Points of View

ST. ALEXIS DES MANTS

THE UNIVERSITY of Toronto party to observe the eclipse will be located at St. Alexis des Mants, Province of Quebec, under the leadership of Prof. C. A. Chant. A forty-foot tower camera with moving plate will photograph the sun and an eleven-foot camera will make long exposure photographs. A special four-lens camera, with two lenses using polarized light, will also be in operation, while motion picture cameras will record time and the shadow bands. The light of the corona will be tested with a 34-inch camera and filters. Members of the party will include R. K. Young, A. Young, J. H. Hornig, and G. A. Cline.

DOUGLAS HILL

TRANSMISSION of radio signals from Douglas Hill, Me., to Cleveland, to study the intensity of reception before, during and after the eclipse will be one of the principal activities of the expedition of the Warner and Swasey Observatory of the Case School of Applied Science under direction of Dr. J. J. Nassau.

The corona will be photographed with a wide angle lens and fourteen-foot camera, and motion pictures will be made.

Members of the party will include: S. McCuskey, Prof. E. M. Justin, Dr. John E. Merrill, Sheldon K. Towson, Frank Herzegh, and David Dietz.

THE ULTRAVIOLET radiation from the corona will be photographed through a special quartz lens silvered to exclude all visible light as a part of the observing program of the Perkins Observatory party from Ohio Wesleyan University, Delaware, Ohio, which will be located at Douglas Hill, Me., within the path of totality. These photographs will be made by Prof. M. F. Jordan.

The expedition under Dr. Harlan T. Stetson, director, will also engage in other photometric, spectroscopic and direct photographic observations of the sun's corona, using lenses of long and short focal length, photronic cells, an objective prism and an illuminometer.

The party will include Prof. N. T. Bobrovnikoff, Marvin Cobb, W. A. Spurr, Dr. E. F. Carpenter and Josef Johnson and will work cooperatively with the party from Warner and Swasey Observatory, Cleveland.

DERBY

THE ECLIPSE observations of the expedition from Sproul Observatory, Swarthmore College, Swarthmore, Pa., will be made from Derby, Vt., using a photographic telescope of 63-foot focal length, several smaller lenses, an interferometer and a spectroscope. The large camera will photograph the corona on a large scale.

Dr. John A. Miller, director, who has observed many other eclipses, will head the party, and other members will include Prof. R. W. Marriott, Prof. J. H. Pitman, Prof. M. Kovalenko, Prof. W. R. Wright and G. Bourdelais.

Motion pictures of the eclipse will be made by W. B. Stearns.

Time Table

ASTRONOMERS will utilize times of eclipse determined to fractions of a second, but the following approximate times (p. m. E.S.T.) will act as a schedule for general observations:

	Begin	*Total*	*End*
MONTREAL	2:14	3:24	4:29
CONWAY, N. H. FRYEBURG, ME.	2:19	3:29	4:33
PORTLAND, ME.	2:21	3:30	4:34
GLOUCESTER, MASS.	2:23	3:32	4:36

Duration of totality on the central line of eclipse middle of shaded area on map on opposite page in the Conway-Fryeburg region will be about 99 seconds, diminishing with distance from central line until at the edge of the path it is about 22 seconds. Duration is a little longer to the west along the central line and a little less to the east.

MAGOG

TO OBSERVE his ninth total solar eclipse, Dr. S. A. Mitchell, director of the Leander McCormick Observatory of the University of Virginia, will lead an expedition to Magog, Province of Quebec, Canada.

The same two powerful concave gratings which were used by Prof. Mitchell to observe the eclipse of 1930 from "Tin-Can Island" will be used to continue his study of the heights of the vapors in the solar atmosphere.

Prof. A. C. G. Mitchell of New York University, Dr. Harry A. Barton of the American Institute of Physics, Prof. Arthur D. Butterfield of the University of Vermont, Hamilton McCormick-Goodhart of Washington and Kempton Adams of New York, will join the party. Dr. Mitchell is the author of *Eclipses of the Sun.*

A LARGE PARTY of British astronomers will join Dr. F. J. M. Stratton, director of the solar physics observatory of the University of Cambridge, in observing the eclipse from Magog, Province of Quebec, Canada.

