

NATURE (vol. xxiv. p. 124). It was, I should think, almost unique in a scientific journal. It turned upon a contradiction which he had detected between a statement which I never made and the fact that he surely entertained an impression that he had somewhere or other (he did not say where) seen me quoted as holding an opinion at variance with that statement. I did not think that time would be well employed in answering it. Even now he talks of his "quotation or misquotation"; a convenient but unusual latitude of expression for a serious case of the latter of these alternatives. Really I am not in the examination-room, and will not therefore attempt to compress into a few paragraphs the answers I should give upon intricate philosophical points, even were the questions reasonably framed. Moreover I must remind Mr. McColl that he does not profess to write as an impartial inquirer or critic, but asked for the insertion of his letter upon the ground that he conceived himself to have been attacked. I have fully explained the only point upon which he had any claim to call for an answer, and therefore now close the correspondence. J. VENN

Achensee, Tirol

### Jupiter

THE great red spot on the planet seems unchanged as I saw it on July 8, while the north temperate zone belt (Gledhill's No. 2) shows a development nearly as striking as the equatorial belts.

Millbrook, Tuam, July 20

J. BIRMINGHAM

### New Red Variable

THIS star, which I found on May 22 only 9 magnitude (see NATURE, vol. xxiv. p. 164), progressively increased up to 8 m. on June 6, and is now again no more than 9. Its deep crimson colour is unchanged. It is  $2^{\circ} 51' 7''$  north of  $\alpha$  Cygni, and forms, with three other stars, the southern end of a little inverted and irregular cross. It will probably decrease to complete disappearance, at least from telescopes of moderate power.

Millbrook, Tuam, July 20

J. BIRMINGHAM

### A Fireball

ON Wednesday the 20th ult., about midnight, a house at Mont Dore, in the Auvergne, was destroyed by a fireball during a severe thunderstorm. My brother, who has lately arrived from thence, did not see the ball himself, but his valet, an intelligent Italian, saw it distinctly. He describes it as a globe of fire about half a metre in diameter, which approached the house obliquely, seeming to pass over a distance of 200 metres in about half a minute. It entered the door of the house and there burst. My brother heard the explosion as well as his valet, and describes it as a dull thud like that of a smothered blast. The house, which was a wooden one, was set on fire, a child burnt to death, and another inmate seriously, if not mortally, injured. Several inhabitants of Mont Dore are said by the valet to have seen the ball, one of whom lived in the adjacent house.

It will be interesting to readers of NATURE to compare the accounts given by Prof. Tait in NATURE, vol. xxii. p. 409.

19, The Boltons, S.W.

JOHN TENNANT

### Meteor

ON July 23, at 7.15 p.m. (Irish railway time) a meteor passed, travelling nearly from south to north, being lost in a bank of black cloud. It must have been of considerable brilliancy, as it was quite distinct, although at the time the sun was well above the horizon. July 22 from ten to fourteen brilliant red pencils and thin columns of auroric lights were rising at intervals. There were also auroric lights on July 23 between 11 and 12, but much less brilliant.

Ovoca, July 24

G. H. KINAHAN

### THE COMET

WE have received the following further communications on this subject:—

The following "Preliminary Note on the Photographic Spectrum of Comet  $\delta$  1881," has been communicated to the Royal Society by Dr. Huggins, F.R.S. (For Dr. Huggins's first note on this subject, see NATURE of June 30.)

ON the evening of June 24, I directed the reflector furnished with the spectroscopic and photographic arrangements described in my paper "On the Photographic Spectra of Stars" (*Phil. Trans.*, 1880, p. 669) to the head of the comet, so that the nucleus should be upon one half of the slit. After one hour's exposure the open half of the slit was closed, the shutter withdrawn from the other half, and the instrument then directed to Arcturus for fifteen minutes.

After development, the plate presented a very distinct spectrum of the comet, together with the spectrum of the star, which I have already described in the paper referred to above.

The spectrum of the comet consists of a pair of bright lines in the ultra-violet region, and a continuous spectrum which can be traced from about F to some distance beyond H.

The bright lines, a little distance beyond H, with an approximate wave-length from 3870 to 3890, appear to belong to the spectrum of carbon (in some form, possibly in combination with hydrogen), which I observed in the spectra of the telescopic comets of 1866 and 1868.

