OUR ASTRONOMICAL COLUMN.

ROMER'S DISCOVERY OF THE VELOCITY OF LIGHT ("Om Ole Rømers Opdagelse of Lysets Tøven": Høst & Søn, København).—When Römer in 1676 announced to the Paris Academy his discovery of the gradual propagation of light from observations of the first satellite of Jupiter in the course of eight years, he gave no details as to these observations. He merely stated that the period of revolution of the satellite deduced from immersions in the shadow of Jupiter (when the earth is approaching Jupiter) was always shorter than the period found from emersions observed when the earth was receding from the planet. The result was that light took about twenty-two minutes to travel over the diameter of the earth's orbit. (It appears from a letter to Huygens that this was found from observations made in 1671–73.) The only observation quoted in the short paper was one of an emersion on November 9, 1676, at 5h. 35m. 45s. p.m., ten minutes later than was calculated from observations in the previous August, as predicted by Römer in the beginning of September. Three years ago a sheet was found in the University Library at Copenhagen on which was written in Römer's hand a list of eclipses of the satellites observed in the years 1668–77. In a paper published in the Transactions of the Danish Academy of Sciences Mrs. Kirstine Meyer discusses these observations in order to find whether they represent a part of the material on which Römer's discovery was based, and shows that this is really the case. It is shown by several examples that the observations of 1671–73 give, in fact, the approximate result announced by Römer, but that the single results differ a good deal. It is interesting to see from some figures jotted down by Römer in the MS. in question that among the values found by him for the time light takes to pass from the sun to the earth is also the correct one of about eight minutes, but he probably rejected this result as founded on rather short intervals of time. The author calculates the amount resulting from the published observation of November, 1676, and finds that it is eight and a half minutes. Curiously enough, Newton, in his "Optics," gives eight minutes, though the only result published by Römer was about eleven minutes.

PARALLAXES OF TWO STARS WITH COMMON MOTION.—Some time ago it was found by Adams that the two stars, A.Oe. 14318 and 14320, though separated by 5′ in declination, had remarkably similar proper motions and radial velocities. The parallaxes and proper motions in R.A. of these interesting objects have since been determined by O. J. Lee from plates taken with the 40-in. refractor of the Yerkes Observatory (*Astronomical Journal,* No. 697). The resulting parallaxes are $0{\cdot}025'' \pm 0{\cdot}008''$ and $0{\cdot}061'' \pm 0{\cdot}012''$, and the proper motions in R.A. $-0{\cdot}0699$s. and $-0{\cdot}0692$s. respectively. More trustworthy determinations of proper motion by Prof. J. G. Porter give the total motions as $3{\cdot}693''$ in the direction $195{\cdot}7^\circ$, and $3{\cdot}675''$ in the direction $195{\cdot}6^\circ$. The difference of parallax, amounting to $0{\cdot}036''$, agrees well with the value $0{\cdot}031''$ previously given by Russell, and the evidence that the two stars are very widely separated in space, while having practically identical motions both in and across the line of sight, is now fairly conclusive. It may be recalled that the two stars are of magnitudes 9·6 and 9·2, and of types G4 and G5 respectively. The radial velocities are exceptionally great, being +307 km./sec. and +295 km./sec., according to the observations of Adams, and the difference is probably not greater than the errors of observation in the case of such faint stars. The two stars have the same R.A., 15h. 5·5m., while the declinations are $-16^\circ\ 2{\cdot}5$ and $-15^\circ\ 57{\cdot}5'$.

THE DIRECT JOINING OF GLASS AT MODERATE TEMPERATURES.

IN a paper presented to the Faraday Society on December 18, Messrs. Parker and Dalladay described some interesting experiments on the direct joining of glass at relatively low temperatures which they have carried out in the research laboratories of Messrs. Adam Hilger, Ltd. The results described are not only of very considerable direct scientific interest, but afford great practical advantages in the construction of glass apparatus out of what is actually a single solid piece instead of using more or less unsatisfactory cements. The advantage of such solid construction is particularly evident in polarimeter tubes and absorption cells—the latter can now be constructed with truly parallel faces and with inside faces optically worked. The process of joining which the authors have worked out consists in placing the surfaces of glass to be united in good optical contact under pressure, and then raising the temperature to a carefully determined degree. The glass surfaces thus treated become perfectly united, so that the two pieces of glass will not separate along their former interface, and the composite piece acts as if it were a single solid mass; even a crack or a diamond-cut will pass through the junction without hindrance or deflection. The temperature employed is chosen as high as possible in order to lessen the time required for union of the surfaces, but if distortion of the optically worked surfaces is to be avoided, then the temperature must not be taken too near the limit, which the authors describe as the "annealing point." This point they determine by observing the strains set up in a piece of glass while being heated at a definite rate in an electric-tube furnace; for each kind of glass they find that these internal stresses—which are readily observed by means of polarised light—disappear quite suddenly. At this point, also, the glass becomes appreciably soft, and can be indented by a sharp tool. When similar kinds of glass are used, having similar "annealing points," then the welding of surfaces in optical contact takes place well below this annealing point. Very dissimilar glasses, however, cannot well be joined, since the softer becomes distorted before the harder is hot enough to weld freely.

THE EXPLOITATION OF INSHORE FISHERIES.[1]

MANY advisory and other committees, some in connection with the great Government departments and others among the leading scientific societies, are at present engaged in deliberations in regard not only to immediate and pressing war problems, but also to the later, and possibly equally important, after-war questions, which are bound to arise, affecting the prosperity of the country and the maintenance of the Empire. A large number of these matters turn upon the application of scientific knowledge and scientific methods to various industries, and amongst these not the least important are those concerned with the allied subjects of agriculture and aquiculture, or the scientific regulation and cultivation of our land crops and our sea-fisheries.

It is recognised that, with the view of making a rapid recovery from the effects of the war, amongst other things, agriculture and allied industries must be promoted, and it must be seen to that no suitable land is wasted, that none is applied to the wrong purpose, and that the most favourable treatment to ensure the best results is given to each area. In fact, a more

[1] Introductory address (abridged) given by Prof. W. A. Herdman, F.R.S., in opening the discussion on Inshore Fisheries in the section of Zoology of the British Association at Newcastle-upon-Tyne on September 7.