endeavouring to prove that heat is imponderable, and capable of being produced *ad infinitum*, from a finite quantity of matter, have again thrown some doubt on the subject. It is a well-known fact, that when water freezes it gives out such a portion of heat during its coagulation that if it were imbibed by an equal quantity of water, at the temperature of 32° of Fahrenheit's thermometer, the latter would be headed to between 140° and 170°. Hence it would appear that, if heat were a ponderable substance, a given quantity of water would become lighter, when frozen in a vessel hermetically sealed. Count Rumford, accordingly, made this experiment by the help of a balance of extreme accuracy; but the result was, that the ice produced appeared to be of precisely the same weight as the water had originally been, at the temperature of 61°, viz.: 4214-28 grains; from which he infers that all attempts to discover any effect of heat on the apparent weights of bodies will be fruitless. The following experiment was also made by the Count, to show the possibility of producing an infinite supply of heat from a finite quantity of matter, viz.—He caused a cylinder of brass to be turned 7¾ inches in diameter, and 9-8 inches long, which was bored like a cannon with a calibre 3-7 inches in diameter and 7-2 deep, so that the bottom was 2-6 inches in thickness. The hollow cylinder contained 385¾ cubic inches of brass, and weighed 113-13lbs. avoirdupoise. By means of the engine used for boring cannon in the arsenal of Munich, a blunt borer, or flat piece of hardened steel, four inches long, 0-63 inches thick, and 3½ inches wide, was kept with one of its extremities, whose area was two one-third square, to this hollow cylinder, on the inside, with the force of about 10,000lbs. avoirdupois, whilst the latter was turned about its axis with a velocity of 32 revolutions in a minute. The cylinder was, in one experiment, covered on the outside with a coating of flannel, to prevent the access of heat from the atmosphere. In another, the borer was made to work through a collar of leathers, so as to prevent the access of air also to the interior of the borer. In a third, the whole cylinder was immersed in water, the borer still working through a collar of leathers, so as to prevent its access to the interior of the bore. In a fourth, the collar of leathers was removed, and the water had access to the bottom of the interior of the cylinder where the friction took place. The result was, that in all these experiments heat was generated by the friction, in sufficient quantity, to cause about 26½lbs of ice cold water to boil in two hours and a half, or at about the same rate as that at which it would have been produced by nine large wax candles. The capacity of brass for heat, or its power of producing it by friction, did not appear to be diminished; and it seemed as if this generation of heat would have gone on for ever—if the friction had been continued the source was inexhaustible. Now as any thing which an insulated body, or system of bodies, can continue to supply without limitation, cannot possibly be an immaterial substance, the inference is, that heat is not of this description, but that it must be an effect arising from some species of corpuscular action amongst the constituent particles of the body. It appears, however, that neither of these experiments, nor any that have yet been made, are sufficiently conclusive in favour of the immateriality of heat. For in an indefinite series of immaterial substances, each a thousand times rarer than the preceding, though the weight of the heaviest be imperceptible to the nicest balance, the highest may, nevertheless, be ponderable. Have we any instrument that could discover the weight of a fluid that was only a million times lighter than atmospheric air? The latter experiment is, perhaps, more difficult to answer satisfactorily; and yet, notwithstanding all the precautions that were taken by the Count, it is by no means demonstrative that the heat evolved was not derived from some exterior source; for there is no absurdity in supposing that a body may be receiving *caloric* in one state, or at one part, and giving it out at another. We have an instance of this in electric fluid, the materiality of which is admitted by every one. "With regard to this part of the subject," says the same ingenious writer, whose sentiments we have already adopted, "it ought not to be omitted, that in another experiment by the Count, heat was found to be communicated through a *Torrecellian vacuum*." Now it is manifest that in such a vacuum there could be nothing to communicate *motion*. Heat, therefore, must be material; the conclusion is almost physically certain. Without further insisting, however, that it can be conclusively demonstrated, that there really exists such a substance in nature as caloric, it at least appears upon the whole, that in the present state of our knowledge we ought rather to consider it as a material substance, because of the two theories that which supposes it to be so, is infinitely the more intelligible, the more agreeable to the analogy of nature, and the less exceptionable. We shall accordingly regard it as an elastic fluid, *sui generis*, capable of pervading, with various degrees of facility, all the solid bodies with which we are acquainted; and of being imbibed and retained by them in different proportions, according to their respective degrees of specific attraction or capacity for it. It will readily be admitted, that from the elasticity and power of pervading other substances, which is evidently essential to this fluid, that whenever a body is by any means charged with a greater quantity than is proportional to its mass and capacity, when compared with other surrounding bodies, the surplus will be communicated to those neighbouring bodies, until the density of the fluid in every body of the system becomes equal. This state of density, or compression of the caloric, contained in a body, constitutes what is commonly called its temperature. All the properties of this element show that its particles are infinitely small, have no sensible adhesion to each other, and that they have a very rapid continual motion in all directions which appears to be essential to them. From what has been said, caloric appears to be a material substance essentially fluid, and many facts concur to prove that it is the only body which can with propriety be called so in nature, consequently the cause of fluidity in others. The effects of cohesion, a no less universal principle than gravity, are restrained and modified by the agency of caloric; and, as without inertia, all the celestial bodies would be drawn together into some one part of extended space, so without heat all matter in the universe would become a congealed and concrete mass, and fluidity, organization, vegetation, and life, could have no existence.

