underneath the observer, and the distance from crest to crest 1,125 ft., and so the one would be one-tenth of the other.

It may be suggested that such measurements would be more reliable if taken from a point above, on the tops or shrouds of the masts of a ship (*vide* Admiralty Manual, p. 94, for directions), so that one could just get a view of the upper horizontal level, so as to see the crests of the other waves advancing.

This computation of wave height much exceeds previous recorded observations by double the amount, so that there may be some error in apprehension, or in statement of the account, or in the calculation.

Dr. Scoresby's observations in the North Atlantic record 24 ft., 30 ft., the highest 43 ft., and the mean 18 ft., in westerly gales; and the frigate *Novara*, 20 to 30 ft. off the Cape Promontory.

French observers in the Bay of Biscay state a height of wave of 36 ft.; Capt. Wilkes, U.S.N., writes of 32 ft. in the Pacific, and Sir J. Ross of 22 ft. in the South Atlantic.

Heights of waves in N.W. gales off the Cape of Good Hope were computed at 40 ft., those off Cape Horn at 32 ft., in the Mediterranean seas at 14 ft. 10 in., and in the German Ocean at $13\frac{1}{2}$ ft., but in British waters they are only found to average 8 to 9 ft.

The velocity of ocean storm waves was observed by Dr. Scoresby in the North Atlantic to be about 32 miles per hour; Capt. Wilkes recorded it at $26\frac{1}{2}$ miles in the Pacific, and French sailors in the Bay of Biscay at 60 miles an hour; and I have noted it myself in the South Indian Ocean at $22\frac{1}{2}$ miles an hour in the great westerly swell after gales.

Further, Dr. Scoresby has estimated the distance between or breadth of his Atlantic storm waves at about 600 ft. from crest to crest, which is only about half of that stated in the letter, and with a proportion of only $\frac{1}{20}$ for height to breadth. (*Vide* Report, British Association, 1850.) Dr. Scoresby states that his waves of 30 ft. in height move at the rate of 32 miles per hour, which hardly accords with the observers of 110 ft. in height, with 25 miles per hour of motion. It would be very desirable that more data should be got on storm waves, for here is another discrepancy of proportion of length to breadth of $\frac{1}{10}$ to $\frac{1}{20}$, which cannot be surely common or correct.

The accompanying diagram is constructed according to Dr. Scoresby's scale of measurements, 600 ft. breadth, 30 ft. height, and 220 ft. vessel, with rates of wind, wave, and vessel, and from it one may ponder on what small dimensions these terrific looking waves are constructed, and that a ship after all looks only like a cork or chip on the great seas.

The account of the peculiarities of storm seas, also therein mentioned, from the S.W. and N.W. directions in the Atlantic, may be extended to the effects of other winds elsewhere on the ocean surface.

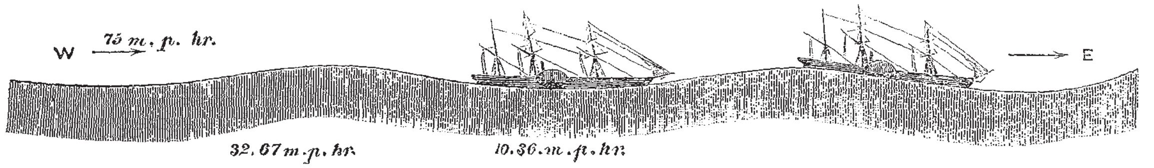
North-east gales in the North Atlantic, and south-east ones in the South Atlantic, appear to have similar effects on the seas and vessels exposed to them.

The waves raised are short, brisk, feathery, and clear, and make a peculiar rushing din, and they do not cause a ship to plunge so much as to roll, and are not accompanied by wet so much as by dry weather.

They are generally not dangerous to navigation in the open sea, as they carry light, clear, swift driving clouds, which do not obstruct marine observations or a view of the horizon all round.

On the other hand, the north-west gales in both hemispheres are attended by heavy, dark, rolling waves of huge bulk, momentum, length, and breadth, up which a ship is driven like up a hill-side, and down which it scuds as into a valley.

Here the vessel plunges more than she rolls, and is subject to lurches on one side or other, and labours much in consequence of the wetness of the sails and rigging, increasing the weight of the top hamper and its hold by the gales.



These winds are more dangerous to navigation, as they are accompanied by thick heavy clouds lying low in the atmosphere, and shedding much rain and obstructing the view of the horizon all round, and so prevent marine observations by day or by night.

The grand westerly gales of the northern hemisphere, seen on the passage to and from America, occur amongst the latitudes of the counter trades, and are reciprocated by the similar belt in the southern hemisphere below 40° latitude, and are called by Maury the "brave west winds."