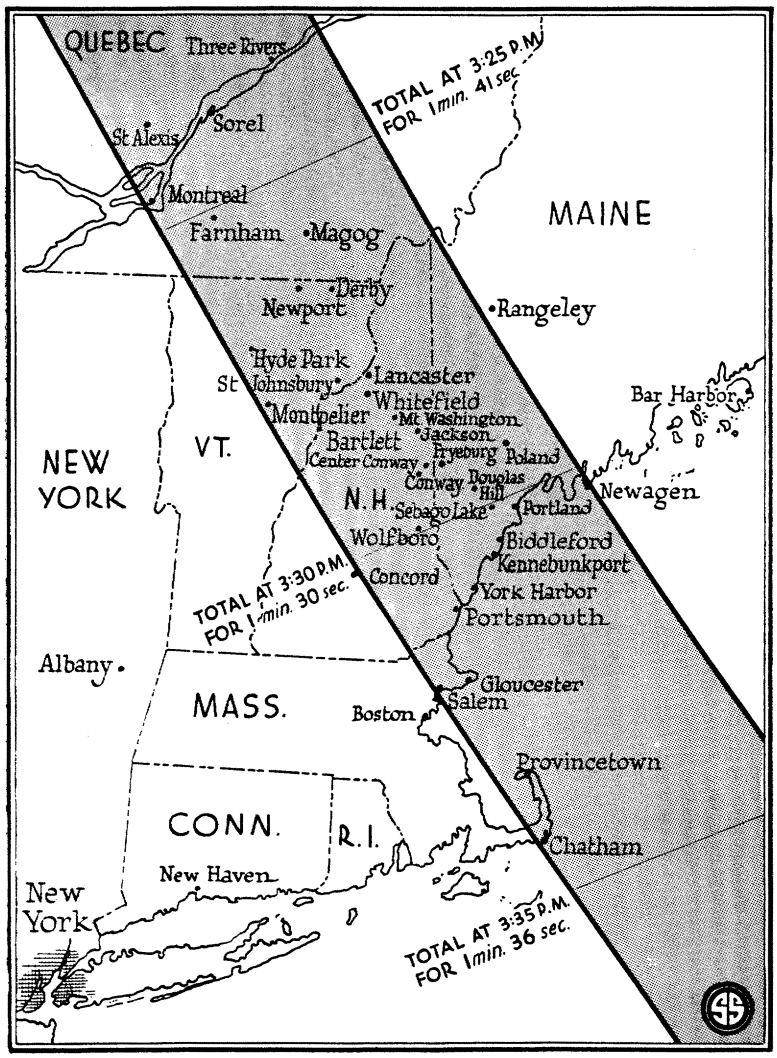
The special observations of the Cambridge University party will include a study of the wavelength of the principal coronal line by an objective interferometer, a photometric study of the intensity of the lines of the sun's chromosphere at different levels in the sun's outer atmosphere and a study of the polarization of the corona in different wavelengths. An array of instruments will be used, including a 19-foot coronograph, an objective grating, spectrographs including a quartz slit one, a 20-inch reflector with a prism spectrograph.

Members of the party will include: Prof. T. A. Carroll, Dr. R. G. Redman, Dr. C. P. Butler, Prof. G. H. Henderson, Dr. F. W. Aston, Dr. C. S. Beals, Dr. H. Knox-Shaw, Dr. T. L. Houghton, Dr. W. J. S. Lockyer, Dr. H. W. Steavenson, T. F. Cameron, Dr. W. Hall, W. S. Thackeray, Col. T. Wiley Cohen.

CONWAY

TWO LARGE CAMERAS, of 85- and 40-foot focal lengths, will be trained on the eclipsed sun by the Franklin Institute party which will be located at Conway, N. H. The large instruments will be fed by coelostats and will be used to record the sun's corona and the partial phases of the eclipse.

Smaller cameras will also be used



ASTRONOMERS AND VACATIONISTS TO SEE TOTAL SOLAR ECLIPSE

Location of the principal astronomical expeditions is shown on this detailed map of the total eclipse of the sun, Aug. 31, in New England and Eastern Canada. Millions of vacationists will join the astronomers in viewing the spectacle.

and motion pictures will be taken. Photographs of the shadow bands, accurate timing of the eclipse, and measurement of light intensity are also on the program.

The party will be under James Stokley, in charge of astronomy for the Franklin Institute Museum and also astronomical staff writer for Science Service. Other members of the party include: David Auspitz, Prof. W. H. Barton of the Pennsylvania Military College, Charles Bittinger, Washington artist who will paint the eclipse, Howard Carl, Dr. L. J. Comrie, superintendent of the British Nautical Almanac, Dr. C. H. Gingrich, I. M. Levitt, Leonard Ormerod, Prof. George H. Peters, retired astronomer of the U. S. Naval Observatory, Dr. George Rosengarten, H. B. Rumrill, and Prof. A. C. Schock.

LIMERICK

LARGE SCALE photographs that will reveal the complicated structure of the sun's corona are the principal objectives of the U. S. Naval Academy expedition.

The observations will be made from Limerick, Me. A 65-foot camera with six and a half inch lens will be used for the corona photographs.

A camera 15 feet long, one 38 inches long with six-inch aperture, a special motion picture camera, two five-inch telescopes and other apparatus will be in operation during the eclipse.

The Navy astronomers under command of Capt. C. H. J. Keppler, U. S. N., will give special attention to photographic and visual observations of the time of the eclipse. The astronomers in the party will include: C. B. Watts, P. Sollenberger, G. M. Raynsford, G. C. Whittaker.

LANCASTER

MT. WILSON Observatory astronomers will observe the eclipse from Lancaster, N. H. The polarization and radiation of the corona, the coronal spectrum, the spectra of any prominences present at the time of eclipse, will be observed. The flash spectrum will be recorded with a moving film spectrograph and the eclipsed sun will be photographed directly through a silvered quartz lens. Three grating spectrographs, a special short focus radiation telescope and three coelostats will be included among the apparatus used.

Dr. Seth B. Nicholson will be in immediate charge of the observations and Dr. W. S. Adams, director of the observatory will be a member of the party. Other astronomers in the party will be H. D. Babcock, F. Ellerman and Dr. Edison Pettit.

FRYEBURG

THE ECLIPSE expedition of Lick Observatory at Mt. Hamilton, Calif., will be located at Fryeburg, Me. Photographs of the corona, its spectrum and the flash spectrum, will be made.

Dr. W. W. Campbell, a veteran eclipse observer, director emeritus of the observatory and president emeritus of the University of California, will be a member of the party which will be under the direction of Dr. J. H. Moore. Other members will include: Dr. W. H. Wright, Dr. C. D. Shane, Dr. D. H. Menzel, and J. F. Chappell.

Two photographic telescopes of 15-foot focal length and one of five-foot focal length and nine spectrographs of various sorts will be used.

THE EINSTEIN shift of star light during the eclipse will be tested by direct photography by the Georgetown College Observatory party from Washington, D. C., under charge of Dr. Paul A. McNally, S. J., that will be located at Fryeburg, Me.

The infrared or heat spectrum of the corona will be observed with a direct-vision spectrograph with camera attached, and the light variation during totality will be measured with photoelectric cells and electrometers.

Special attention will be given to an anomalous increase in light intensity at about the middle of totality, that was

last observed by Father Wulf of Valkenburg, Holland, in 1914.

Rev. E. J. Kolkmeyer, S. J., of Georgetown, Rev. T. D. Barry, S. J., and Rev. J. P. Delaney, S. J., of Canisius College, Buffalo, will join the Georgetown party.

DR. W. H. PICKERING of the Mandeville Observatory, Jamaica, will observe the approach and recession of the moon's shadow at Fryeburg, Me., during the eclipse. Motion pictures will be taken.

CAPTIVE balloons and airplanes will be used by Dearborn Observatory, Evanston, Ill., astronomers to observe changes in the temperature and pressure of the air at various altitudes during the time that the moon's shadow falls on the earth, Aug. 31. The eclipse observations will be made from Fryeburg, Me.

A battery of motion picture cameras especially equipped for the purpose will make a record of the whole eclipse. Dr. Oliver Justin Lee, director, will have the cooperation of Capt. Barnett Harris, Signal Corps, U. S. A., who will have charge of the movie operations. Other members of the party will be Prof. Ernest G. Bryant, Middlebury College, Vt., and Newton L. Pierce.

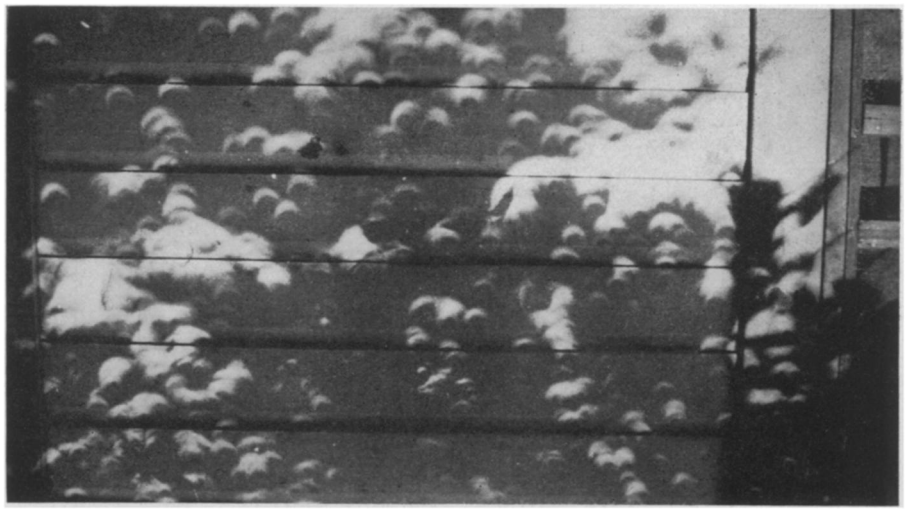
PROF. E. A. FATH, director of the Goodsell Observatory, Carleton College, Northfield, Minn., will observe from Fryeburg, Me.

DR. HEBER D. CURTIS, a veteran eclipse observer, will lead the University of Michigan party to observe from Fryeburg, Me.

Accompanying the party of professional astronomers there will be three Detroit amateur astronomers, Robert R. McMath, Francis C. McMath and Judge Henry S. Hulbert, who will make motion pictures of the eclipse using a special camera and camera drive built for the eclipse.

The McMaths and Judge Hulbert have made a hobby of astronomical motion picture photography, developing methods and apparatus at a special observatory at Lake Angelus, Mich., which they last year presented to the University of Michigan.

Dr. Curtis will photograph the corona with a lens of 40-foot focal length, and he will also observe the flash spectrum in the visual and infrared regions. Interferometer measurements of the corona will also be made. Dr. D. B. McLaughlin and Baldwin Curtis will be members of the party.



LOOK FOR CRESCENT IMAGES

When the sun is partially eclipsed, look for the crescent images of the sun as formed through the foliage of trees. The photograph shows how the crescents will appear as on the side of a house. The same effect can be obtained by piercing a piece of cardboard with a sharp pin or needle and obtaining an image of the sun through the tiny hole.

SEBAGO LAKE

HARVARD COLLEGE Observatory astronomers will observe the eclipse from Sebago Lake, Me., and their efforts will be concentrated upon the color, brightness and polarization of the sun's corona. Dr. F. L. Whipple will be in charge, L. B. Andrews with the cooperation of Dr. W. M. Cohn will study the polarization, and W. A. Calder will use a photoelectric cell. Small photographic and telescopic equipment will be used.

CENTER CONWAY

USING MIRRORS coated with chromium by a process just perfected by Dr. Robley Williams, the eclipse observing party from Fuertes Observatory of Cornell University, Ithaca, N. Y., will attempt to photograph the ultraviolet spectrum of the corona from Center Conway, N. H.

Profs. S. L. Boothroyd, director, R. W. Shaw and Robley Williams and other observers will also use mirrors to photograph the visible spectrum in the same way.

THE STRUCTURE and light intensity of the sun's corona will be studied by an expedition of the Van Vleck Observatory of Wesleyan University at Middletown, Conn., which will observe the total eclipse from Center Conway, N. H., Dr. Frederick Slocum, director, will lead the expedition. Using a lens of 25-foot focal length, two lenses of 11-foot focal length, two eight-inch mirrors and several smaller photographic lenses, the corona will be photographed in light of various colors.

Profs. C. L. Stearns, B. W. Sitterly, Lois T. Slocum and N. W. Storer will be in the party. Dr. Slocum is chairman of the eclipse committee of the American Astronomical Society.

BIDDEFORD and SACO

THE SUN'S eclipse will conveniently visit the two private observatories of F. C. Deering, lumber manufacturer and amateur astronomer. At his winter home at Saco, a ten and a half-inch telescope will be in operation and at his summer home at the sea a six-inch telescope will be used.

MT. WASHINGTON

FROM the highest point in the path of eclipse, the summit of Mt. Washington, N. H., a Science Service party will make direct photographs of the sun, photograph the approaching and retreating shadow of the moon and take motion pictures of the eclipse.

The elaborate expeditions from the large observatories have selected observing sites at lower elevations where prospects for clear weather are more hopeful than they are on the top of Mt. Washington, 6288 feet above sea level. The Science Service expedition has been planned in order that (*Turn to page* 75)

Radio Experimenters Will Observe Eclipse With Interest

In Path of Totality Moon Will Block Flow of Atoms From Sun, Affecting Strength of Radio Signals

RADIO as well as astronomy will benefit from observations of the total eclipse of August 31. Scores of astronomers will be within the narrow path of the moon's optical shadow that cuts across Canada and New England on the eclipse afternoon, and they will have a little more than a minute and a half for observations. Radio experimenters will observe a newly recognized sort of eclipse, a "corpuscular eclipse," caused by the moon interfering with a flow of atoms driven forth from the sun by the pressure of light. Instead of using telescopes, cameras or eyes, such as will be used to record the visible eclipse, the radio observers will measure for several hours the signal strength of radio transmissions.

