dition, the strong continuous radio emission, from a source identified[7] with the anomalous extragalactic object NGC 5128 can now be interpreted more simply as due to the heating, on collision, of hydrogen gas in *both* spiral and elliptical galaxies.

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SCULPTOR-TYPE SYSTEMS IN THE LOCAL GROUP OF GALAXIES

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The smallest and faintest galaxies known are six dwarf elliptical stellar systems which belong to the local group, all closer to our galaxy than 400 kpc. These dwarfs, called Sculptor systems after the first galaxy of this type discovered, range in diameter from 2000 parsecs down to about 800 parsecs, and in absolute magnitude from −12 down to about −8.5. Although their surface brightness is so low that all have been discovered from the concentration of resolved stars, the Sculptor systems appear to differ from normal elliptical galaxies only in brightness and size, not in shape and stellar content.

Table I lists the known Sculptor-type galaxies. The first two were discovered by Shapley on plates taken with the Bruce 24-inch telescope at Harvard's Boyden Station; the remaining four were found by Harrington (Leo II) or Wilson on 48-inch schmidt plates taken for the National Geographic Society–Palomar Observatory Sky Survey.

The uniform coverage of the sky provided by the Sky Survey allows an estimate to be made of the probable total number of Sculptor-type galaxies in the local group. The whole sky north of

TABLE I
SCULPTOR-TYPE GALAXIES
1950.0

	α	δ	l	b
Sculptor	$0^h\ 57^m.5$	$-33°\ 58'$	241°	−83°
Fornax	2 37·5	−34 44	203	−64
Leo I	10 5·8	+12 33	194	+50
Leo II	11 10·8	+22 26	189	+69
Ursa Minor	15 8·2	+67 18	71	+45
Draco	17 19·4	+57 58	53	+34

—27° has been scanned and only four Sculptor-type systems found. However, because of obscuration and the high density of galactic stars in low latitudes, it is likely that no Sculptor systems lying inside a zone from galactic latitude —20° to +20° could be detected. The area north of —27° and outside this low-latitude belt is one-half of the entire sky. Hence, if there is no preferential plane of distribution, there should be a total of about eight Sculptor systems in the local group, including the six now known.

If this estimate is correct, then, since the total number of galaxies of other types belonging to the local group is probably known, two-thirds of the population of the local group is composed of elliptical galaxies, and about two-thirds of the ellipticals are Sculptor-type dwarfs.

Other intergalactic population II stellar aggregates have been discovered on National Geographic Society Survey plates. They are properly identified as globular clusters, even though they are at such large distances that their dynamic association with our galaxy is uncertain, but no estimate of the total number can be made at present. Table II lists some of these clusters found by the writer. The Ursa Major cluster was independently discovered by Hubble, and the Sextans cluster independently by Baade.

The presence of globular clusters in intergalactic space raises the question whether there might not be a continuous transition in the properties of population II stellar aggregates from giant elliptical galaxies through Sculptor systems down to globular clusters. But on the basis of systems known at present, while the Sculptor systems show continuity with large ellipticals, a gap

TABLE II

GLOBULAR CLUSTERS

1950.0

	α	δ	l	b
Sextans	10^h $3^m.0$	$+\ 0°\ 18'$	209°	+43°
Ursa Major	11 26·6	+29 15	170	+73
Serpens	15 13·5	+ 0 5	329	+44
Pegasus	23 4·2	+12 28	56	−43

seems to exist between the luminosities and sizes of the smallest Sculptor galaxies and the largest globular clusters.

CAN WE HOPE TO DETECT EVOLUTIONARY CHANGES IN SINGLE STARS?

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The ages of the hottest stars, those of spectral types O and early B, are now believed to be of the order of 10^6 or 10^7 years. Even with this relatively short time scale we cannot expect to observe evolutionary changes of individual stars with respect to luminosity or temperature. But it is possible that these changes, unobservable as such, produce changes in other parameters which are more easily subjected to observational scrutiny.

In particular, if a B-type star evolves with constant mass in such a manner as to describe an evolutionary track away from the main sequence, its mean density would decrease. If such a star should pulsate in accordance with the relation $P\sqrt{\varrho} =$ constant, the corresponding change in the period may prove to be detectable.

Figure 1 shows a small portion of the H-R diagram, with the region occupied by the pulsating stars of the β Canis Majoris and β Cephei stars, according to D. McNamara and A. D. Williams. This work was based upon studies of these stars made at the Berkeley astronomical department during the past four and one-half years, and is well authenticated. The main sequence was drawn according to the data of W. W. Morgan and H. L. Johnson. The open circles represent the stars in the galactic cluster