.14$ has taken place, and if so, whether its amount is consistent with the model predictions. This, however, should be possible when the remaining 85 per cent of the NVSS data become available.