In the continuous spectrum shown in the photograph, the dark lines of Fraunhofer can be seen.

This photographic evidence supports the results of my previous observations in the visible spectra of some telescopic comets. Part of the light from comets is reflected solar light, and another part is light of their own. The spectrum of this light shows the presence in the comet of carbon, possibly in combination with hydrogen.

On the next night, June 25, a second photograph was obtained with an exposure of an hour and a half. This photograph, notwithstanding the longer exposure, is fainter, but shows distinctly the two bright lines and the continuous spectrum, which is too faint to allow the Fraunhofer lines to be seen.

*Postscript, July 9, 1881.*—I have since measured the photographs of the comet's spectrum, and I find for the two strong bright lines the wave-lengths 3883 and 3870. The less refrangible line is much stronger, and a faint luminosity can be traced from it to a little beyond the second line 3870. There can be, therefore, no doubt that these lines represent the brightest end of the ultra-violet group which appears under certain circumstances in the spectra of the compounds of carbon. Professors Liveing and Dewar have found for the strong line at the beginning of this group the wave-length 3882.7, and for the second line 3870.5.

I am also able to see upon the continuous solar spectrum, a distinct impression of the group of lines between G and h, which is usually associated with the group described above. My measures for the less refrangible end of this group give a wave-length of 4230, which agrees as well as can be expected with Professors Liveing and Dewar's measure 4220.

In their paper "On the Spectra of the Compounds of Carbon" (*Proc. Roy. Soc.*, vol. xxx. p. 494), Professors Liveing and Dewar show that these two groups indicate the presence of cyanogen, and are not to be seen in the absence of nitrogen. If this be the case, the photograph gives undoubted evidence of the presence of nitrogen in the comet, in addition to the carbon and hydrogen shown to be there by the bright groups in the visible part of the spectrum. On this hypothesis we must further suppose a high temperature in the comet unless the cyanogen is present ready formed.

I should state that Mr. Lockyer regards the two groups in the photograph, and the groups in the visible spectrum, to be due to the vapour of carbon at different heat-levels (*Proc. Roy. Soc.*, vol. xxx. p. 461).

It is of importance to mention the strong intensity in the photograph of the lines 3883 and 3870, as compared with the continuous spectrum, and the faint bright group beginning at 4230. At this part of the spectrum, there-

fore, the light emitted by the cometary matter exceeded by many times the reflected solar light. I reserve for the present the theoretical suggestions which arise from the new information which the photographs have given us.

THE second evening of its appearing I examined the head of this comet with a McClean spectroscope (with slit) and also with a Hilger's half-prism instrument (a half-size model of the Greenwich one).

The appearances were mainly those seen by other observers, viz., a bright continuous spectrum from the nucleus and a much fainter one crossed by bright lines from the coma. There were however two points of interest which struck me, as I see by NATURE, vol. xxiv. p. 261, they did M. Thollon in Paris. These were: (a) The continuous spectrum from the nucleus had a mottled or striated look, but I could not be certain whether dark lines or bright lines or spaces predominated in causing this effect; (b) the presence of shorter and additional lines to the three carbon ones, extending beyond the continuous spectrum.

These appearances, I admit, I only recognised indistinctly and with doubt at the time, but, corroborated as they now seem to be, I do not question that there was some ground for them. With reference to the nucleus spectrum it could only have comprised a small portion of solar light as shown by the few Fraunhofer lines detected by Dr. Huggins and others in it. The residue of the bright stripe has been attributed (because continuous) to some incandescent solid or liquid substance; but is this necessarily the case? Is it not possible that the matter yielding this spectrum is still in a truly gaseous form, and do not the appearances above described rather point to the character of a gas spectrum passing from the line or band condition to the continuous one, under its existing circumstances of ignition, pressure, &c. (whatever these may be)?—an effect not without parallel, I fancy, at least in the case of hydrogen.

J. RAND CAPRON

Guildown, July 23

A COMET is now visible here. I saw it last Thursday, June 30, at 3:10 a.m. It was in the west, and appeared to me about 30° from the pole star, and 20° above the horizon. The tail was straight and directed towards the pole star. A local paper says this comet was seen to the east at 8 p.m. the preceding day, and that the tail was 20° in length—it appeared to me only 5°.