Ballymena. J. G.

THE COMET.

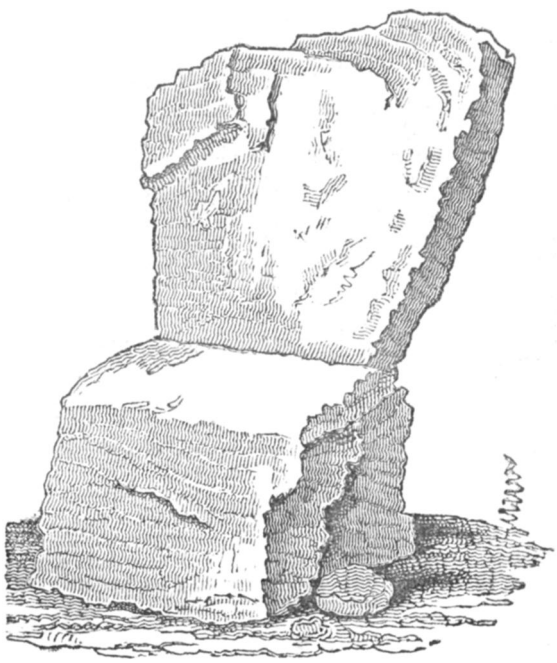
The little comet which at present excites so much the interest of astronomers and of the public, was first seen by Montaigne, at Limoges, in March 1772. It was soon afterwards observed by Messier, and on the 3d of April in the same year, a small telescopic star was seen by him shining through it, and was mistaken for a nucleus, or bright and solid body of the comet, such as many are found to possess; a more attentive examination, however, confirmed the suspicion suggested by its first appearance, that it had neither nucleus nor tail. In its appearance it resembled perfectly those faint nebulæ, or little clouds of light, which are seen in great numbers among the stars by the help of telescopes, in every part of the sky, and could only be distinguished from a nebula by observing that it shifted its place among the stars, and passed from constellation to constellation. In 1806, a little comet was observed, which passed the perihelion of its orbit, that is the point nearest to the sun, on the 2d of January in that year; it was not, however, at that time recognised to be the same comet which had been seen in 1772, nor was this identity perceived until the comet was re-discovered in 1826. On the evening of the 27th of February in that year, it was perceived by Biela, whose name it now bears, at Josephstadh, in Bohemia, as a small round nebulosity, which on the following evening had advanced about a degree towards the east, and had a little increased in size and brightness. Biela continued to observe it for some time. Gambart, at Marseilles, discovered it independently, on the 9th of March following, and from his observations, he concluded that it passed its perihelion on the 18th of the same month. The comet was observed soon afterwards, at Gottingen, by Harding, and at Altona, by Clansen; it disappeared about the beginning of the following May. The calculations of Gambart and of Clanson established the identity of the comet, thus discovered by Beila in 1826, with that of 1772, and with that of 1806, and shewed that this little body revolves about the sun in an ellipse or oval curve, the sun being out of the centre of the

oval by about three quarters of the half length of the oval; that is, as it is technically expressed, the linear eccentricity being about three quarters of the mean distance. The time of revolution was found to be about six years and three quarters; so that, although through its faintness it happened not to be perceived, it must have passed its perihelion five times in the interval from 1772 to 1806, and twice in the interval from 1806 to 1826. It was also an inference from the time of revolution thus found, that the comet would pass its perihelion again towards the end of 1832; and a more accurate calculation since made by Baron Damoiseau, in which the attractions of the planets, especially of Jupiter, were allowed for, conducted to the expectation that this perihelion passage would take place on the 27th of November, 1832. Whether this prediction has been verified to the very letter, it is difficult as yet to say, for the faintness of the comet has scarcely suffered it to be seen; it has, however, been perceived in the excellent telescopes of Herschel, and in a part of the sky but little differing from that expected.

