

The values of photovisual magnitude and spectrum in Table III are read directly from a smooth curve drawn through a plot of the data summarized for the individual stars in Table II.

The mass-spectrum curve is shown in the accompanying figure. The masses for types A0 to F5 are only upper limits of average mass because of the incompleteness of the corresponding luminosity curves.

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Note on a Remote Cloud of Galaxies in Centaurus. — The available Bruce plates of long exposure record more than forty distinct groups of external galaxies. In some groups the membership is limited to ten or a dozen systems; in other several hundred members are shown on the photographs. Except for a few clouds of bright galaxies, we must suppose that a considerable part of the group membership remains undiscovered below the limit of the photographic plate. Apparently we see nearly all of Coma-Virgo Cloud A, but Clouds C and D probably extend far below our eighteenth magnitude limit (H.B. 865).

A cloud of galaxies in Centaurus that appears to be one of the most populous yet discovered and is otherwise noteworthy is shown on three long exposure Bruce photographs that have recently been examined for faint nebulae. The full extent and population of this cloud cannot be accurately measured or even estimated until photographs showing objects of the twentieth magnitude or fainter can be obtained; but a preliminary account should be of interest because of the great linear dimensions, the numerous population, and the distinctly elongated form.

1. The Centaurus cloud is centered at $13^h 23^m.6$, $-31^\circ.1$ (1900), with galactic coordinates 281° and $+30^\circ$. It appears to be oval in form with dimensions roughly $2^\circ.8$ by $0^\circ.8$, and an area of 2.2 square degrees. The limits are of course indefinite on the Bruce plates which show only the brightest two magnitudes, 16 to 18. The boundary line suggested in the drawing, Figure 1, encloses a smaller area than used in computations for this note. The position angle of the longer axis is 90° .

2. There is an indefinite extension on the north side of the cloud, comprising approximately thirty systems; its center is at $13^h 22^m.3$, $-30^\circ.4$ (1900).

3. The Bruce plates on which the Centaurus cloud appears cover effectively an area of about thirty degrees and show more than a thousand systems. The average

number per square degree, excluding the Centaurus cloud and the two other smaller groups that appear on the plate, is eighteen. The average number per square degree in the cloud is 163. Correcting for the general field population, we find that there are about 315 members of the cloud (including the extension) between magnitudes 16.0 and 18.1.

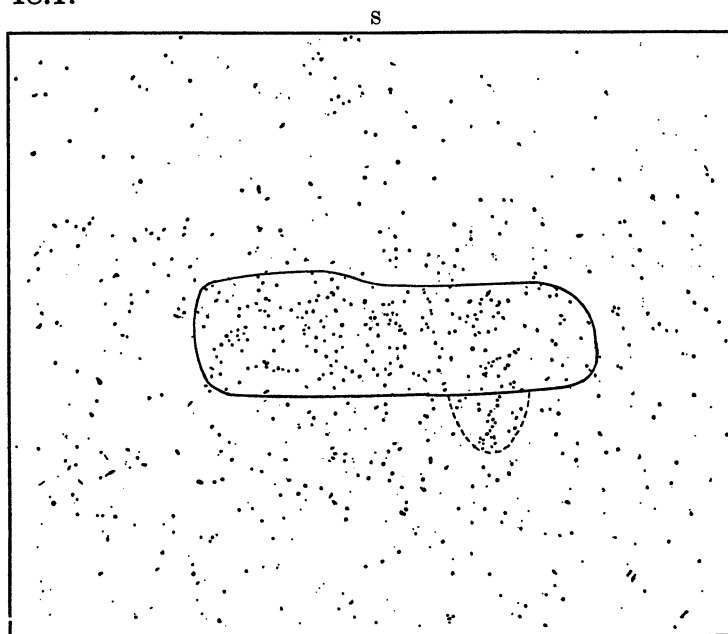


FIGURE 1

4. The distribution of galaxies within the Centaurus cloud is such as to indicate that we are seeing a discoidal system more or less edgewise (Figure 1). There is no conspicuous central concentration, and the Centaurus cloud perhaps more nearly approaches the form of the galactic system than does any other large cloud of galaxies yet found. It lends support, in fact, to the hypothesis discussed elsewhere that the galactic system is a flattened cloud of more or less distinct galaxies of ordinary dimensions. Twenty or thirty of the members of the Centaurus cloud are apparently separated by less than a diameter from a companion system, and several pairs and multiples are formed of systems in contact. The extension of our survey to the twentieth magnitude will doubtless show much greater apparent and actual compactness.

