

## NEW LIST OF BLUE GALAXIES

Enrique Chavira

Instituto Nacional de Astrofísica, Óptica y Electrónica  
Tonantzintla, Pue. México

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## RESUMEN

Se presenta una nueva lista de galaxias azules determinadas en placa espectroscópica con emulsión 103aD, bajo los filtros *UBV*. Esta placa está centrada en  $2^{\text{h}}30^{\text{m}}$  y  $-6.5^{\circ}$  (1950); comprende al material obtenido para el programa de estrellas débiles azules, en dirección del Polo Sur Galáctico, por Haro y Luyten (1962).

## ABSTRACT

We present a new list of blue galaxies obtained in an Eastman Kodak spectroscopic plate emulsion 103aD with *UBV* filters. The plates were centered at  $2^{\text{h}}30^{\text{m}}$  and  $-6.5^{\circ}$  (1950). These plates were originally taken for the observational program of faint blue stars in regions the South Galactic Pole, by Haro and Luyten (1962).

*Key words:* GALAXIES-BLUE

We present results of the survey for blue galaxies in a plate of the 48" Palomar Schmidt centered at  $2^{\text{h}}30^{\text{m}}$ ,  $-6.5^{\circ}$  (1950). This plate was originally obtained for the observational program of faint blue stars in regions near the South Galactic Pole by Haro and Luyten (1962).

This work is the continuation of that project for the survey of blue galaxies by Haro (1956) on photographic plates obtained with the Tonantzintla Schmidt camera 26"/30". The plates were obtained with the technique of three exposures, slightly displaced from one-another, made successively on the same plate behind filters, that isolate spectral bands in ultraviolet, blue and yellow. The identification of blue galaxies, is made using the *UBV* images thus obtained. This process was developed at Tonantzintla Observatory around 1955 by Haro and Herbig (1955); Iriarte and Chavira (1957) and Chavira (1958-1959).

The characteristics of the filters used in the present survey are as follows: the *U* filter is Schott UG 1, spanning  $\lambda\lambda 3500-4000$ ; the *B* filter spans  $\lambda\lambda 3900-4825$ ; the *V* filter has a range of  $\lambda\lambda 4825-5150$ . All exposures were taken using Eastman Kodak 103aD emulsion, (Haro and Herbig 1955). Although chromatic aberration caused by the correcting plate, with this aperture and focal length, may not be entirely negligible we assumed it to be zero following Minkowski and Abell (1963).

The calibration for the technique of multiple exposures was defined by Haro and Luyten (1962). The identification of the blue galaxies is carried out by comparing their yellow images with other galaxies to insure the blue nature. Figures 1 and 2 show the identification of these objects.

Four of our blue galaxies, numbers 5, 9, 10 and 14 in

the blue plate of the Palomar Sky Survey, show knots and other morphological properties similar to those described by Ambartsumian and Shachbazian (1957), Burbidge, Burbidge and Hoyle (1963), Arp (1966), Zwicky (1967), Stockton (1968, 1972) and Keel (1985).

Table 1 presents the results of our survey. It is arranged as follows: column 1, running number; column 2, identification in other catalogues; columns 3 and 4, the 1950 coordinates which were measured using SAO stars as standard (their rms error is estimated as  $\pm 0.55$  arcsec); column 5, photographic magnitudes from eye estimate by the author, and magnitudes listed in other catalogues when available; column 6, the chart number where this object is marked.

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## REFERENCES

- Ambartsumian, V.A. and Shachbazian, R.K. 1957, *Doklady Akad. Nauk. Armyanskoy S.S.R.*, **185**, 25p.  
 Arp, H. 1966, *Atlas of Peculiar Galaxies* (Pasadena CA: Institute of Technology).  
 Burbidge, E.M., Burbidge, G.R., and Hoyle, F. 1963, *Ap. J.*, **138**, 873.  
 Haro, G. and Herbig, G.H. 1955, *Bol. Obs. Tonantzintla y Tacubaya*, **2**, No. 12, 33.  
 Haro, G. and Luyten, W.J. 1962, *Bol. Obs. Tonantzintla y Tacubaya*, **3**, No. 22, 37.

TABLE 1

## RESULTS OF THE SURVEY

| No. | Name          | R.A. (1950)                                       | Dec.        | $m_{pg}$ | Fig.           |
|-----|---------------|---------------------------------------------------|-------------|----------|----------------|
| 1   | Mrk 1031      | 2 <sup>h</sup> 16 <sup>m</sup> 19.42 <sup>s</sup> | -3°16'29.7" | 15.5     | 1              |
| 2   | ...           | 19 18.15                                          | -4 59 55.4  | 18.4     | 1              |
| 3   | ...           | 21 31.15                                          | -3 06 27.4  | 19.4     | 1              |
| 4   | ...           | 21 34.91                                          | -4 46 38.5  | 16.5     | 2              |
| 5   | ...           | 24 00.31                                          | -6 23 02.3  | 14.8     | 1 <sup>a</sup> |
| 6   | ...           | 24 13.66                                          | -2 38 53.6  | 18.8     | 2              |
| 7   | MCG-01-07-013 | 24 49.88                                          | -4 10 57.8  | 15.5     | 2              |
| 8   | ...           | 25 30.07                                          | -4 13 06.2  | 17.1     | 2              |
| 9   | MCG-01-07-015 | 25 41.69                                          | -6 03 41.3  | 15.0     | 1 <sup>a</sup> |
| 10  | ...           | 25 53.00                                          | -4 10 08.7  | 16.9     | 2 <sup>a</sup> |
| 11  | ...           | 26 08.96                                          | -5 40 40.9  | 16.7     | 1              |
| 12  | ...           | 26 16.62                                          | -8 40 44.1  | 17.0     | 2              |
| 13  | MCG-01-07-016 | 27 00.30                                          | -3 26 07.3  | 14.0     | 2              |
| 14  | KUG-0227-055  | 27 16.03                                          | -5 33 47.6  | 16.5     | 1 <sup>a</sup> |
| 15  | ...           | 27 35.88                                          | -7 33 52.5  | 17.0     | 2              |
| 16  | ...           | 27 43.06                                          | -3 27 50.3  | 20.0     | 2              |
| 17  | ...           | 27 46.20                                          | -5 37 25.3  | 18.3     | 1              |
| 18  | ...           | 29 22.02                                          | -6 12 30.3  | 17.8     | 1              |
| 19  | ...           | 30 05.78                                          | -7 03 02.3  | 18.2     | 2              |
| 20  | ...           | 30 11.04                                          | -6 27 07.6  | 18.5     | 1              |
| 21  | ...           | 36 38.39                                          | -3 57 47.3  | 16.6     | 2              |
| 22  | ...           | 37 23.39                                          | -3 57 30.5  | 17.6     | 2              |
| 23  | ...           | 40 19.10                                          | -7 45 14.2  | 16.9     | 2              |
| 24  | ...           | 41 00.07                                          | -7 32 30.8  | 17.8     | 2              |

a. Enlargement of identification chart is included.

Notes to Table 1: 1. Spherical, compact form. Spectral type s2e from Markarian (1967). 2. Elongated. 3. Close to MCG-01-07-008. Faint and very poorly defined, possible faint external ring. 4. Elongated. 5. Galaxy with gap in main body. Emerging bridge connecting one blue condensation. 6. Elongated. 7. MCG-01-07-013: Internal bar or bright spiral with inclination III-IV, but ring implies inclination II. Bright spiral has barlike arms with surrounding ring connected (note from Vorontsov-Velyaminov and Arhipova 1963). 8. Two apparent nuclei. 9. MCG-01-07-015: Interacting. An elongated companion is present 0.4 arcminutes to the west. Spiral distorted, with apparent stars superimposed on southern arm. Patchy companion of 19th magnitude, intensity 4-5, 1.1 arcminutes to northeast (note from Vorontsov-Velyaminov and Arhipova 1963). 10. Elongated, main body red, shows two blue faint condensations. 11. Elongated. 12. Elongated. 13. MCG-01-07-016: (Np); ls; H (note from Vorontsov-Velyaminov and Arhipova 1963). 14. KUG-0227-055; In the Schmidt Palomar plate, three colors ( $U-B$ ) = 0, ( $B-V$ ) = 0. The smaller northeastern component is bluer than the main body (note from Takase and Miyauchi-Isobe 1988). 15. Elongated. 16. Weak, elongated. 17. Elongated. 18. Elongated. 19. Elongated. 20. Spherical. 21. Elongated. 22. Spherical, faint filament. 23. Spherical. 24. Spherical.

Haro, G. 1956, *Bol. Obs. Tonantzintla y Tacubaya*, 2, No. 14, 8.  
 Chavira, E. 1958, *Bol. Obs. Tonantzintla y Tacubaya*, 2, No. 17, 15.  
 Chavira, E. 1959, *Bol. Obs. Tonantzintla y Tacubaya*, 2, No. 18, 3.  
 Iriarte, B. and Chavira, E. 1957, *Bol. Obs. Tonantzintla y Tacubaya*, 2, No. 16, 3.  
 Keel, W.C. 1985, *A.J.*, 90, 577.  
 Markarian, B.E. 1967, *Astrofizika*, 3, 24.  
 Minkowski, R.L. and Abell, G.O. 1963, *Stars and Stellar Systems*, ed. K.A. Strand (Chicago: University of Chicago Press), 481.

Takase, B. and Miyauchi-Isobe, N. 1988, *Ann. Tokyo Astr. Obs.*, Second Series, XXII, No. 1.  
 Stockton, A.N. 1968, *A.J.*, 73, 887.  
 Stockton, A.N. 1972, *Ap. J.*, 173, 247.  
 Vorontsov-Velyaminov, B. and Arhipova, V. 1963, *Morphological Catalogue of Galaxies*, ed. Acad. of Sci. USSR (Moscow: Moscow University Press), Vol. 33.  
 Zwicky, F. 1967, *Adv. Astr. and Ap.* (New York: Academic Press), 5, 267.

Enrique Chavira: Instituto Nacional de Astrofísica, Óptica y Electrónica, Apartado Postal 216, 72000 Puebla, Pue., México.

## BLUE GALAXIES

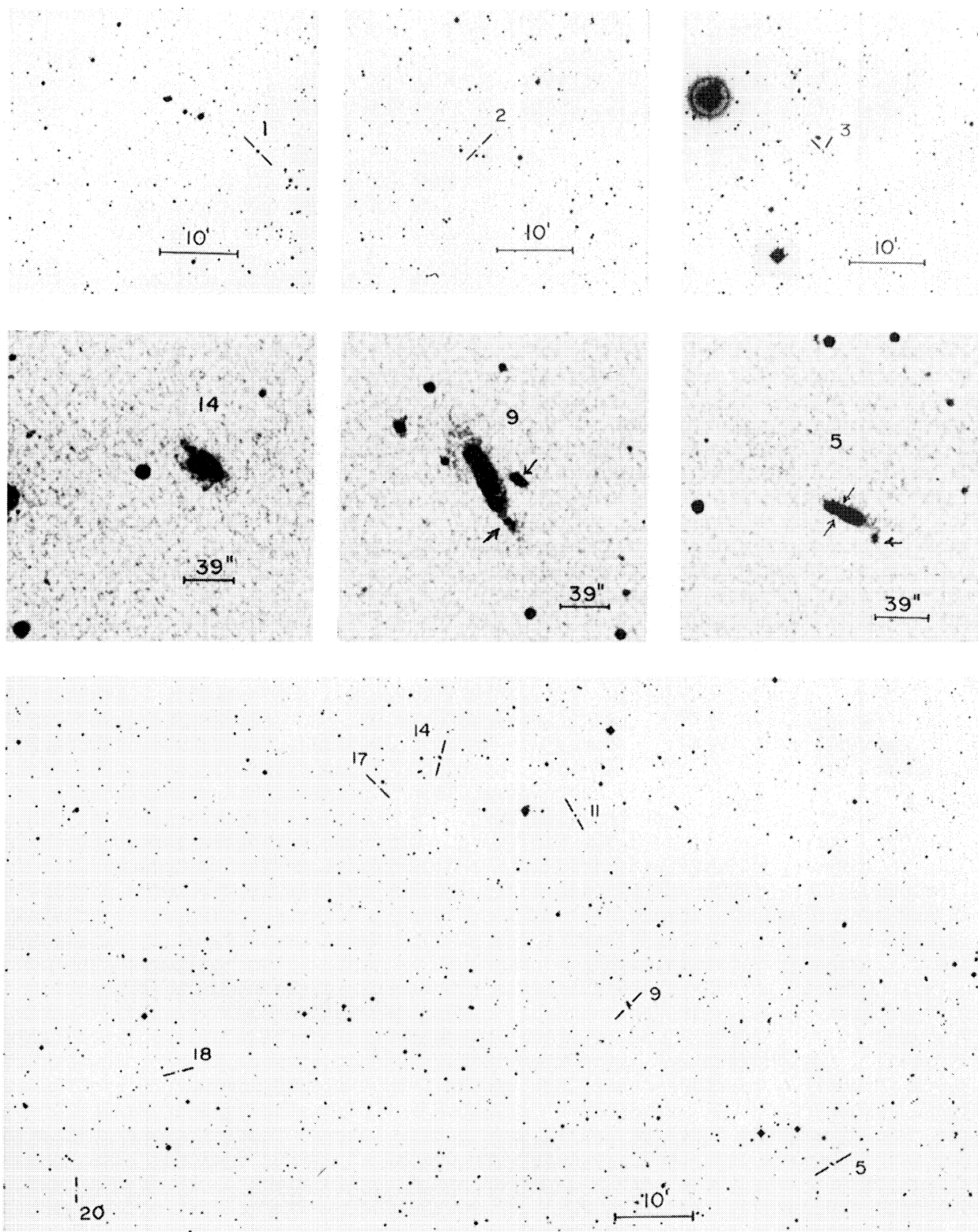


Fig. 1. Identification charts.

