cording is continuous and the observer or his assistant can read and partly reduce the data while the record is being made. Slides were shown to illustrate the stability of the tracings at magnitudes 9, 12, and 14, all of which are of photoelectric precision. The smallest sky diaphragm is 0.5 mm in diameter, corresponding to 0'.3. With this diaphragm, sky and star deflections are equal at magnitude 15.5, and can be read at full scale.

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*Steward Observatory,
University of Arizona,
Tucson, Ariz.*

Denisse, J. F. Microwave solar noise and sunspot.

Covington's measurements of solar noise intensity in the 2800 megacycles band are compared over a period of 20 months with the relative sunspot number, the total sunspot area ΣA , and with a daily index $\Sigma A^{\frac{1}{2}} H_0$, where A is the spot area and H_0 the intensity of the magnetic field. The last comparison yields the best correlation, with a correlation coefficient of 0.9. The remaining discrepancies seem associated with rapid changes in the topography of certain spots. It is shown that these results are consistent with the expected gyromagnetic emissions associated with the magnetic field of the spots, assuming a kinetic temperature of several million degrees in the corona. Comparisons of the observed emission with the true areas and the projected areas of the spots allows an estimate of the shape of the emitting surface associated with the spots.

Some indications are given of possible relations between cosmic rays and radio emissions coming from the sun and the galaxy.

*Paris, France,
and U. S. Bureau of Standards,
Washington, D. C.*

Dodson, Helen W. Position and development of the great solar flare of May 10, 1949.

On May 10, 1949 a large bright flare occurred in a spot group, 17°S, 12°E, between 20^h03^m and 22^h20^m U.T. Observations made at Central Radio Propagation Laboratory indicate that it was accompanied by a great burst of solar noise and followed by a severe magnetic storm. $H\alpha$ spectroheliograms show that about 15 minutes before the principal outburst the region began to brighten in two widely separated points. The location and extent of the flare was strongly influenced by the underlying spots. Furthermore,

the most intense portion of the flare lay directly over one of the principal spot components.

The spectroheliograms of the flare were made with a band pass of 0.36 Å centered on $H\alpha$. Intensity measures indicate that at maximum the flare had four times the intensity of the undisturbed $H\alpha$ disk. The rate of decline suggests an exponential law.

Spectroheliograms of the spot group taken before and after this great flare are remarkably similar. A curved, dark filament was a conspicuous feature of the region before the flare. Its trace was clearly marked across the flare, and the filament itself was still strong and well defined on May 11. However, on this date a large neighboring filament had disappeared, and the spot associated with the most intense portion of the flare had become visible on the $H\alpha$ spectroheliograms.

On May 8 an earlier flare had been observed in the same spot group. Comparison of the two photographic records indicates that the pattern and location of the two outbreaks were very similar. On May 8th, a portion of the flare apparently moved directly towards a sun spot and both outbreaks showed a slow limbward drift of the flare position with time.

*McMath-Hulbert Observatory,
University of Michigan,
Ann Arbor, Michigan.*

Duff, G. F. D. and R. E. Williamson. Broken line guillotine factor models for late-type main sequence stars.

Two integrations of point source models for late-type main sequence dwarfs have been performed. The guillotine factor has been taken to vary with different powers of the density in the inner and outer fractions of the radiative envelope. The two models are found to represent Morse's guillotine factors with a uniformly low error. Chemical compositions have been calculated using a modified form of the usual mass-radius-luminosity equation. Fairly high central densities are predicted for late-type dwarfs, on the basis of these models. A definite departure from the perfect-gas law at the dwarf end of the main sequence is indicated. The models have been compared to determine the effect of a change of the guillotine factor in the outer layers of the star. It is found that the central conditions do not depend sensitively upon moderate variations of opacity in this region.

*David Dunlap Observatory,
Richmond Hill, Ontario.*

Duncan, John C. Galactic nebulae photographed in red light.