This region is traversed by the Australian and New Zealand liners, south of the Cape, and the voyages along this tract are as exciting as a race, and the ship is in much the same predicament as the man in the song with a steam leg.

As much sail as can be safely and possibly carried is spread, as speed is a vital necessity in order to keep the canvas and rigging from being blown away, and to prevent the ship being pooped by a following wave.

The frail bark then boldly scuds along before the wind, down one mountain wave and up another, with cordage creaking and masts bending, as fearless as the wild albatross following in its wake, or the gay porpoise careering in its front.

The difference to the passenger between these two classes of winds seems mainly to depend upon their wetness or dryness, so that the rainy weather adds to the discomfort of the one and the clearer weather in the other gives him some consolation in the storm.

The ship itself would no doubt have a preference, while in the one case its canvas and cordage are soaked with water and its decks deluged or sloppy; in the other its rigging is allowed to retain its natural trim, or even to get slackened by over-dryness, and the decks remain comparatively dry.

As to the waves themselves, it still remains to be explained why they should be greater with winds laden with rain than with dry winds, in the open sea and far away from land, unless the weight of the atmosphere above them should be allowed to count, as the barometer rules higher of course in the north and south easterly winds than in the north or south westerly gales.

Admitting there might be a difference in certain instances, even over the same tract of latitude, of one inch in the height of the mercury in the barometer between westerly and easterly gales, we may find on calculation that this would make a difference of 896,091 tons of weight of the superincumbent atmosphere on the surface of a square mile of the sea. This difference of atmospheric pressure would cause or allow a greater mobility to impression by the winds in the seas outside the tropics and under low barometric indication anywhere, and also a tendency in them to flow in towards these regions, and into storm tracts, as is narrated in accounts of cyclones, where great floods are sometimes produced.

The movements of the ocean swells after gales, it may be hazarded, might be accelerated by the tendency of the disturbed equilibrium to restore itself in the efflux of the seas from the storm region to calmer exteriors.

There might therefore appear to be as much movement and commotion in the waters below as there are in the atmosphere above, in all disturbances of the equilibrium mutually arranged between these two fluid coverings to the surface of the earth.

Edinburgh J. W. BLACK

Walker's System of Geometrical Conics

IT is remarked in NATURE, vol. xi. p. 404, that Walker's "generating" circle appears to have dropped out of recent textbooks; but I may be allowed to add to the statement of your reviewer that Walker's method was revived in the *Messenger of Mathematics*, vol. ii. p. 97. I had been acquainted with his method for some years previously, and had communicated it to several mathematicians, but omitted it from my elementary "Geometry of Conics" (1872), hoping that I might soon have leisure to develop it more fully in a larger work. Shortly before the publication of my article in the *Messenger*, Mr. R. W. Genese rediscovered the circle and its properties. Mr. Day uses this circle in his work on the Ellipse (1868), but has overlooked one of its characteristic properties. C. TAYLOR

St. John's College, Cambridge

Destruction of Flowers by Birds

"P. B. M.," in NATURE for April 1, refers to the destruction of the crocuses in a garden at Burton-on-Trent, by birds. This may also be observed in the flower-beds in Hyde Park, near Park Lane. It is remarkable, however, that while the yellow flowers are very extensively destroyed, the white ones remain uninjured. The reason for this is not very evident, and I should be glad to see it explained. C. ROBERTS

Bolton Row, April 6

OUR ASTRONOMICAL COLUMN

RED STARS, &c.—We lately referred to the incompleteness of the first catalogue of isolated red stars formed in 1866 by Prof. Schjellerup of Copenhagen. In the last part for 1874 of the *Vierteljahrsschrift der Astronomischen Gesellschaft* is a second and much extended catalogue by the same astronomer. The first list, which was published in *Astron. Nach.*, No. 1,591, with additions in No. 1,613, contained 293 stars; in the new catalogue the number is upwards of 400. The notes attached have also been considerably extended. The author remarks that his first list was instrumental in the discovery of a number of variable stars, and that Secchi found in it many stars of his Type III. and the whole of Type IV. Those who are interested in the discovery and observation of variable stars will do well to provide themselves with Schjellerup's new catalogue. The same part of the *Vierteljahrsschrift* (which accidental circumstances have delayed in publication) contains an ephemeris of most of the variable stars for the year 1875; also a notice of Prof. Schönfeld's researches on S Cancri from observations to April 1872; the period is found to be 9d. 11h. 37m. 45s., and the epoch of minimum is fixed to 1867, August 31, at 14h. 12m. 15s. Paris mean time. This star has long been known to resemble Algol in its law of variation; the diminution of light commences somewhat suddenly, 8½ hours before minimum, and about 13 hours after minimum the star recovers the brightness at which it continues to shine for the greater part of its period.

