

members at La Silla. Walraven reported further results of his multicolour photometry of Cloud stars at the ESO Symposium, compared with model computations. Five-colour photometry by Wamsteker of 500 blue stars and two-colour photography by Velthuyse have been carried out in the inter-Cloud region at the Leiden Station.

(d) *Absorption and polarization*

Studies of absorption continue to emphasize local obscuration in many parts of the LMC as compared with the relative transparency over much of the SMC, including the core. Gascoigne has examined main sequence B stars and adopts locally in the SMC a reddening of $0^m.2$, most of which may be in the foreground, and $0^m.05$ in the LMC. Le Marne (*Astr. Soc. Aust.*, 1, 97) and Faulkner's work on 30 Dor, which combines radio and optical measures, suggests $A_v/E=3$ for foreground absorption, but $A_v/E=7$ within the nebula. However, Gascoigne's photometry of the cepheid HV2749, only $15'$ of arc south of 30 Dor, yields $A_v/E=2.8 \pm 0.25$.

6. Tidal Action

Tidal action between the Clouds and the Galaxy has been considered by a number of workers (29-5003), but it is still uncertain whether the Clouds are bound gravitationally to the Galaxy. Kerr (*A.J.*, 73, S102) has pointed out that the bulk of the high-velocity H I clouds, with a total mass comparable to that of the Magellanic system, may be moving in an approximately opposite direction to the Magellanic Clouds.

WORKING GROUP FOR RESEARCH ON SUPERNOVAE

(by F. W. Zwicky)

By October 1966, the number of supernovae in extragalactic systems which had been definitely identified was 184. During the following three years an additional 70 supernovae were discovered, bringing the total number by July 1969 to 254.

The search for and the investigation of supernovae has been engaged in by an ever increasing number of observatories and astronomers, the majority of whom strongly support the continuation of the working group on supernovae and, until further notice, of the writer as its chairman.

Circular letter No. 9 was issued to the members of the working group in June 1968, giving data on the supernovae Nos. 171 to 216. A catalogue-monograph on the supernovae found since 1885 is in preparation and should be ready for presentation at the 1970 IAU Assembly. In the meantime K. Rudnicki and A. Karpowiczowa have announced that the manuscript of their catalogue of supernovae, including all major bibliographic data has been sent to the printer.

Two new approaches to the search for supernovae are in the first stages of realization, namely (a) automated searches by Professors Hynek and Colgate, the first having already resulted in 40000 bright galaxy reductions, the second being expected to start operation in the fall of 1969 and (b) the endeavours by J. Strong and F. Zwicky to have full-size objective gratings built for large (up to $50''$ apertures) Schmidt telescopes. With gratings of this type, supernovae to about $m_p = 16.5$ may be discovered on single plates, the spectrum being observed at discovery.

The frequency of supernovae appearing in galaxies within about five absolute magnitudes of the brightest has been redetermined by several investigators using extensive material. The frequency found originally by Zwicky of about one supernova per galaxy per 300 to 400 years has been confirmed. It is estimated that most of the supernovae which have appeared in the central cores of the galaxies observed have been missed. Also, no estimate can as yet be made of the frequency of intrinsically faint supernovae such as Eta Carinae. As predicted already from the statistics made 30 years ago there are some special galaxies which produce supernovae at a far greater rate than normal. For instance four supernovae each have appeared in NGC 5236 and NGC 6946 during the past fifty years.

A most interesting issue arises with respect to the frequency of supernovae in quasars and in the

most massive compact galaxies, in some of which according to theory up to several hundred supernovae per year may be expected. The spectrum of the first variable compact galaxy, [R.A. $0^{\text{h}}39^{\text{m}}5$ Decl. $+40^{\circ}03'$ (1950)] discovered by Zwicky in February 1965 and showing random variations of two magnitudes since 1936 is therefore now being scanned.

Many light curves of supernovae have been established during the past three years and many spectra have been obtained. From an improved redshift-magnitude relation for supernovae a probable value of 150 km s^{-1} per million parsecs for the Lundmark-Hubble constant is derived.

With the discovery of the pulsar in the Crab Nebula, Zwicky's 1933 hypothesis of some supernovae being caused through the collapse into neutron stars seems to have found its confirmation.

No cosmic rays, radio waves or X-rays have as yet been observed coming from recently observed supernovae, as theory would predict.

No tenable interpretation of the spectra of supernovae of the types I and IV has yet been proposed.

WORKING GROUP ON GALAXY PHOTOMETRY

(by G. de Vaucouleurs)

1. A tabular presentation has been adopted and the report does not cover work in the U.S.S.R. During the report period Circular No. 6 (Report on Prague Meeting) and a Technical Supplement, No. 6a, were distributed. Work on standard luminosity profiles for a few well-observed galaxies (NGC3115, 3379, 4486) progressed more slowly than expected, but provisional results will be available for presentation at the 1970 meeting.

2. On the observational side the major event to report is the publication of an *Atlas de Galaxies Australes* by J. L. Sersic; it gives photographs, descriptions and detailed surface photometry of 50 southern galaxies observed with the 150-cm reflector of Cordoba Observatory. Another important contribution is the dissertation of H. D. Ables on "Optical Study of Nearby Galaxies" of interest to radio astronomy. The isophotometric atlas of 70-80 galaxies and *UBV* catalogue of 500 galaxies observed by G. and A. de Vaucouleurs at Mt. Stromlo and McDonald Observatories and by H. D. Ables at Flagstaff, F. Bertola at Asiago and other collaborators is being prepared for publication in 1970-71.

On the technical side the rapid development of automatic digital methods for data recording and processing should lead to a great acceleration in the production of precise isophote maps, but most commercial instruments are still deficient with respect to mechanical precision, optical design (stray light, beam definition) and electrical stability.

On the theoretical side I. R. King (Berkeley) is continuing his work on the structure and dynamics of elliptical galaxies, and lenticular and spiral galaxies have been analyzed by K. C. Freeman in Australia and by J. and N. Heidmann in France; all these studies demonstrate again the basic importance of precise and detailed surface photometry for an understanding of the structure and evolution of galaxies.