Diffuse nebulae in the regions of Orion, Sagittarius, and Cygnus were photographed by the author in 1948 with the 18-inch Schmidt camera on Palomar Mountain and the 60-inch and 100-inch reflectors on Mount Wilson, using rapid red-sensitive emulsions and filters which confined the light employed to a band within about 200 angstroms of $H\alpha$. At the Ottawa meeting eighteen of these photographs are presented in the form of lantern slides; also, for comparison, a few photographs made earlier in blue light.

In Orion, faint nebulosity fills the region south of the Belt and including the Sword, and exhibits remarkable and beautiful forms. Shown in great detail are the great Orion nebula, M 42-43; the region of the dark Horsehead, Barnard 33; and the nebula east of ζ Orionis, NGC 2024. South of σ Orionis is a nearly straight edge, 20 or more light-years long, which divides a brighter and a fainter nebulous field (Plate I).

In Sagittarius, faint extensions are shown around M 8. Farther north, similar extensions appear around M 17, M 16, and an uncatalogued nebula in Serpens.

More than 100 square degrees of the sky, extending from η Cygni on the south beyond Deneb and NGC 7000 to ω Cygni on the north, is filled with faint nebulosity, the brightest part of which is the nebulous region around γ Cygni, discovered by Barnard. The small curved nebula NGC 6888 is particularly strong in red light; likewise an uncatalogued S-shaped nebula situated about halfway between γ and σ Cygni.

A remarkable feature of some nebulae, strongly revealed on red photographs, is a dark core from either side of which extend plumes or brushes of luminous nebulosity. This appearance is shown in the space between M 42 and M 43 Orionis, in NGC 2024, in the brightest nebula near γ Cygni, and in NGC 6334 Scorpii, a nebula photographed by the author and reported to the American Astronomical Society in 1940.

*Whitin Observatory,
Wellesley College,
Wellesley, Mass.*

Edmondson, Frank K. The minor planet program at the Goethe Link Observatory.

The minor planet program at the Goethe Link Observatory was started on January 6, 1949. Up to the present time (June 15) 169 plates have been taken.

The object of the program is to recover objects on the critical list that are specifically assigned to us by Dr. Herget. Probably our most significant re-discovery so far is (1192) Prisma, which had not been observed since 1931. The residual from the ephemeris was $+13^m.7$ and $-44'$ on February 18th.

We have also picked up (1362) Griqua, in excellent agreement with a special ephemeris computed by Dr. Brouwer. (1452) 1938 DZ₁, which had not been observed since its discovery in 1938, was recently picked up with a residual of $-10^m.8$ and $+1^\circ 53'$.

A new object, 1949 DA, was found on plates taken on February 18th in an attempt to find (1273) Helma. Seventeen asteroids were found on a single plate, taken on April 3rd for the purpose of getting an accurate position of (459) Signe for Dr. Herget. Probably 15 of these objects are new.

The instrument used on this program is a 10-inch Cooke triplet loaned to us by the University of Cincinnati. The mounting was made by Fecker, and the guide telescope is provided with a micrometer which we use to guide on the expected motion of the asteroid. A 30-minute exposure on a 103a-O plate shows star No. 33 of the polar sequence as easily visible ($m_{pg} = 17.1$) and star No. 36 as barely visible ($m_{pg} = 17.8$). Hence, 18th magnitude asteroids should be detectable on hour exposures made with this instrument.

The main financial support for this program comes from a contract with the Office of Naval Research.

*Goethe Link Observatory,
Indiana University,
Bloomington, Ind.*

Elvey, C. T. and Don Williams. Recent spectroscopic observations of the aurora, night sky and twilight.

Spectroscopic observations of the aurora, night sky and twilight are being made as part of a program to investigate the physics of the upper atmosphere. A prism spectrograph is used and has an $F/0.7$ camera giving linear dispersions from 150Å/mm at 4000Å to 1080Å/mm at 7000Å. Observations have been made at College, Alaska, and in the vicinity of the Naval Ordnance Test Station at China Lake, California. This is a preliminary report on the observations and final studies will be published as soon as the measurements and analyses are made.

Visual inspections of the material indicate: