ON THE NOMENCLATURE OF DIFFUSE FRAGMENTARY OBJECTS

P. Polechova
Observatory Petrin, Prague, Czechoslovakia

ABSTRACT

For the purpose of cataloguing diffuse objects in a wide range of
dimensions, two alternative proposals are presented.

Problems similar to those discussed in connection with the nomenclature
of optical HII-regions may occur with any diffuse objects such as mole-
cular clouds, large reflection nebulae, HI-regions, and, of course,
radio HII-regions.

The radio HII-regions are most commonly designated by the galactic
numbers "G". The galactic longitude forms the first part of this num-
ber, the galactic latitude the second part, both parts being usually
accurate to the first decimal digit and separated by the sign of lati-
tude. This system (also used sometimes for optical objects) was intro-
duced by Mezger and Henderson (1967) in a survey at 5 GHz, with a half
power beam width of the telescope of about 6'. The angular dimensions
of their objects were in the range from 3 to 11'.

The angular diameters of the HII-regions stretch over a wide extent of
at least three orders of magnitude - from several arc sec up to seve-
ral degrees or tens of degrees. For larger objects, galactic numbers
accurate to two decimal digits would be inconvenient since large abso-
lute errors may occur in the coordinates, which would change the name.
Galactic numbers accurate to one decimal digit are not usable throu-
ghout the catalogue, either since among the optical HII-regions (repre-
sented on the northern sky by the catalogue of Sharpless)there exists
at least one triple (S 192, S 193, S 194) and one couple (S 256, S 257)
of objects the galactic coordinates of which are identical for all the
three or the two objects, respectively, if they are denoted with accu-
racy of the first decimal digit. On the other side there is an example
of the radio counterpart of NGC 2024 for which Wilson et al. (1970)
and Reifenstein et al. (1970) give G 206.5-16.4, while Schraml and
Mezger (1969) give G 206.6-16.4. This example shows that the names
should not be introduced freely by the authors.

I think the new objects should be named by running numbers with the
mark of the discoverer firstly. The incorporation to the system of the
general catalogue should then be made cautiously. The system should
consider the following conditions.

It should be open to later discoveries, including both the discove-
ries of "new" emission centers and the discoveries of new extensions
of "old" objects.

It should include rough information about the position in the Galaxy
and the advantage of the galactic coordinates lies also in their cons-
tancy with time.

The number should not be regarded as a substitute of any kind of coor-
dinates, and the once established name should not be changed.

Since generally a higher resolution of a sky survey implies a more de-
tailed fragmentation of the objects, every survey of the sky can only
be appropriate for a limited range of angular dimensions.

The coordinates in a general system may depend not only on the resolu-
tion but also on the frequency.

I think that the best workable system is one which uses and refines
the system already in use. The result of such considerations is a pro-
posal of a multiscale nomenclature system, where the information about
the dimensions would be included in the name of the object, in addition
to the information about its galactic coordinates. (Moreover, it can
contain also information about the frequency in place of the, formerly
constant, G.).

Each object can be affixed to a definite size of a coordinate box
according to its angular diameter. Thus the appropriate accuracy of the
coordinates (which determines the names of the object) would be assured.
The correspondence of the objects' dimensions to the boxes is shown
in Table 1. Table 2 presents an alternative which is a logical exten-
sion of Table 1.

In the range of the one-decimal coordinate boxes (former G-numbers)
the catalogue of Rodgers et al. (1960) and for instance that of Bok
et al. (1955) would be usable as a guide for the purpose of the general
catalogue of the optical HII-regions.

Objects	small	medium	large
Size Θ of the objet	less than 6'	$6' \lesssim \Theta < 60'$	larger than 60'
Size of the box	$0.01°$	$0.1°$	$1°$
Name	LLL.LL±BB.BB	LLL.L±BB.B	LLL±BB

Table 1. The proposed rules for the range of the accuracy of the coordinates determining the names of the objects - alternative 1

Size Θ of the object	... $3.6' \lesssim \Theta < 36''$	$36'' \leqslant \Theta < 6'$	$6' \lesssim \Theta < 60'$	$60' \lesssim \Theta$
Size of the box	... $0.001°$	$0.01°$	$0.1°$	$1°$
Name	... LLL.LLL±BB.BBB	LLL.LL±BB.BB	LLL.L±BB.B	LLL±BB

Table 2. The proposed rules for the range of the accuracy of the coordinates determining the names of the objects - alternative 2.

REFERENCES

Bok B.J., Bester M.J., Wade C.M. : Daedalus 86, 9 or Harvard reprint
     N° 416 (1955)
Gum C.S. : Memoirs Roy. Astron. Soc. 67, 155 (1955)
Lynga G., Hansson N. : Astron. Astrophys. Suppl. 6, 327 (1972)
Marsalkova P. (=Polechova P.) : Astrophys. Space Sci. 27, 3 (1974)
Mezger P.G., Henderson A.P. : Astrophys. J. 147, 471 (1967)
Münch L. : Bol. Obs. Tonantz. Tac. 2 N° 13, 28 (1955)
Perek L., Kohoutek L. : Catalogue of Galactic Planetary Nebulae,
     Praha (1967)

Polechova P. : Ph. D. Thesis, Charles University, Praha (1979)

Rodgers A.W., Campbell C.T., Whiteoak J.B. : Monthly Notices Roy.
    Astron. Soc. 121, 103 (1960)

Reifenstein E.C. III, Wilson T.L., Burke B.F., Mezger P.G., Altenhoff
    W.J. : Astron. Astrophys. 4, 357 (1970)

Schraml J., Mezger P.G. : Astrophys. J. 156, 269 (1969)

Sharpless S. : Astrophys. J. Suppl. 4, 257 (1959)

Sivan J.P. : Thèse de Doctorat d'Etat, Université de Provence, France
    (1977)

Van den Bergh S. : Astron. J. 71, 990 (1966)

Walmsley C.M. : unpublished (1973)

Wilson T.L., Mezger P.G., Gadner F.F., Milne D.K. : Astron. Astrophys.
    6, 364 (1970)

Wilson T.L., Downes D. (Ed.) : Lecture Notes in Physics 42, HII-regions
    and related topics, Springer-Verlag (1975)