I regret I cannot send fuller information, but probably the comet is to be better seen in England.

Karachi, July 2

F. C. CONSTABLE

### SEA-SHORE ALLUVION

IT is somewhat remarkable at the present day to find even professional men, when dealing with works of coast defence, attributing the movement of littoral shingle to the tidal currents.

The late Mr. Palmer, C.E., in a well-known paper read before the Royal Society nearly half a century back, Col. Reid, R.E., in an essay published in the commencement of the series of quarterly papers by officers in the corps of Royal Engineers, Mr. Redman, M.Inst.C.E., in a paper on the South Coast of England, read before that society some thirty years back, and another on the East Coast of England seventeen years back, as well as in very numerous reports made by him for a Government department (the War Office) during the last quarter of a century, have all shown that these shingle formations are in no way affected by the tide, which must exercise only a negative influence, the flood and ebb setting in contrary and opposite directions, equal in duration, and neutralising each other. Shingle moles are in effect resultant on the wind waves alone, and are deposited in two parallel ridges or hummocks locally termed "fulls," marking the relative range of neap and spring tides, the

crest of the last being normally (except in some exceptional cases such as the *Chesil*) ten feet above high water of spring tides with a broad, gently sloping foreshore of sand down to low water; an abnormal tide, resultant on exceptional gales occurring at rare intervals, sometimes breaches the crest and produces great mischief, as at Seaford on the Sussex coast a few years back, which was inundated by the sea, and where the authorities are about to carry out artificial works of defence.

The prevailing movement in the English Channel is to the eastward, or up Channel, due to the fact that south-west winds prevail for nine months in the year; and along the East Coast the movement is southward, due to the particular trend of the coast and the North Sea offing. It really hardly appears necessary to insist on these well-known facts to any one practically acquainted with the subject, or to hydraulic engineers conversant with the surrounding physical conditions of our tidal harbours, estuaries, and rivers.

Notwithstanding this, strangely enough we find a contemporary journal, the *Engineer*, in a series of articles on the Brighton, Hove, and Shoreham beaches, professedly written for the education of public opinion on the subject, themselves ignoring the fundamental laws governing the motion of this marine alluvion, and attributing it to tidal currents instead of to the wind waves, and yet insisting at the same time that the question, as doubtless it is, is an imperial one, demanding the attention of the Legislature.

Thus, October 3, 1879, "Brighton Beach" (*The Engineer*):—

"A very strong tidal current sets up the Channel to the eastward, and sweeps with it the rolling shingle" (*sic*).

"So rapidly did this disappear under the influence of this current that it became necessary to stay its travel by the erection of heavy timber groynes."

"Knowing what we do also of the effect of sea currents, it is in our opinion exceedingly questionable if their carrying powers can be arrested by anything short of a check which shall produce almost dead water"

One of the last papers read at the Institution of Civil Engineers, on "Upland and Tidal Scour," also attributes the movement of the Norfolk and Essex beaches to the tidal currents.

Nor are local authorities, highway boards, vestries, district boards, and large landowners any more at one than these would-be educators of public opinion on the subject, for we find farmers as a rule sending down their teams and waggons to the sea-shore during winter slack time to collect boulders and pebbles from the sea moles of Nature's forming; railway companies where allowed, and a convenient communication effected, removing it wholesale for ballast of the iron road; lords of the manor conveying it equally wholesale to shipping craft for ballast, until stopped by the strong arm of the law brought to bear on the question by some Government department.

Local magistrates are equally offenders, as recently, about twelve months back, the magistrates sitting at Canterbury authorised their surveyor, after long discussion, as the order was given with the fear of an impending injunction hanging, "Damocles" like, over their heads, to quarry shingle from the sea-shore at Herne Bay for the repairs of the highways; thus robbing the supply travelling up the estuary of the Thames to the westward (the general movement of the belt of shingle being diverted up such estuaries as those of the Thames, Wash, &c.), the material being at the same time so much wanted along the Blue Town frontage at Sheerness, where grave fears have long prevailed, due to the insufficiency of the sea-shore works of defence. This Canterbury decision, taken in the month of January in last year, appeared to us at the time the extreme of rashness, when the interests to