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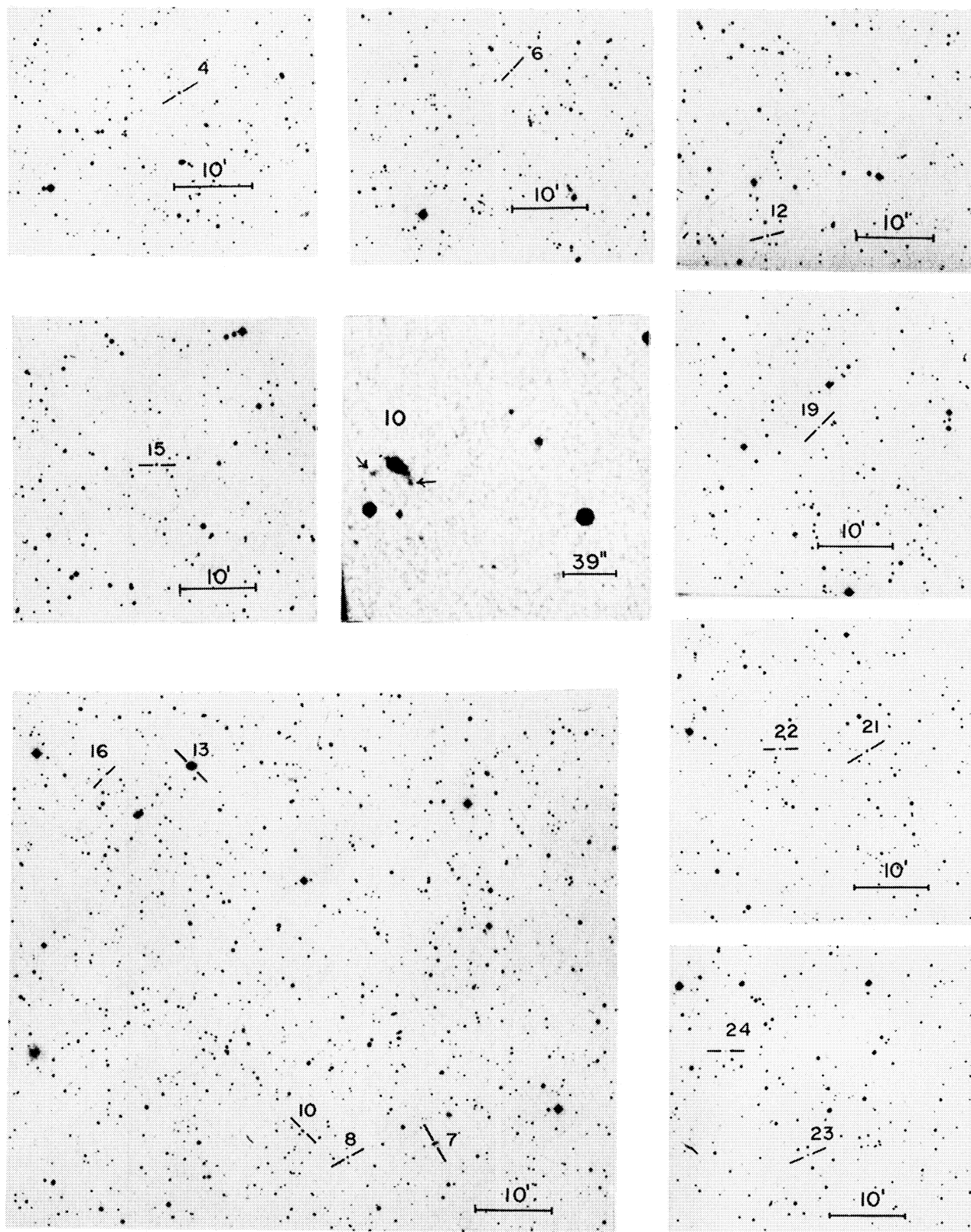


Fig. 2. Identification charts.

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