H.

(To be continued.)

CORONATION CHAIR OF THE O'NEILS, OF CASTLEREAGH.



The curious piece of antiquity represented in the prefixed engraving, was for a long period the chair on which the O'Neils, of Castlereagh, were inaugurated, and originally stood on the hill of that name within two miles of Belfast. After the ruin of Con O'Neil, the last chief of Castlereagh, and the downfall of the family, in the reign of James the First, the chair was thrown down and neglected, till about the year 1750, when Stewart Banks, Esq. Sovereign of Belfast, caused it to be removed to that town, and had it built into the wall of the Butter Market, where it was used as a seat until the taking down of the Market-place a few years ago. It was then mixed with the other stones and rubbish, and was about to be broken, when Thomas Fitzmorris took possession of it, and removed it to a little garden in front of his house in Lancaster-street, Belfast, where it remained till the present year, when it was purchased from him for a young gentleman of cultivated mind and elegant tastes, R. C. Walker, Esq. of Granby Row, Dublin, and Rathcarrick, in the County of Sligo, who has had it removed to the latter place, where it will be preserved with the care due to so interesting a monument.

This Chair, which is very rudely constructed, is made of common whin stone—the seat is lower than that of an ordinary chair, and the back higher and narrower.

Respecting its antiquity, we have nothing to offer beyond conjecture. The branch of the O'Neils to whom it appertained, shot off from the parent stem in the 10th century, and is still represented by the present Earl O'Neil; but this inaugural chair may have belonged to the ancient chiefs of the district which they subsequently ruled. Such chairs, or sometimes mere large stones, on which the impression of two feet were sculptured, were placed in some elevated spot in every lordship or territory; and an allusion to them, as well as to the mode of electing the chiefs and tanists, occurs in the poet Spencer's curious "View of the state of Ireland."

Eudox. What is this which you call tanist and tanistry? these be names and terms never heard of nor known to us.

Iren. It is a custome amongst all the Irish, that, presently after the death of one of their chief lords or captains, they doe presently assemble themselves to a place generally appointed and knowne unto them, to choose another in his stead, where they do nominate and elect, for the most part, not the eldest sonne, nor any of the children of the lord deceased, but the next to him in blood, that is the eldest and worthiest, as commonly the next brother unto him, if he have any, or the next cousin, or so forth, as any is elder in that kindred; and next to him do they choose the next of the blood to be tanist, who shall next succeed him in the said captaincy, if he live thereunto.

Eudox. Do they not use any ceremony in this election? for all barbarous nations are commonly great observers of ceremonies and superstite rights?

Iren. They use to place him that shall be their captaine upon a stone, always reserved to that purpose, and placed commonly upon a hill; In some of which I have seen formed and engraven a foot, which they say was the measure of their first captain's foot; whereon hee standing, receives an oath to preserve all the auncient former customs of the countrey inviolable, and to deliver up the succession peaceably to his tanist, and then hath a wand delivered unto him by some whose proper office that is; after which, descending from the stone, he turneth himself round, thrice forwards and thrice backwards.

Eudox. But how is the tanist chosen?

Iren. They say he setteth but one foot upon the stone, and receiveth the like oath that the captaine did.

There was, and probably still is, another stone chair on which the O'Neil's of Tyrone, the chief branch of the family, were inaugurated. It is marked in some of our old maps under the name of—"The stone where they make the O'Neils." And there are similar chairs to be found in other districts.

This curious mode of inauguration is of very remote antiquity in Ireland, and said to have been introduced even before the arrival of the Milesians by the Tuatha de Danan colony. Our readers are, no doubt, familiar with the history of the stone coronation chair, now in Westminster Abbey, called "The Fatal Stone," which that ancient people are said to have brought with them into Ireland, and to which such superstitious veneration was paid, not only here but in Scotland, It was supposed that in whatever country this stone was preserved, a prince of the Scythian race should govern, and, in consequence of this belief, was sent to Scotland for the coronation of Fergus the first King of the Scots, and who was of the blood royal of Ireland. Here it remained, and was used by the subsequent monarchs, till in the year 1296 it was conveyed to London by Edward the First, where it has been ever since appropriated to the same purpose.

We shall have frequent opportunities in our future numbers of returning to the history of the illustrious family of the O'Neils, and in the meantime present our readers with an engraving of their arms—the bloody hand—from an impression from the silver signet ring of the celebrated Turlough Lynnoch. It was found a few years ago near Charlemont, in the county of Armagh, and is at present in the possession of a gentleman of that county.

P.

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