the wave-length of light, and if the density changes are sufficiently large, should be able to act as a grating. This effect, which was predicted by Brillouin, has now been observed by P. Debye and F. W. Sears (*Proc. U.S. Nat. Acad. Sci.*, June 15) and made the basis of a method for finding the speed of supersonic waves, the wave-length being found by the optical experiment in terms of the wave-length of light, and the frequency by a radio wave-meter. The theory is not given in full, but leads to the ordinary diffraction formulæ, so far as the angular deviation of the light is concerned. The diffraction pattern in its higher orders provides a test of the constancy of the speed of the supersonic waves. By measuring the intensity of the diffracted beams when the light is passed through the liquid at different distances from the source of the waves their attenuation can be calculated, but so far has been found to be appreciable only for glycerine, which probably acts in this way from its high viscosity.

Optical Absorption of Solutions of Sulphur.—An example of the value of a study of optical absorption spectra for obtaining information concerning the molecular condition of a dissolved substance is given by Prof. Campetti in a paper published in parts 6-10 of the *Rendiconti* of the Reale Istituto Lombardo di Scienze e Lettere for 1932 (vol. 65). Results are given of determinations of the absorption limits for solutions of sulphur in *m*-xylene and carbon tetrachloride at temperatures ranging from 20° to 130°. The curves connecting the limits of absorption (ordinates) with the concentrations of sulphur in the two solutions at any one temperature intersect near the absorption axis. If, however, the initial ordinate is made the same for both curves, the curve for the carbon tetrachloride solutions lies wholly above that for the *m*-xylene solutions, so that a given weight of sulphur dissolved in the former solvent exerts a somewhat greater absorbing effect than when dissolved in *m*-xylene. Since the formation in solution of molecular groups of greater complexity than S_8 is improbable, the obvious and almost necessary explanation of such behaviour is that sulphur and *m*-xylene give rise to molecular associations with absorption less than the sum of those of the components separately. This conclusion appears to be related to the fact that, at temperatures which are not too high (about 195°), the two liquids—liquid sulphur and *m*-xylene—are miscible in all proportions.

Astronomical Topics

New Comet.—A comet of magnitude 7½, visible in an opera glass, was discovered independently by Mr. L. Peltier at Delphos, Ohio, and by Dr. Whipple photographically at Harvard. It is Mr. Peltier's third cometary discovery and Dr. Whipple's first, though his name is very well known as a cometary observer and computer. He and Mr. L. E. Cunningham have computed the following orbit for the comet:

T	1932 Sept. 1·510 U.T.		
ω	38°	10′	1932·0
Ω	344	40	
i	71	49	
$\log q$	0·01662		

The comet is in high northerly declination, and visible all night; an ephemeris is given for 0^h U.T.:

		R.A.			N. Decl.	
Aug. 21	4^h	7^m	20^s		64°	51′
25	5	5	12		73	38
29	7	5	58		79	22
Sept. 2	9	57	36		79	47
6	11	44	44		76	22
10	12	35	45		72	12
14	13	3	14		68	16

The following observations have come to hand; the first is by Mr. Möller at Copenhagen, the others by Dr. W. H. Steavenson at Norwood:

	U.T.			R.A. (1932·0).			N. Decl.		
Aug.	10^d	23^h	7^m 18^s	3^h	11^m	$35{\cdot}25^s$	38°	27′	27·6″
	11	23	42 24	3	14	54·41	41	8	11·2
	12	23	21 15	3	18	25·16	43	45	15·8
	13	23	39 5	3	22	22·52	46	27	35·7

Dr. Steavenson saw a short tail, the shape of which resembled that of Halley's comet in miniature; it made a considerable angle with the radius vector produced.

Observations of Radio Signals during the Eclipse.—A Science Service Bulletin, dated July 25, invites the co-operation of all who have means of estimating the strength of radio signals in observing the effect of the eclipse on these signals. In a letter in Nature of May 21, p. 757, Profs. S. Chapman and E. V. Appleton pointed out that the radio effect may be expected to precede the optical eclipse by two hours, so that the British Isles come within the affected region; observations should be continued during the whole of the afternoon of Aug. 31, but it is in the latter part that the eclipse effect is to be looked for. The main object of the investigation is to test theories about the upper and lower Heaviside layers; one theory ascribes both layers to the action of ultra-violet light from the sun; the other theory ascribes the lower layer to neutral particles streaming from the sun. In the former case the effect would be limited to the regions of optical eclipse; but in the latter view the slower motion of the particles would cause an eastward shift of the radio eclipse compared with the optical one. Also the streams of particles are supposed not to come from the whole sun, but from special regions; this would make the region of radio eclipse as broad as the diameter of the moon, as contrasted with the hundred-mile width of the zone of optical totality.

Lunar Computations for the *Nautical Almanac*.—An article by Dr. L. J. Comrie (*Mon. Not. R.A.S.*, May) illustrates in a vivid manner the immense aids to astronomical calculations that have been afforded by mechanical inventions in the present century. Prof. Brown's Lunar Tables were introduced into the almanacs for 1923. More than 1400 periodic terms are tabulated, and the computations up to the present have involved the continuous work of two skilled computers. Dr. Comrie noticed that much of the work could be facilitated by the use of the Hollerith tabulating machine, and was instrumental in obtaining the hire of a machine for the office of the *Almanac*; by its aid it has been possible to carry out the larger part of the lunar computations for the remainder of the present century at an aggregate cost of less than a quarter of what it would have been on the old method, and with considerably greater security against error. The details of the process are described in the paper. The first stage is to divide the period of each harmonic term into an integral number of parts, so chosen that the motion in a day is an integral number of these parts; the next stage is the preparation of cards, which are punched with holes in different columns, the height of the hole in each column indicating the corresponding digit. The cards for each harmonic term are then arranged in stacks. The top cards of each stack, representing the first date, are collected by hand into another stack; the addition of harmonics is performed by the machine, and the result printed. An important feature is the sorter, which automatically arranges the cards in groups according to the numbers punched in any selected column. The result is easily checked, since all the cards in each stack have a hole in the same place, so that there is a tunnel right through the stack.