

has since shown<sup>1</sup> that the increased density of the jet on electrification is only partly due to the cause to which I attribute it, namely, the electrical repulsion preventing the coalescence of the drops, as he proves that the electrification of the jet overpowers the surface tension, and so promotes the formation of small drops, and in this way assists in increasing the density of the condensation.

Mr. Bidwell's misunderstanding of my position is greatly due to an impression he seems to have that I attribute all cloudy condensation to the presence of dust particles. Now, if he will turn to my first paper on this subject,<sup>2</sup> he will find that the effect of the vapours of hydrochloric, sulphuric, and nitric acids, active vapours, mentioned in his lecture, have all been referred to, and experimented with, as well as many other substances, so that I was well aware of these causes of condensation. Further, he will find in the paper referred to, as well as in another of a later date,<sup>3</sup> that it is possible to produce cloudy condensation without the presence either of dust or a vapour capable of forming a nucleus with water vapour, or even the abnormal condition due to electrification, all that is necessary being a sufficiently high degree of supersaturation.

Darroch, Falkirk.

JOHN AITKEN.

### The Os Pedis in Ungulates.

PROF. EWART, in a recent paper,<sup>4</sup> describes the os pedis or "coffin bone" of the horse as consisting to a large extent of a bony cap developed from connective tissue around, and quite independent of the terminal phalanx. This throws an entirely new light on one of the most remarkable bones of the horse's skeleton, and is especially interesting to veterinarians. Having a foetal calf (about 6½ months) in my possession, I was led, on reading Ewart's paper, to examine the digits, and wish now, in a word, to state the result.

I found each digit provided with a bony cap similar to that figured by Ewart from his 35 c.m. horse embryo. On making a longitudinal vertical section of one of the digits, the investing cap could easily be distinguished from the phalanx proper; and, further, I noticed a large deposit of osseous matter in what may be termed the diaphysis (shaft) of the terminal phalanx, and an indication of a second ossific centre at its apex. This affords additional proof that the third phalanx in ungulates, as in man, consists partly of membrane bone and partly of cartilage bone, and that it in all probability develops from several centres.

I hope soon to publish a number of observations on the structure and development of the digits in ungulates.

A. E. METTAM.

Royal Veterinary College, Edinburgh.

### A Brilliant Meteor.

A METEOR of extraordinary splendour was seen here this evening at 7.45. It appeared vertically under the Pole star, at an elevation of 40°, and, after pursuing a path that sloped down to the west at an angle of 30°, disappeared silently under Casiopeia.

The incandescent mass had an apparent volume equal to that of a good-sized orange. It gave out a bluish-white light that brilliantly lit up, for about four seconds, the grounds and buildings of the College.

The glowing mass was followed by a long, conical, crimson train ending in a wisp of condensed vapour resembling smoke.

The sky was clear, starlit, and moonless at the time.

M. F. O'REILLY.

The Training College, Waterford, January 31.

### THE VATICAN OBSERVATORY.

THE report recently issued by the Vatican Observatory (*Pubblicazioni della Specola Vaticana*, Fasciculus iii.) is the best that has been prepared by Father Denza, and in abundance of matter and fineness of execution, it compares favourably with that of any observatory. The

<sup>1</sup> *Phil. Mag.* October, 1893.

<sup>2</sup> "Dust, Fogs, and Clouds." (*Trans. Roy. Soc. Edin.*, vol. xxx. part i.)

<sup>3</sup> "On the Numbers of Dust Particles in the Atmosphere." (*Trans. Roy. Soc. Edin.* vol. xxxv. part i.)

<sup>4</sup> "The Development of the Skeleton of the Limbs of the Horse." (*Journal of Anatomy and Physiology*, January, 1894.)

first report was published in 1891, but neither that nor the one of 1892 contains so much evidence of work done as the bulky tome last issued. The observatory, as it is at present constituted, only dates back to 1889; but previous to that, it passed through so many vicissitudes that a brief outline of its history may be of interest.

It is recorded that an observatory tower was erected by Pope Gregory XIII. in connection with the reform of the calendar, some time previous to 1582. The tower was intended for astronomical observation, and there is every reason to suppose it was the first celestial watch-tower built in Rome. The following translation of an extract from the *Nautica Mediterranea* of B. Crescenzi, published in Rome in 1607, clearly shows that the room at the top of the tower was used for astronomical purposes:—"When the sun arrives at the tropic of Cancer its rays enter a little hole which Ignatius Danti has had made for that purpose in the roof of the apartment which Pope Gregory XIII. had erected upon the Belvedere Gallery, and the rays only enter the hole once a year, when the sun is furthest from the equinox, after which he turns and goes back." Danti appears to have marked a meridian line upon a marble table in the tower, and meridian observations were made until about 1644, but the observatory was afterwards neglected, and remained so for about a century and a half. It was only towards the end of the last century that an attempt was made to renew the astronomical work. Cardinal Zelada had a large meridian circle constructed, and furnished the observatory with some good astronomical instruments, among which was a telescope by Dollond. As the observatory was not available for public instruction, it was decided to establish another at the Roman College, and the new observatory was erected in 1787, though observations had been carried on at the College long before.

In 1789 the Vatican Observatory commenced a new epoch in its history. Philip Gili began his directorship in that year, and, in addition to making astronomical observations, initiated researches in magnetism and meteorology, and other branches of terrestrial physics. The observatory kept well apace with the times until the death of Gili in 1821, but after that it became quite disorganised. All the instruments and records were dispersed, and the observatory itself was entirely deserted until about 1870, when it was transformed into a residence.

Before passing to the third epoch in the "eventful history" of the Vatican Observatory, a few remarks upon the Observatory of the Roman College may be of interest, especially as the relations between the two institutions are not generally well understood among astronomers. According to Father Cortie, who has kindly furnished most of the following information upon this matter, the Roman College Observatory dates back at least to 1572. It belonged to the Society of Jesus, and consisted in the beginning of a few rooms set aside for astronomical studies. Scheiner, of sun-spot fame, Clavius, the author of the Gregorian reform of the calendar and the observer of Tycho Brahe's Nova of 1572, de Gottingues, who observed Jupiter's spots and the comets of 1664, 1665, and 1668, Boscovich, and other renowned astronomers were connected with it. There still exists in the Kircher Museum of the College a meridian line traced by Boscovich, and the same astronomer drew up the plans for a new observatory, but they were never carried into effect, on account of the troubles in France and Spain, during which the Society of Jesus was suppressed. During the period of the suppression, the observatory was directed at first by J. Callandrelli, who in 1773 built a square tower at the eastern angle of the facade of the College, and placed in it a zenith-sector and a meridian circle, the gifts of Cardinal Zelada and Pope Pius VII.