MHz, the National Radio Astronomy Observatory (NRAO) 300-ft. telescope was used; at 2·7 GHz, 5 GHz and 14·5 GHz we used the NRAO 85-ft. telescope. The angular resolution of the telescopes is in each case high enough to allow a clear separation of the flux densities of both sources. The flux densities were measured relative to either Cassiopeia *A*, Taurus *A* or Virgo *A*, whichever was more convenient for a particular observation. Some earlier measurements at high frequencies[1,2,4] and the interferometer measurement by Leslie and Elsmore[3] were combined with our own measurements. All these observations also give a clear separation between *NGC* 1265 and *NGC* 1275. Our recently analysed high-frequency spectra of the strongest non-thermal radio sources[5] were used to convert the relative flux density measurements into flux densities. The flux densities used for the spectra of *NGC* 1265 and *NGC* 1275 are given in Table 1.

Table 1. Flux Densities (in Flux Units) for *NGC* 1275 and *NGC* 1265

Frequency (MHz)	*NGC* 1275	*NGC* 1265	Ref.
178	41·0 ± 10% (m.e.)	15·5 ± 12% (m.e.)	3
750	22·9 ± 7·5%	11·5 ± 10%	
1,400	13·0 ± 12%	6·3 ± 15%	
2,700	8·7 ± 5%	—	
3,000	8·7 ± 5·3%	3·7 ± 11%	2
3,000	8·9 ± 5·8%	—	4
5,000	10·7 ± 10%	< 2·5	
8,000	18·8 ± 5%	—	1
14,500	18·2 ± 12%	—	
16,500	23·6 ± 9%	—	1

The values are also shown in Fig. 1. The mean errors of the individual measurements are indicated by error bars. The spectrum of both sources steepens between 178 MHz and 3 GHz. But whereas the flux density of *NGC* 1265 is below our detection limit at 5 GHz, the spectrum of *NGC* 1275 shows the already mentioned increasing flux density above 3 GHz. This behaviour of the high-frequency part of the *NGC* 1275 spectrum has been discussed extensively by Dent and Haddock[1].

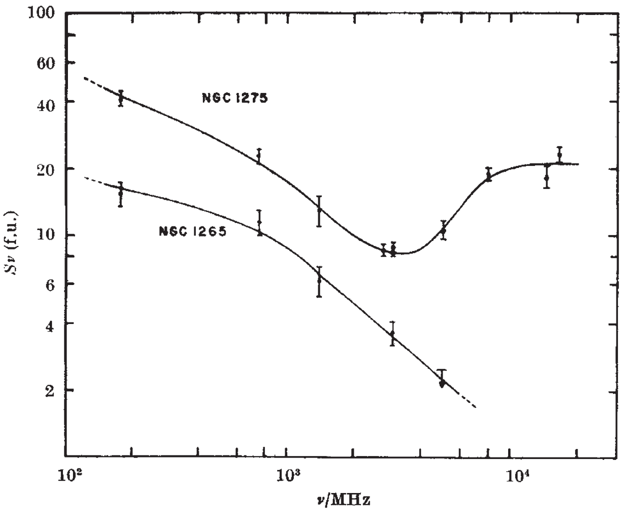

Fig. 1. Spectra of *NGC* 1275 and *NGC* 1265

As *NGC* 1275 is classified as a Seyfert galaxy, we have looked at the other Seyfert galaxies at 5 GHz and 14·5 GHz. In all cases the results were negative. Our detection limit was 5 f.u. and 20 f.u., respectively.

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[1] Dent, W. A., and Haddock, F. T. (preceding communication).
[2] Lynds, C. R., and Sobiesky, S., *Publ. Nat. Rad. Astro. Obs.*, **1**, 155 (1961).
[3] Leslie, P. R. R., and Elsmore, B., *Observatory*, **81**, 14 (1961).
[4] Heeschen, D. S., and Meredith, B. L., *Publ. NRAO*, **1**, 121 (1961).
[5] Baars, J. W. M., Mezger, P. G., and Wendker, H. (in the press).

PHYSICS

The Linear Temperature Scale

The Kelvin temperature scale used at present is linear, forming an ordered sequence of numbers:

$$+\,0^\circ\,\text{K}\ldots 273{\cdot}16^\circ\,\text{K}\ldots +\,\infty^\circ\,\text{K} \qquad (1)$$

for all normal thermodynamic states. If the so-called 'abnormal' thermodynamic states are admitted, the foregoing thermodynamic scale can be extended by adding a sequence of negative temperatures[1,2]. Alternatively, if the following relation is introduced:

$$T = e^{\psi} \qquad (2)$$

where $\psi = \int g(\theta)d\theta$ and depends on the thermal properties (θ) of the system (refs. 3, 4, 5); T, absolute temperature (°K); it is possible to construct another temperature scale, the ψ-scale, or the logarithmic scale. Fig. 1 shows the relation between both these temperature scales.

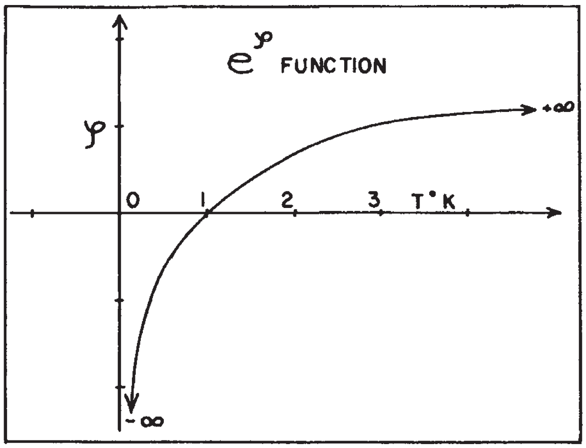

Fig. 1. Relation between temperature scales

The logarithmic nature of the ψ-function assures that the zero value on the linear absolute scale (T-scale) will be reached asymptotically, that is, $T = 0^\circ$ K, when $\psi = -\infty$.

Comparing both these scales (the linear scale and its explicit[4,5] functional form, the ψ-scale), the inaccessibility of the absolute zero[6,7] follows generically, being not imaginable from the linear T-scale alone.

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[1] Ramsey, N. F., *Phys. Rev.*, **103**, 20 (1956).
[2] Landsberg, P. T., *Phys. Rev.*, **115**, 518 (1959).
[3] Caratheodory, C., *Math. Annalen*, **67**, 355 (1909).
[4] Born, M., *Phys. Z.*, **22**, 218 (1921).
[5] Chandrasekhar, S., *Introduction to the Study of Stellar Structures* (Dover Publications, 1957).
[6] Haase, R., *Z. Physik. Chem.*, Neue Folge, **9**, 355 (1956).
[7] Haase, R., *Z. Physik. Chem.*, Neue Folge, **12**, 1 (1957).

METEOROLOGY

An Experimental Determination of the Atmospheric Temperature Profile by Indirect Means

An article by Kaplan[1] suggested a method of obtaining indirectly the temperature profile of the atmosphere by measuring from a satellite the radiances at several wavelengths in the 15-μ band of carbon dioxide. To test the practical application of this proposal the U.S. Weather Bureau has developed a grating spectrometer[2] with fixed exit slits and detectors to measure simultaneously the