THE twelfth edition, revised, of Mr. W. T. Lynn's small volume on "Celestial Motions" has been published by Messrs. S. Bagster and Sons, Ltd., price 2*s*. net. The book is an easy introduction to the main facts of astronomical science, and the frequent re-issues enable the author to keep it up-to-date.

MR. JOHN BROWNING has issued the fourth edition, rewritten and revised, of his concise little book "How to Work with the Spectroscope." The book provides beginners with a handy guide to the use of spectroscopes of various kinds, including McClean's star spectroscope, the microspectroscope, and others; and we welcome it as a simple means of extending the circle of observers of spectroscopic phenomena. The price of the book, with a coloured chart of spectra, is 1*s*. 6*d*., and without the chart, 9*d*.

OUR ASTRONOMICAL COLUMN.

NEW ELEMENTS FOR HALLEY'S COMET.—In a note appearing in No. 419 of the *Observatory* (February, p. 104), a set of elements for Halley's comet, deduced by Mr. C. J. Merfield from the observations made since the re-discovery of the comet in September last, is compared with the elements predicted for this return, as follows:—time of perihelion passage, April 19·6394 (G.M.T.), $\omega = 110° 43' 24''$ (= predicted + 68″), $\Omega = 57° 15' 56''$ (= predicted − 16″), $i = 162° 12' 34''$ (= predicted − 8″), $e = 0{\cdot}967300$ (= predicted + 0·000019″), and $\mu = 46{\cdot}6723''$ (= predicted + 0·003″). From these elements Mr. Crommelin has calculated the conditions for the comet's transit over the sun, and finds that the first contact should take place on May 18d. 14h. 22m. (G.M.T.) in position angle 264°. Thirty minutes later the centres of the two bodies will be at their least separation, the comet being 62″ south. Last contact should occur at 15h. 22m., in position angle 92°, and the horizontal parallax of the comet will be 54·4″, or 45·7″ relative to the sun. The transit will be visible in Australia, the Pacific, and Asia, and it is sincerely to be hoped that careful and comprehensive observations will be made, for they may provide useful additions to our knowledge concerning the constitution of the denser portions of the comet.

In the same journal Father Cortie discusses the alleged Papal excommunication of Halley's comet ("The Devil, the Turk and the Comet") in 1456, and quotes conclusive evidence showing the story to be a myth.

STUDIES OF SOLAR AND STELLAR SPECTRA.—In two recent communications to the Academy of Sciences (*Comptes rendus*, Nos. 1 and 3), Count A. de Gramont publishes some interesting results as to the occurrence of what he designates *raies ultimes* in the spectra of the sun and various stellar types.

The *raies ultimes* of an element are those lines which persist in the spectrum throughout the range of flame, arc, and spark conditions. Treating different alloys in which the quantity of a component continuously decreases, M. de Gramont finds that the first lines to disappear from the spectrum are the "spark" lines, then those produced in the arc, and lastly the "flame" lines; the most persistent lines are the *raies ultimes*. On the hypothesis that the spectra of the various regions of the sun are dissociation spectra, and that their differences are due principally to variations of the proportions of elements present, M. de Gramont hopes to find indications which will show, more or less, the regions of the sun, and he gives a list of the most persistent and the most sensible lines of seventeen elements already traced in the solar spectrum.

M. de Gramont further points out that the absence of the lines of the metalloids, &c., from the solar spectrum should not be accepted as proof that these substances do not exist in the sun, for he has already shown that the "ultimate" lines of many of them exist in the more refrangible part of the spectrum which our atmosphere absorbs. The "ultimate" lines of gold occur at λλ 2676·0 and 2428·1, and it is suggested that this is the reason that gold has, so far, been considered as absent from the sun.

In the second paper M. de Gramont considers the distribution of *raies ultimes* in different stellar types, having studied for this purpose the Harvard classifications, the numerous publications of Sir Norman Lockyer, and the works of Sir William Huggins. Using the nomenclature of Miss Cannon, in the Draper Catalogue, he finds that these ultimate lines do not occur in the hottest stars, but make their appearance in B8A, the Algolian type, and generally increase in intensity as the lower types are reached. In the *c* division the "ultimate" lines appear at a stage later, and in less numbers, than in the *a* division. M. de Gramont points out that the *c* division corresponds with Sir Norman Lockyer's "ascending series," of which the most characteristic types are the Rigelian and the Cygnian, in which predominates the "test spectrum" or spectrum of enhanced lines. The presence of oxygen and nitrogen lines in the helium stars, lines dissimilar to the ultimate lines, is taken as an indication that in such stars powerful electrical discharges are in action.

M. de Gramont concludes by suggesting that the presence or absence of "ultimate lines" in the spectra of stars may furnish valuable indications of the relative temperatures, or the stage of evolution, of the different types, and is equally applicable to the Harvard classification and the conceptions of Sir Norman Lockyer.

MARKINGS ON MARS.—Too late for insertion at the end of his letter on Martian markings as seen with small and large telescopes, published in last week's NATURE (p. 397), Prof. Lowell writes:—"It will prove of interest to students of the subject that this optical shattering of lines, due to a large glass, is precisely what M. Antoniadi observed at Meudon in his observations of Mars. He saw in the canals, in place of lines, a tesselated series of dots. His observed mosaic effect is the exact theoretic effect that a large aperture should produce on continuous lines such as the canals, and always does produce in the case of the rings in the images of a star."

ELEMENTS AND EPHEMERIS FOR TEMPEL'S COMET (1873 II.).—In No. 4386 of the *Astronomische Nachrichten* M. Maubant gives the elements and a search-ephemeris for Tempel's second comet, which is expected to pass through perihelion in the near future. The conditions are not favourable for observation.

THE NEW COMET (1910*a*).

ALTHOUGH by its increasing distance from the sun and the earth, and by its apparent recession into the sun's rays, the great comet of 1910 is becoming less popular as a spectacle, the interest among astronomers as to the results accruing from the mass of observations will doubtless continue for a long period. From observers situated in many parts of Europe and Africa we are receiving further evidence of this comet's title to rank among the "great comets" of history.

In sending us the drawing here reproduced, Father Cortie encloses some valuable observations of the comet's appearance on January 26. The drawing was made by Mr. William McKeon, an assistant at the Stonyhurst College Observatory, at 6 p.m. January 26, and in making the observations a small pocket telescope of 1½ inches aperture and 17 inches focal length was employed. The following are Mr. McKeon's remarks concerning the comet's appearance at the time:—"Nucleus of the comet bright and sharp; no merging into the tail, magnitude 2. Nucleus of comet 2° S. and 7° W. of Venus (estimated). The tail terminated at a star of about the seventh magnitude some 8° N. by E. of the head. The star to the right of the comet (N. by W.) was of about the third or fourth magnitude."

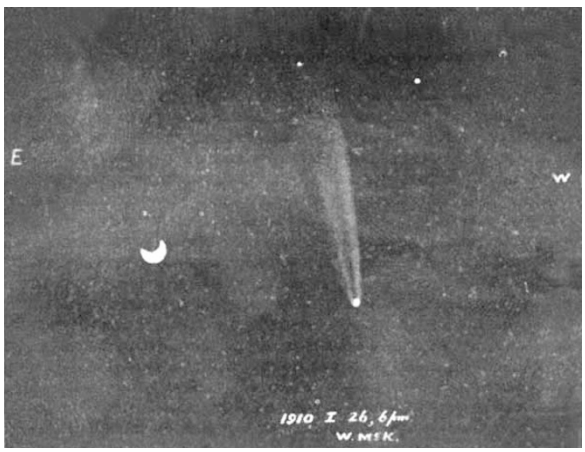
Father Cortie identifies this latter star as α Equulei, magnitude 4·1, and thence deduces that the length of the tail, as seen in the small telescope employed, was about 7½°. Naked-eye observations by himself showed the tail extending almost to ε Pegasi, which would make its length 12°; its breadth at the end, he estimated, was about 3°. The sky was perfectly clear, and the tail of the comet

was quite a conspicuous object after the head had set, until it was lost in the moonlight. As the drawing shows, there was, in addition to the two main branches of the tail, separated by a dark segment, a fluffy extension on the eastern side; all these features are shown on the photographs taken the same evening, and mentioned in NATURE last week.

Further observations were made on January 29, and, although the sky was less clear, the length of the tail was estimated by Father Sidgreaves to be 17° or 18°; the general brilliancy of the comet was less.

Father Cortie also records some observations made by the Rev. J. Rowland at St. Asaph, N. Wales, who directs attention to "a faint general illumination of the sky to the east of the tail, of a width apparently of 10° to 15°, the length of the tail being over 20°. There was also an apparent deviation of the tail to the east between α and γ Pegasi." This confirms the independent observations, made at Stonyhurst and elsewhere, as to the apparent existence of a cloud of particles following the eastern branch of the comet's tail.

Mr. Theodore Kensington, West Malvern, also mentions a similar phenomenon. He says, in a letter dated February 5:—"The comet was a magnificent sight from the Malvern Hills a week ago, and of even more than ordinary interest owing to the glare which was visible, in apparent connection with it, on its southern side. This glare was best seen on the evenings of January 29 and 30, but it was also visible last Wednesday and Friday."



The comet as seen at Stonyhurst on January 26 by Mr. McKeon.

Mr. Kensington further states that the glow was like that from a distant city or an aurora, but that it was not terrestrial was shown by its setting with the stars. It was like an inverted U the right side, bounded by the comet and the square of Pegasus, reaching nearly to Saturn, while the left (south) side descended almost perpendicularly, but with a slight trend inwards, to the visible horizon. The distinction between the bright background on the one side of the comet and the dark sky on the other side was quite marked, but after January 29 there was a darker band of sky between the comet's tail and this glow.

Miss Eleonora Armitage, writing from Dadnor, Herefordshire, states that the glare seen in the neighbourhood of the comet was the zodiacal light, which showed particularly well on January 29. She adds:—"The tail of the comet was well defined on the west side, reaching a little beyond and above α Pegasi, as seen with the naked eye; on the east side it could be traced almost so far as γ Pegasi, but along most of this side the edge was very indefinite, owing to the light practically blending with that of the zodiacal light, both having apparently the same degree of luminosity. β Aquarii could be seen through the tail a little above the nucleus of the comet. The next evening, January 30, the comet was much fainter, but the tail could still be traced for nearly 30°, while the zodiacal light stretched up in a bright cone, the apex almost reaching to Saturn. When seen again on February 4 the northern movement of the comet had removed it from the track of the zodiacal light, so that the two lights appeared to be separated by a segment of dark sky, the eastern edge of the curved tail being now nearly as clearly defined as the western."

Reports from other observers indicate that the zodiacal light has been well seen on several occasions during the past fortnight. Dr. F. J. Allen saw it and the comet, under ideal conditions, from the Mendip Hills on January 30, and suggests that the "glare" near the comet as seen by other observers was doubtless the light. A correspondent ("E. W. P.") at Ross, Herefordshire, also states that "the zodiacal light was distinctly seen this evening at 6.45 (February 4), whilst the tail of the 'daylight' comet seemed to reach further than ever."

Dr. Allen's observations of the comet are of especial interest, for he remembers distinctly the comet of 1858 (Donati's), and has seen all the bright comets since, and states that, as he saw it on January 30, 1910*a* is the only one which can be compared in effect with Donati's. The intermediate ones, though brighter than the present one, were poor little things in apparent size. He suggests that the estimates of its apparent size have erred on the side of cautiousness. As he saw it at Cambridge, during the early days of its appearance, his estimates agreed with the usual ones; but as seen from the Mendips, smoke, gas-lamps, and clouds being absent, and the night exceptionally clear, the tail reached beyond and included α Pegasi, and then took a more pronounced curve to the left. He estimates its length as 40°, and suggests that, had the zodiacal light been absent, the tail might have been traced further, for the light rendered its S.E. limit indefinable; his observations extended for more than an hour, between 6 p.m. and 7.30 p.m. Prof. R. A. Gregory, observing at Chichester on January 29 and 30, found that the tail was certainly 30° long, whilst M. Giacobini reports (*Comptes rendus*, vol. cl., No. 5, p. 263) that, as seen by the naked eye at the Paris Observatory, on January 29, its length exceeded 45°. M. Chofardet, at Besançon, states that on January 27 the tail was 25° long, and, curving towards the south, mixed its light with that of the zodiacal light.

In a further communication, Mdlle. de Robeck, observing at Inistioge, Kilkenny, states that on January 29 the comet appeared very much in the same way as shown in Mr. Rolston's sketch in last week's NATURE, but the tail seemed to reach higher, and swept upward nearer to α Pegasi. After Venus had set, the tail of the comet was seen like a great search-light sweeping the sky, and the fainter stars below Pegasus were seen glittering brightly through it; the night was exceptionally clear at Inistioge. Mdlle. de Robeck also states that, before the comet became such a noticeable object, the country people around Inistioge took Venus to be the much-talked-of object, and saw in it a portent of dreadful calamities. That the Earl of Crawford's suggestion (NATURE, January 20, p. 349) was an urgent one is proved by the reports of "comet scares" in Russia, Turkey, and other countries, occasioned by the sudden and unexpected appearance of 1910*a*. It certainly would be well to prepare the native minds for the apparition of Halley's comet when, as Mr. Cowell thinks it will, it becomes sufficiently bright and large to attract general attention.

Mr. Keeling, of the Helwan Observatory, Egypt, reports that the comet (1910*a*) was observed on several evenings at Helwan, Egypt, and photographs of it were obtained on January 24, 25, 27, and 28; the camera employed has a Cooke lens of 4 inches aperture and 28 inches focal length. Naked-eye observations on January 27 and 28 showed the tail to be 24° to 25° in length.

A telegram from Dr. Aitken (*Astronomische Nachrichten*, No. 4386, p. 292) states that Dr. Albrecht finds the sodium lines in the spectrum of the comet to be so displaced as to indicate a recession of 66 km. per sec. in the line of sight. As the position of these lines has now, apparently, been measured with sufficient accuracy to justify a definite statement as to "shift," it seems very improbable that the yellow lines observed are due to helium, unless two sets of such lines have been observed, and there is no suggestion of this. In this regard Mr. Hinks writes to us dis-

claiming the statement attributed to him by a reporter, as mentioned on p. 410 last week, and states that "there is no truth in this reported unconventionality."

Spectroscopic observations of the comet, made at Meudon, are described by MM. Deslandres, Bernard, and d'Azambuja in No. 5 of the *Comptes rendus* (vol. cl., p. 253).

Using the prismatic cameras previously employed on the Morehouse and Halley comets, photographs were obtained on January 22, 24, 25, 27, 29, and 30. Orthochromatic, red-sensitive plates were used, and the best negative of January 22 was secured with an exposure of five minutes. This shows a brilliant nucleus giving a continuous spectrum from λ 700 to λ 420 and several condensations.

The brightest condensation is at λ 590, and is recognised as due to sodium; it shows a complete monochromatic image of the comet with a well-defined tail, brightest at its edges and extending to a distance of 20 of arc from the head. The hydrocarbon bands at λ 560 and λ 470 are also recognisable. In addition to these, there are two condensations at λ 620 and λ 700 extending some 10 minutes of arc into the tail, and not previously recognised in cometary spectra.

The later photographs show the progressive differences which have been observed in other comets (*e.g.* that of 1882) having small perihelion distances; the sodium lines faded gradually, while the hydrocarbon bands became more intense, and those due to cyanogen made their appearance.

On January 29 and 30 the sodium bands were absent, the hydrocarbon bands (λλ 565, 517, 474) stronger than before, the continuous spectrum extended into the ultra-violet, and the cyanogen bands at λλ 388, 387, 386 were complete and intense.

The wave-lengths given now are, necessarily, only approximate, but other photographs, taken at the same time with a slit spectrograph, will give finer values, which are promised in a later publication.

Ordinary photographs were also secured, and those taken on January 22 show a fine, curved tail divided into two "antennæ" with a dark line down the centre. On January 29 a supplementary tail was shown, nearly as intense as the first, and making an angle with it of about 25° towards the south.

Observations made with a simple Nicol on January 29 indicated that the light from the tail was strongly polarised in the plane containing the sun, the comet, and the earth.

The *Astronomische Nachrichten* also contains the elements and ephemeris by Dr. Kobold, from which we gave an extract last week, and the records of a number of observations made at the Continental observatories. At the Bothkamp Observatory on January 23, 4h. 50m. (M.T. Bothkamp), Dr. Schiller found the comet to be of the first magnitude, and to have a sharply defined nucleus of 4″ diameter. He reports, also, that the head was very similar to that of Donati's comet shown in Fig. 153 of the third edition of Newcomb-Engelmann; the position-angle of the medial line of the two tails was 40°. On January 23 the comet was fainter, but, to the naked eye, the tail appeared to extend to a distance of 15°.

Later elements and ephemeris are published in Circular No. 119 from the Kiel Centralstelle, and are based on observations made on January 20, 23, 26, and 30; they are as follows:—

Elements.

$T = 1910$ January $17{\cdot}1235$ (M.T. Berlin)
$\omega = 320° 58{\cdot}6'$
$\Omega = 88° 47{\cdot}1'$ } 1910·0
$i = 138° 47{\cdot}2'$
$\log q = 9{\cdot}11153$.

Ephemeris (Midnight, Berlin).

1910	R.A. h. m.	Decl. ° ′	Magnitude
Feb. 10 ...	21 54·4 ...	+ 7 40·8 ...	4·0
12 ...	21 57·2 ...	+ 8 24·8	
14 ...	21 59·8 ...	+ 9 5·5 ...	4·4
16 ...	22 2 3 ...	+ 9 43·5	
18 ...	22 4·6 ...	+10 19·1 ...	4·8
20 ...	22 6·8 ...	+10 52·8	
22 ...	22 8·9 ...	+11 24·9 ...	5·0

The magnitudes are based on the observation that the magnitude on January 27 was 2·0, and are independent of any physical changes in the comet itself.

We notice that the misnomer "Drake's comet" is still being employed. As this is likely to lead to subsequent confusion, it would seem as well to refer to this object as the "Worssell-Innes comet, 1910*a*," Messrs. Worssell and Innes, of the Johannesburg Observatory, having been the first to make and record any definite observations of it.

A FINNISH ETHNOLOGICAL EXPEDITION TO BRITISH PAPUA.

ABOUT the middle of this month Dr. Gunar Landtman, lecturer in sociology at the University of Helsingfors, will leave London for an ethnological expedition to British Papua. In 1904 Dr. Landtman attended the Martin White lectures on sociology that were given in the University of London by Prof. E. Westermarck and those on ethnology by Dr. A. C. Haddon. In 1905 he wrote his doctor's dissertation "On the Origin of Priesthood," and in 1909 published a thesis on "The Primary Causes of Social Inequality." Dr. Landtman will make the island of Badu, in Torres Straits, his headquarters; thence he expects to proceed to Saibai, and later to that portion of the mainland of British Papua which faces Torres Straits, and is known to the natives as Daudai, and, gradually working his way eastwards, he will eventually study the natives of various islands in the delta of the Fly River. Very little is known about this district, and it is important that it should be investigated before the natives are further modified by contact with the white man.

The ethnography of the islanders of Torres Straits has been carefully described by the members of the Cambridge Anthropological Expedition to Torres Straits, and it is fortunate that their results will now be linked on to the mainland of New Guinea, for there is no doubt that the western and eastern islands of the Straits were populated by various emigrations from the mainland. Friendly relations have always been maintained between the islanders and the mainlanders, and a good deal of simple trading has taken place between them; but most interesting of all is the culture influence that formerly extended from the mainland to the islands. In the island folk-tales we hear of the introduction of ceremonies (in most of which masks were employed) by men who seem to have been actuated by a missionary spirit, and the most important of the hero-cults of the central and eastern islands appears to have come from New Guinea. It is Dr. Landtman's intention to endeavour to trace these to their sources.

Totemism is known to occur in the district about to be investigated, where, for some unexplained reason, plant totems are more abundant than animal totems. We may also expect to learn something about the origin of the hero-cult of the islanders, but we do not in the least know whether these legendary persons are heroes in their own country. To the east, along the shores of the Papuan Gulf, the Rev. J. Holmes has discovered a belief in gods who appear to be apotheosised ancestors. It is remarkable that this is the only district of British Papua from which gods have been recorded, but we do not know the western limit of this belief.

A careful study of the social customs and religious beliefs and practices of the natives of Daudai and of the Fly River delta will reveal to us whether their totemism is in a typical condition or whether it is being modified by superior cults, and it is very desirable that a metamorphosis of this kind should be accurately recorded. There are many other problems connected with this interesting region that require elucidation, and we wish Dr. Landtman every success in his undertaking. Dr. Landtman would like to spend at least two years in the field, but is at present uncertain whether he will not have to content himself with one year. On his return he proposes to spend about nine months in Cambridge in order to work out his results, which will be published in English.