PRINCIPLES OF A CODED NUMBERING SYSTEM AND ITS APPLICATION
TO OPEN CLUSTERS

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When we began to collect systematically photometric data it
was felt that we needed an appropriate system of identification
for our catalogues on magnetic tape.   The current system of iden-
tification which uses catalogue or list name and star number is
best suitable for printed catalogues but brings out many drawbacks
when using and intersecting catalogues on magnetic tapes.   Thus
we developed a coded system of identification with the two basic
conditions that it allows to include in the files stars with all
possible kinds of numbering found in the literature, and that com-
puter use was as simple as possible (Mermilliod, 1973).

One criterion of quality of a catalogue is that the stars are
recorded under a single identification.   Because of the exotic
and complex heterogeneity in the identification of stars found in
the literature, star cataloguing brings forward many problems.
Due to the anarchic development of identification systems we are
obliged to define priority orders among the catalogues and to al-
ter the original designation found in the literature to give our
compilation a high degree of homogeneity in the identifications.
For example, photometric data for a proper motion star can be
found in the literature under the following identifications: HD,
DM, Gliese, Luyten LTT, Giclas G stars.   Thus much secondary
material is necessary in the form of transit tables and cross-
identifications.   This problem has to be solved separately for
field stars and for stars in open clusters.

This system was first used for the photometric files pre-
pared in the Lausanne and Geneva observatories for the CDS.

SCHEMATIC PRINCIPLES AND MEANING OF THE CODED NUMBERS

A coded number presents 10 digits. The first is a sign
which separates southern DM stars from the northern ones. For
the rest of the codes, it is always positive. The general mean-
ing of a code is contained in the second digit which runs from 0
to 9. This is the first key to decode a coded number into the
two parts contained in the 8 remaining digits: a) the second key
which gives the reference to a catalogue or a published list, b)
the number of the star in the quoted reference. The schematic
definitions of the coded numbering system are given in the appen-
dix.

SOLUTION FOR THE FIELD STARS

Among the 73,000 measurements compiled in the UBV system
(Mermilliod and Nicolet, 1976), some 46,000 concern HD, HDE and
DM stars, 16,000 stars in open clusters, and 12,000 remain stars
with various identifications. Some of them come from well-known
catalogues, such as the Gliese catalogue (Gliese, 1969) or the
luminous stars in the southern milky way (Stephenson and Sanduleak,
1971), for example. Such catalogues are very valuable and all
stars contained in them having no other identification than that
of a specific catalogue, are easily coded. So also are stars
from the selected areas. But there are in the literature plenty
of lists with less than 100 stars, or less than 1,000 for more ex-
tended survey. One good example is the Feige stars (114 in total)
(Feige, 1958) and another could be a sequence of stars in a chosen
constellation. Such lists have their utility too and should not
be neglected during the compilation of large files. In the frame-
work of the coded numbering system a solution to each problem has
been looked for.

One major advantage of this system is that no accurate co-
ordinates are necessary to form the files. With the references,
one can easily go back to finding charts. A second one is that
stars of a catalogue are recorded together in a file and not dis-
persed throughout it.

STARS IN OPEN CLUSTERS

Up to now, stars in open clusters were the most difficult to
include in large compilations, principally because there exist for
each cluster many numbering systems. This results in an intricate
situation, whose solution needs an appreciable amount of work and
material. The general form of a coded number for a star in an
NGC cluster is +2, followed by the NGC number and the star number
in the cluster. This is simple, but the star's number is diffi-
cult to define, due to the multiplicity of the available numbering

systems.   In order to solve correctly this problem we need cross-identification tables between different numbering systems and also between the adopted final system and the HD and DM catalogues, because bright stars in open clusters are frequently included in lists of field stars under their HD number.   These realizations are explained in more detail and with references in the Catalogue of UBV photometry and MK spectral types in open clusters (Mermilliod, 1976).   As for field stars, we note that stars of an open cluster are recorded all together in a specific place in a large file, and thus their usage is greatly facilitated.

CONCLUSION

Taking into account all the definitions and principles, one obtains eventually quite a homogeneous numbering system which helps to keep up to date high quality catalogues which we hope contain only a small number of redundant identifications.

Computer use has proved to be very effective and the more catalogues are coded with this system, the more easy is the comparison of many catalogues, photometric, spectroscopic and so on.

REFERENCES

Feige, J.:   1958, *Astrophys. J.* <u>128</u>, 267.
Gliese, W.:   1969, *Catalogue of Nearby Stars.*
Mermilliod, J.C.:   1973, *CDS Internal Report* No. 5.
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APPENDIX

Schematic definitions of the coded numbering system

Durchmusterung catalogues

±0.0ZZBBBBB   ZZ: declination zone   BBBBB star number

HD and HDE catalogues

+1.00BBBBBB   BBBBBB star number

Open clusters

+2.NNNNBBBB   NNNN NGC number   BBBB star number
+3.IIIIBBBB   IIII IC number   BBBB as above
+4.AAXXBBBB ⎫   ⎧ AA,A cluster names
               Anonymous clusters   XX,XX cluster no.
+5.AXXXBBBB ⎭   ⎩ BBBB star number

Star catalogues and star lists

```
+6.0AABBBBB ⎫
+6.1AAABBBB ⎬   AA, AAA, AAAA author identification
+6.2AAABBB  ⎭   BBBBB, BBBB, BBB star number
```

Selected areas

```
+7.AXXXBBBB     A    catalogue of selected areas
                XXX S.A. number
                BBBB star number
```

Catalogues by declination zones (except DM catalogue)

```
+8.AAZZBBBB     AA author identification, ZZ declination zone
                BBBB star number
```

Miscellaneous lists

```
+9.0AAABBBB     Stars in associations

+9.5RYXXBBB     R = 0 : Harvard standard regions
                R = 1 : Cousins E regions
                Y = 1-6, stands for A-F
                XXX = 01-09 : region designation
                BBB  star number
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