THE COMET OF 1812.—Of those comets discovered during the present century which appear to have periods of revolution approximating to that of Halley's Comet, it is probable that the one detected by Pons at Marseilles on the 20th of July, 1812, will be the first to revisit these parts of space, and this visit may be looked for within a few years' time. We are indebted for our knowledge of the elliptical form of this comet's orbit to Encke, who, working when assistant at the Observatory of Seeberg under the guidance of his "great tutor Gauss," discovered early in the year 1813 that no parabola would represent the observations, and that an ellipse with a period of revolution rather exceeding seventy years was very far preferable. His further and definitive investigation of the elements is found in *Zeitschrift für Astronomie*, ii. p. 377. He made use of observations between July 23 and Sept. 27, taken at Paris, Marseilles, Vienna, Milan, Seeberg, Bremen, Berlin, and Prague, 110 in number, and finally arrived at an elliptical orbit, with a period of 70·69 years, the probable uncertainty of this result allowing of it being as short as 66·54 years, or as long as 75·27 years. Encke does not appear to have had the advantage of the original observations taken at Paris, which appear in the folio volume of observations 1810-20, nor yet of the original observations by Flaugergues at Viviers, which were not printed until the end of the year 1820, when they found their way into Zach's *Correspondance Astronomique*. Mr. W. E. Plummer, of the University Observatory, Oxford, has reduced the Paris and Viviers observations with every care, and, making use of Leverrier's Solar Tables, has deduced an ellipse quite verifying Encke's computations; he has hopes of being able to assign limits to the period of revolution. We are also informed that the return of this comet is engaging attention at the Observatory of Strassburg, and that under Prof. Winnecke's superintendence sweeping ephemerides will be prepared there to facilitate the rediscovery of the comet. It approaches nearer to the orbit of Venus than to that of any other body in the planetary system, but there could have been no material perturbation from this cause during the last appearance. The comet was detected by Bouvard at Paris on August 1, 1812, and it was also independently discovered on July 31 by Wisniewski (the last observer of the great comet of 1811), at Novo Tcherkask, as stated in a letter from Von Fuss to Bode, though he is not credited with this discovery in our cometary catalogues. The other comets which appear to have periods of revolution of similar length are the comet of 1815, usually known as Olbers' Comet, which is the subject of a masterly investigation by Bessel in the Berlin Memoirs, 1812-15; the comet discovered by De Vico at Rome, 1846, February 20, of which the best orbit is by Van Deinse, in his "Inaugural Dissertation," Leyden, 1849; and the comet detected by Brorsen at Altona, 1847, July 20, which has been calculated by D'Arrest and Gould, but may yet admit of further investigation.

METEOROLOGY IN ENGLAND

THE address of the President and Report of the Council of the Meteorological Society of England for the present year will be read with a lively interest, awakened and strengthened by a growing conviction that the Society has reached a critical turning point in its history. Hitherto the Society has been regarded as little more than an association of amateur meteorologists,—the national work, falling properly within the province of such a society, of collecting the data of observation for the elucidation of the laws of the weather and climate of England, having been independently carried out by their late energetic, able, and popular secretary, Mr. Glaisher, whose great and in many respects valuable labours in this department are somehow passed over in the documents before us.

The Society, however, has now resolved to undertake the work of collecting meteorological statistics, and in carrying out this resolution has already established ten stations pretty well distributed over different districts of England. It is fitting that on private observers should fall the labour of investigating Climatic Meteorology, leaving the Government to look after the physical side of the science. In making it imperative on all their observers that verified instruments alone be used, consisting of at least a barometer, dry and wet bulb thermometers, maximum and minimum thermometers, and a rain gauge; that the adoption of Stevenson's Thermometer Box be a *sine quâ non*, and that it be not placed within ten feet of any wall; that the rain gauge has its rim placed one foot above the ground; and that the hours of observation be 9 A.M. and 9 P.M.—the Society deserves our hearty commendation.

We must, however, point to a serious omission in the system of observation which has been adopted. No imperative condition is laid down, and no recommendation made, so far as we can see, with reference to the vital question of the height of the thermometers above the ground. If this point be not definitely settled and made an imperative condition of observation, the Society will collect materials on which no scientific inquiry into the climate of England can be based, and on which little, if any, scientific value can be placed. The