OUR ASTRONOMICAL COLUMN.

TABLES FOR FINDING LATITUDE VARIATIONS.—Prof. S. C. Chandler gives, in the *Astronomical Journal* (No. 392), tables for finding the variations of latitude for the present year, these being a continuation of those published in an earlier number of the same journal (No. 193). The formulæ used in the computation were derived entirely from observations made previous to 1894·0, so that, as is suggested, a good opportunity is given of comparing the theoretical with the observational places obtained since that date. Such a comparison made by him shows that only an average difference without regard to sign of ±0″·041 is indicated, a quantity sensibly not greater than the uncertainty of the observed points themselves. This satisfactory conclusion shows us then that predictions of the movements of the pole may, with no reasonable doubt, be made for several years beforehand. From an investigation, which Prof. Chandler has in hand, he informs us that a discussion of the whole series of observations from 1889 to 1896·5, demonstrates that the radius of the 428-day revolution has been diminishing in accordance with the law given by him (Equation 52, *Astr. Journ.*, 322), but at a slightly greater rate. He further adds that a comparison of the observations at Kasan in 1895 and 1896, in conjunction with those made in Central Europe, confirms the fact of the "remarkable eccentricity of the annual ellipse which was developed from the previous European and American observations."

THE TRIFID NEBULA.—Prof. Pickering, in the Harvard College Observatory Circular (No. 15), gives a brief account of the performance of the Bruce photographic telescope which is now erected at Arequipa. This instrument was generously given by Miss Catherine Bruce, as it had been suggested that a telescope of 60 cm. aperture and 343·8 cm. focal length would give most probably excellent photographic results. Since it was set up, it has been in constant use by Prof. Bailey, and a plate accompanies the Circular to serve to illustrate the work already accomplished. The original negative was taken last year, on June 11, with an exposure of three hours, on a plate 14 × 17 in. The region covered extends in R.A. from 17h. 40m. to 18h. 10m., and in declination from −20·8° to −26·5°. The two nebulæ on that part shown in the figure are the Trifid Nebula N.G.C. 6514 and N.G.C. 6523. It is stated that photogravures of two regions have been prepared, and a limited distribution, mainly to observatories, is being made of them. It is also proposed to issue maps of other portions of the sky, such as the Magellanic Clouds. It was originally intended to map the entire sky, but it is now thought better to furnish contact prints on glass from the original negatives to such astronomers as will make use of them.

Excellent results have already been obtained with objective prisms, and these, as we are informed, will be communicated in a future Circular.

THE PERIOD OF SIRIUS' COMPANION.—In this column for November 19, we gave the measures made by Prof. Aitken of the companion of Sirius, and pointed out that the position angle differed from that reported by Dr. See. In the current number of the *Astr. Nach.* (No. 3400), Herr H. J. Zwiers communicates a short note, in which he has taken the mean of the new measures made at the Lick Observatory—namely:

1896·8235 ... Position angle 189·28° ... Probable error ± 0·67°
Distance ... 3·74″ ... ,, ,, ± 0·12″

and compares this place with that given by the computation of the orbit (*Astr. Nach.*, 3336), which is

Postion angle 185·99°
Distance ... 4·05″

The difference, observation minus calculation, gives for the two measures: position angle + 3·29° and distance −0·31″, showing that the computed place is sufficiently near until more observations have been obtained. Prof. Auwer's suggestion that the period may be a little longer than 49·4 years is thus endorsed, while Herr Zwiers' period of 51·10 years gives a somewhat too slow a movement.

HEAT RAYS OF GREAT WAVE-LENGTH.—It is well known that the spectrum we see when observing an ordinary red-hot poker through a prism is only a fractional part of a much more extensive one. In addition to the common light waves there are several other kinds, such as electrical, heat, &c., all of which may form part of the spectrum in its entirety, and the attempt has often been made to increase our knowledge over the broad region between the electrical and light waves. This may be done by either reducing the wave-lengths of electrical oscillations, or by the discovery and measurement of longer heat waves. In the pamphlet we have before us, a reprint from the *Physical Review* (vol. iv. No. 22), Messrs. H. Rubens and E. F. Nichols have just completed a very interesting investigation of the infra-red waves of great wave-length. The new theories of dispersion have suggested a method by means of which homogeneous rays of great wave-length may be obtained, and in sufficient quantity to make the determination of their properties and wave-length possible: this can be done, further, without the intervention of either a prism or grating. The authors make "reflection" the basis of their investigation, and in the instrument they devised they have chosen three reflectors of the same substance as the light source used. The bolometer employed was one of platinum, after the design of Lummer and Kurlbaum, the absorbing layer being a coating of platinum black, deposited electrically.

The two substances studied were quartz and fluorite. In the case of the former, the mean wave-length of the observed rays gave in the first and third orders 0·00887 mm. and 0·00882 mm. respectively. The agreement between the two values lies well within the limit of probable error. For fluorite the maximum energy in the diffraction spectrum of the first order corresponded to a wave-length of 0·0244 mm., the mean from other series varying from 0·024 mm. to 0·025 mm.

The authors remark that if these values be compared with those computed from the Kettler-Helmholtz dispersion formula for the middle of the absorption bands, in each case the observed value for quartz is 10 per cent., and for fluorite 20 per cent. less than the computed. As inaccuracies may arise from the computed values, and there may be errors in the experimental values, such as, for instance, a variation in the absorption of platinum black with the wave-length, yet "one is justified in regarding the agreement between the observed and computed wave-lengths as close enough to confirm the utility of the theories involved."

The rays corresponding to the infra-red absorption band in fluorite lie thus almost exactly midway between the shortest ultra-violet rays of Schumann (λ = 0·0001 mm.) and the 6 mm. electrical waves of Lebeden, reckoning the interval according to octaves, as is customary in acoustics.

The authors hope, moreover, to be able to refine the present method of observation, and study waves of greater wave-length; and, by means of an improved radiometer, obtain a much higher degree of sensitiveness.

THE VALUE OF PATHOLOGICAL RESEARCH.[1]

ON the occasion of the jubilee of Queen's College, Belfast, last month, the new physiological and pathological laboratories were formally opened by the Lord Lieutenant. On the following day an address of welcome and congratulation was presented by the North of Ireland Branch of the British Medical Association and the Ulster Medical Society to Lord Lister, who, after receiving it, spoke as follows:—

It gave me very great pleasure to witness the opening of the physiological and pathological laboratories yesterday by His Excellency the Lord Lieutenant. Such an establishment is calculated to be of enormous advantage to the North of Ireland. The benefits which it will confer will be of various kinds. In the first place it will be of very great assistance to the medical practitioner in forming his diagnosis of the disease of the patient he has to treat. In these days the knowledge of pathology has made immense advances; and, at the same time, along with those advances in pathological knowledge, there has arisen increased complexity in the methods of examining pathological objects. Section cutting, staining, microscopic examination—these are matters of the utmost moment; and yet for the general practitioner there may be neither the apparatus nor the time requisite for that kind of investigation. It will, therefore, be of great advantage to the practitioner, when he has removed or in any way obtained a portion of a morbid growth, to send it to a central institution, and have absolutely definite informa-

[1] An address delivered January 20, in connection with the opening of the new physiological and pathological laboratories in Queen's College, Belfast, during the celebration of the jubilee of the College, by Lord Lister, P.R.S.