# Extracts from Publications.

*Note on the two main types of Cometary Development and their Variation with the Solar Distance. (By J. H. Reynolds).*—

At the March meeting of the Society I drew attention to the two principal types of cometary development.

The first type is that in which the tail is merely a continuation of the parabolic envelopes of the head, formed from matter projected from the nucleus towards the Sun; this may be termed the cylindrical type, and is associated with large comets near perihelion, such as 1910*a*. In the other type the tail is formed from streamers radiating from a point in the nucleus directly away from the Sun; this may be termed the conical type, and of this Morehouse's Comet was a conspicuous example.

From an examination of the Helwan photographs of Halley's Comet, it was evident that both types were represented in the series, the cylindrical type being developed when the comet was near perihelion at a distance of 0·5 to 0·6 R, and the conical type coming into prominence when the solar distance was greater than 0·8 R.

As it seemed, therefore, probable that the type of tail development depended on the solar distance, a preliminary examination of the photographic records of other comets was made by Mr. Knox Shaw and myself. Unfortunately these records are very incomplete, and usually only a few isolated photographs of each comet are available. At the same time the results were fairly consistent, and the following provisional classification was adopted, to which there were no marked exceptions :—

Solar distance under 0·6 R—Cylindrical type.

Do. 0·6 to 0·8 R—Intermediate, combining both the cylindrical and the conical types.

Do. over 0·8 R—Conical type.

The only series of photographs in the library of the Society comparable with the Helwan series of Halley's Comet were the Greenwich photographs of Morehouse's Comet. As, however, the perihelion distance of this comet was over 0·9 R, and the latest photograph in the library was taken over a month before perihelion passage, this series has no bearing on the point at issue, except that the conical form of tail was consistently shown.

Recently two comets have appeared which go far towards putting this provisional classification on a firm basis.

Beljawsky's Comet (1911*d*), photographed at Helwan at a solar distance of between 0·3 R and 0·4 R, showed distinctly the cylindrical type. Photographs of Brooks' Comet (1911*c*), taken by Mr. Longbottom at Chester, showed a well-developed conical tail, while the solar distance was 1·0 R and over. When near perihelion, at about 0·5 R, it appears visually to have developed the cylindrical type, and this is confirmed by photographs taken at that time.

[*Monthly Notices of the Royal Astronomical Society, Vol. LXXII No. 1.*]

*Note on the Spectrum of Comet Brooks (1911c). (By the Astronomer Royal of Scotland).*—The cameras were rotated so as to have the edge of the prism approximately parallel to the comet's tail, but it was not until the end of October that a definite tail could be traced in the spectra.

With the spar camera no trace could be found of duplicity in the knots, such as is recorded in the spectrum of Comet Morehouse (1908c), the brightest knot $\gamma$ 467 being, in particular, noted as symmetrical and round. The knot $\gamma$ 388 was very much flatter, and on one or two negatives gave the impression of a slight shading towards the violet.

With the other camera the knot $\gamma$ 467 is distinctly double, the fainter image being on the violet side. None of the other knots showed signs of duplicity.

As early as September 8 a faint continuous spectrum could be traced, and this phenomenon was easily visible as the brightness of the comet increased. This comet differs in that respect from Comet Morehouse, in which the continuous spectrum was absent.

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The astronomical event of the last few weeks in my immediate circle has been the almost sudden death of Mr. W. T. Lynn, mentioned in the "Scientific News" column of last week. I make no apology for occupying space here in writing about a personal friend, for the deceased gentleman must have been known to many readers of this paper by his writings, if not by his personality. He had not been an immediate colleague of mine, because he left the Royal Observatory Staff, which he did chiefly from considerations of health, in 1880, a year or two before I joined; but for the last seven-

teen years I have received from him with unfailing regularity, about the first day of each month, at least one letter, if not more, for publication in the Observatory Magazine on some astronomic-historical subject of the type with which members of the British Astronomical Association will associate the name of Mr. Lynn. For thirty years he devoted himself to this kind of research, living in Blackheath alone, but not quite the life of a recluse, for he had relations and friends in the neighbourhood, at whose houses he was always welcome. During the last few years of his life he suffered from a troublesome complaint in his right arm, which might have caused some persons to give up writing; but Mr. Lynn went gamely on to the end, earning the respect which was shown by the attendance of a representative gathering at his funeral service.

The death-roll of astronomers for the year now coming to an end is not a very long one. Besides the name of Mr. Lynn, it includes those of Dr. Johnstone-Stoney; Mr. W. Coleman, of Dover, an amateur who made micrometric measures of double stars, several series of which are published in the Memoirs of the Royal Astronomical Society, and whose 8-in. telescope, by the way, was bequeathed to that Society, and is now being used by a well-known observer; Mr. Arthur Cotlam, one of the first secretaries of the British Astronomical Association; the Rev. Dunne Parker, of Stevenage; and another Fellow of the Royal Astronomical Society, Mr. Wegg-Prosser, of Hereford. As all these six gentlemen lived to well over seventy—the average of their ages at death was, in fact, above eighty years—more evidence is added in favour of the unusual longevity of astronomers.

[*English Mechanic.*

*No Sermonising.*—But Mr. Hollis's remarks this week about the longevity of astronomers has made me reflect, and, against my will, I am compelled to utter—to make you also reflect. Possibly it will be a chance for you. It is true that those who make the pursuit of knowledge their chief aim in life perpetually renew their youth. Their active minds disregard the creakings of their body machinery. They do not "drop like mellow fruit into the grave"; they disappear, leaving good influences and noble aspirations for others. The Goddess of Science sometimes claims a victim from among her votaries; but she is never merciless as is the Goddess of Pleasure. "Truisms" I hear some one mutter. Exactly. Very many lives have been ruined by the neglect of the commonest truisms.

[*English Mechanic.*

*Scientific Optical Surface: Eyes Shining at Night.*—Mr. H. N. Irving, in letter 672, raises the question of plate-glass *versus* cast and annealed discs for mirror-making. The question is by no means such a simple one as he appears to represent it. I hold no brief for either plate or cast discs, but plate is a favourite material with the great body of amateur mirror-makers, and in the interest of these very deserving and persevering workers, I should like to relieve their minds of fears which might be raised by the remarks of Mr. Irving and Mr. D. Booth.

In the first place, what is "plate-glass"? Many and various are the makes of it. Some kinds are sad rubbish from an optical point of view, though good enough for shop-windows. But the best sorts are of very high quality indeed, and in the perfection of their annealing and their freedom from veins and patches of unequal density, bubbles, and other flaws, compare very favourably indeed with the best cast discs. I have several large lenses which I have made from good plate-glass, and these are for the most part quite free from internal defects.

[*English Mechanic.*

*Some Ideas about Mars.*—In regard to Martian "Canals," two ideas of the past week are worth mentioning. One is that the shape of any object that is too small to be defined is necessarily round. Of course, this has been pointed out before, but without the guinea-stamp of authority which it now receives. But, as stated, it requires qualification. The law laid down was that, whether the object itself be round, square, or irregular, its telescopic image is round. This is quite true as long as the aperture of the telescope is circular. But a square aperture must produce square images, and a triangular one triangular images, and so on, the fact being that the shape of detail too small for definition is necessarily a function of the shape of the aperture.

The other idea was that Mars was shown to have a mean temperature below the freezing-point, and it was argued that therefore all the water on Mars was in the condition of ice, and that the "canals" could not be water-channels. Well, what we know of the temperature of Mars does not amount to much; but accepting the view that water is present on Mars, we are bound to accept also the Polar caps as deposits of snow, and snow at all implies that water evaporates somewhere else; and, further, we see that the Martian snow-caps melt entirely away now and again, which is definite proof that even the Poles of the planet are for a considerable period above the freezing-point.

[*English Mechanic.*