5. The angular diameter, apparent photographic magnitude, apparent concentration, and form have been estimated on Harvard plates by Miss S. F. Mussells for 526 galaxies in and immediately around the Centaurus cloud. The detailed

data will be published elsewhere. The frequency of angular diameters, excluding one of 1'.8 diameter, is as follows:

Diameter	6"	12"	18"	24"	30"	36"	42"	48"	54"	60"	66"
Number	15	245	165	71	12	5	5	3	2	1	1

The plate limit is of course responsible for the scarcity of objects measured as less than 9" in diameter.

6. The corresponding distribution in apparent magnitude is shown in the accompanying table.

FREQUENCY OF MAGNITUDE

Magnitude	Number	Magnitude	Number
15.3	1	17.0	25
15.6	1	17.1	55
15.9	1	17.2	31
16.1	5	17.3	38
16.2	4	17.4	47
16.3	2	17.5	50
16.4	10	17.6	57
16.5	8	17.7	22
16.6	24	17.8	23
16.7	21	17.9	16
16.8	12	18.0	50
16.9	19	18.1	4

The irregular frequency among the magnitude decimals can be fully accounted for by considering the method of measuring. The magnitudes were estimated independently three times — twice the estimates were made to half magnitudes only, and once to tenths. The adopted magnitudes are means of the three estimates.

7. The frequency of apparent magnitude for the cloud and for the immediately surrounding fields is shown in the following tabulation where the numbers of objects are given for intervals of three tenths of a magnitude.

Magnitude	15.4	15.7	16.0	16.3	16.6	16.9	17.2	17.5	17.8	18.1
Number in Cloud	0	1	5	10	41	39	93	102	40	28
Number in Field	1	0	1	6	12	17	31	52	21	26

The values for the faintest two intervals again indicate the limitations of the photographic plate.

The luminosity curves are plotted from the foregoing tabulation in Figure 2. It is obvious that the form of the curve for the cloud will not be appreciably changed if corrected for the forty field objects that lie within its bounds.

8. Comparing the Centaurus cloud with Coma-Virgo Cloud A we infer from the above fragmentary luminosity curve that the former is about ten times as populous and its members 5.7 magnitudes fainter. If the luminosities have the same spread as in Coma-Virgo Cloud A and as in the Andromeda group (H.B. 873), the Centaurus cloud is about fourteen times as remote as the former, that is,

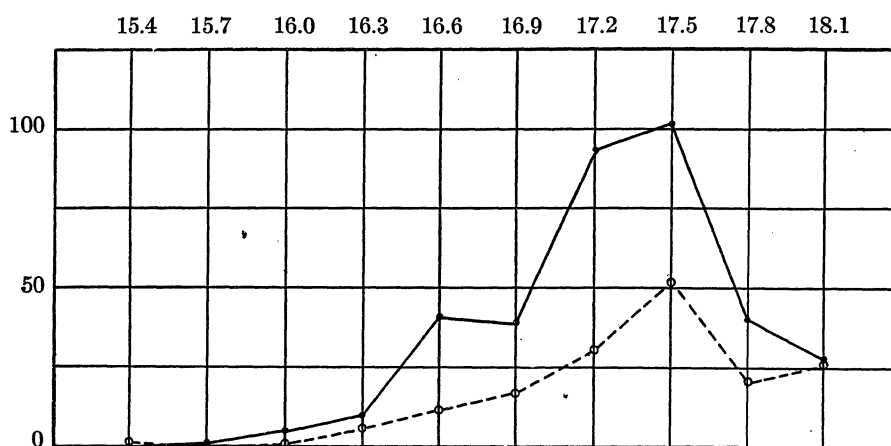


FIGURE 2. — Frequency curve of Magnitudes for the Centaurus Cloud. Ordinates and abscissae are numbers of nebulae and apparent photographic magnitudes. Full line and dots indicate frequency in the cloud; broken line and circles, in the surrounding field.

it is forty-five megaparsecs distant. Its length and breadth are 2.2 and 0.6 megaparsecs, and its maximum diameter is therefore more than three times the average diameter of the Coma-Virgo clouds of galaxies (H.B. 873). Its largest members are 13.5 kpc = 45,000 light years in diameter, comparable with the Andromeda Nebula, Messier 31. The average angular diameter in the available part of the Centaurus cloud is about 15'', corresponding to an average linear diameter of three kiloparsecs, in excellent agreement with the diameters of systems of the same absolute magnitude in the Coma-Virgo clouds.

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