Since the rise of radio the existence of layers of air in the earth's upper atmosphere that reflect radio waves and allow them to travel long distances has been recognized. Called Kennelly-Heaviside after the American and the Englishman who discovered it, the ionized or conducting layer was first recognized to exist about 60 miles up. It is born of radiation from the sun, as is proved by the changes that it undergoes with the cutting off of the sun's light at night and the coming of light in the morning. Until recently, the Kennelly-Heaviside layer was not suspected of being twins, but research in England and in this country has proved that there are really two layers, the original layer at an altitude of 60 miles and another layer at 120 miles.

There are two theories about the origin of the layers and the coming eclipse may render a decision between them. One is that ultraviolet light from the sun is responsible for both layers. The other view is that the lower layer, as Prof. S. Chapman of the Imperial College of Science and Technology, London, holds, may be caused by neutral particles streaming from the sun. Prof. E. V. Appleton of King's College, London, suggested that these two theories may be tested at the August 31 eclipse and they are enlisting the aid of observers in all parts of America and Europe.

If the streaming of neutral atoms or corpuscles from the sun at the rate of a thousand miles per second causes interference with radio transmission by affecting the ionized layers, this "corpuscular eclipse" will be observed east of the path of optical total eclipse and the shadow of the moon in the rain of corpuscles will not even fall upon some of the hundred-mile-wide path that will be darkened by the optical eclipse. The center of the radio or corpuscular eclipse will pass through Spitzbergen, Greenland and mid-Atlantic and it will cut a swath of about 1,600 miles compared with the hundred miles for the visible total eclipse. The radio eclipse will happen some two hours earlier than the visible eclipse because the corpuscles travel slower than light.

England is within the area of corpuscular eclipse and Profs. Appleton and Chapman are recruiting observers both there and in the United States. Radio amateurs who have a simple detector milliameter as a part of their short wave sets can participate. In Canada, the Canadian National Research Council, McGill University and commercial communication companies are cooperating in sending expeditions to observe the "radio eclipse" from Canada and Newfoundland.

After the eclipse, thanks to the discovery of the radio eclipse, we may be more positive as to what happens to radio waves only a few miles above our heads every day and night.

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Points of View, Continued from Page 70

the eclipse may be recorded in the remote contingency of cloudy weather at lower altitude combined with clear weather on Mt. Washington.

A special camera of 30-inch focal length will be used for the direct photographs. The party will include Watson Davis, managing editor of Science Service, Paul Brockett, assistant secretary of the National Academy of Sciences, and William Brockett.

YORK HARBOR

HOWARD RUSSELL BUTLER, artist who has traveled to Oregon, California and Connecticut to paint past total eclipses of the sun, will have the Aug. 31 eclipse sit for him at his studio at York Harbor, Me. He will have 93 seconds in which to paint its portrait.

MONTREAL and PARENT

THE ROYAL OBSERVATORY at Greenwich, England, will send an expedition to Parent, P. Q., Canada. Imperial College, London, will also be represented by an expedition that will observe from Montreal.

PROF. D. W. MOREHOUSE of Drake University, Des Moines, will observe from Montreal where he will cooperate with a British expedition.

WHITEFIELD

THE Seagrave Observatory, Providence, R. I., expedition will observe from Whitefield, N. H.

BARTLETT

ASTRONOMERS from the Tokio Imperial Observatory will observe from Bartlett, N. H.

JAPANESE-RUSSIAN

A PARTY from the National Observatory, Poulkovo, Russia, under direction of Prof. A. Belopolsky and a party from the Kwasan Observatory of the Kyoto Imperial University, under direction of Prof. Issei Yamamoto, will observe the eclipse, the American Astronomical Society has been informed, but the exact locations of their observing stations is not now known.

AMATEURS

OBSERVATION of the eclipse by amateurs is being organized by the Amateur Astronomers Association. Observers who desire to affiliate themselves with this group are invited to communicate with Dr. Clyde Fisher at American Museum of Natural History, New York.

BROADCASTING

RADIO broadcasts will carry descriptions of the eclipse to those outside the path of totality who will be able to see only the partial phases.

The Columbia Broadcasting System will broadcast from Conway, N. H. James Stokley, astronomical writer for Science Service, in charge of the Franklin Institute eclipse party, and an announcer will describe the eclipse.

The National Broadcasting Company will broadcast from Norway, Me.

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