solid body, the currents mentioned above with reference to the iron must necessarily be far less strong.

"With similar modifications according to the temperature required for their liquefaction the swimming takes place with all other metals."

Tycho Brahe's Portrait

IN NATURE (vol. xv., p. 406) is published a copy of a portrait of Tycho Brahe in the possession of Dr. Crompton of Manchester. Although it seems, from the inscription in the corner, that the portrait is a contemporary one, there does not appear to me to be sufficient reason for preferring this portrait, of the origin of which nothing whatsoever is known, to others of the same date. Both Tycho's "Epistolæ" and "Mechanica" contain an engraving by J. D. Geyn from the year 1586, and if the newly-discovered portrait really (as conjectured by Dr. Crompton) should have been painted to be engraved for the "Mechanica," it can hardly have been considered a good likeness, as the engraving by Geyn was preferred. The latter is very like the portrait on Tycho's large wall-quadrant, of which an engraving in the "Mechanica" gives us an idea, and which Tycho himself mentions with the following words:—"Hanc effigiem magna solertia expressit Thobias Gemperlinus eximius artifex (quem mecum Augusta Vindelicorum in Daniam olim receperam) idque tam competenter, ut vix similior dari possit." This portrait is from 1587.

The Royal Gallery at Frederiksborg (about twenty English miles from Copenhagen) contained a fine portrait of Tycho Brahe, which unfortunately was burned in the great fire in 1859, when so much of that beautiful castle was destroyed. It agreed on the whole with the two above-mentioned portraits, while the long narrow face on the Manchester portrait shows hardly any resemblance to the features on the others. I may also add, that the fine monument erected by Tycho Brahe's heirs in the church in Prague (Teinkirche), where he was buried (of which I have seen a copy in Copenhagen), is very like Geyn's and Gemperlin's engravings.

The article which accompanies the portrait in NATURE contains several small mistakes, which perhaps also occur in Brewster's "Martyrs of Science." Tycho was not born in Sweden but in Denmark, as the province of Schonen (with the island of Hven) belonged to the latter country from ancient times and up to 1660, and he was of an ancient Danish noble family. His castle was called "Uraniborg" (Latin Urani-burgum, the Celestial Castle), the Observatory "Stjerneborg" (Stellæburgum).

J. L. E. DREYER

Observatory, Birr Castle, Ireland

Yellow Crocuses

CAN any of your readers elucidate this problem? When, a fortnight ago, the yellow crocuses flowered, the sparrows all at once made a terrible onslaught upon them. I found the gardener in Lincoln's Inn Gardens one day mourning over a fine line of crocus plants, every flower of which was in absolute ruins. All the work of the sparrows, he said. I have seen them, too, on the flower-boxes in my windows here frequently, tearing at the crocus blooms. Yet now, later, the blue and striped crocuses are blowing, and the sparrows leave them altogether untouched. What is there in the London bloom specially that attracts the London sparrow? The taste is, I think, peculiar to the town bird. In gardens at a distance from, and immediately around, London, I have watched plenty of yellow crocus blossoms, not one flower of which has been attacked.

Gray's Inn, April 6

ALFRED GEORGE RENSHAW

Tropical Forests of Hampshire

IN Mr. J. Starkie Gardner's lecture on The Tropical Forests of Hampshire (NATURE, vol. xv. p. 232), the following statement occurs which is open, I think, to considerable question:—"All the shipworms generally known to us live only in salt-water, and are so delicately organised that the slightest mixture of fresh-water instantly kills them." This sweeping assertion is partly qualified by allusion to the occurrence of a species described by Mr. George Jeffries as inhabiting fresh-water, and the fact of bored wood being found 300 miles up the Gambia River; still as Mr. Gardner speaks of these facts as a "theory" still in need of verification, I would point out that no waters are more infested with the shipworm than the deltas of tropical rivers wherein the water is often largely brackish if not potable.

My own experience is confined to the delta of the Irawadi, a

tangled maze of creeks, the waters of which are brackish or salt for about a third of the year, and slightly so, and even potable, during the other months. The large canoes, however, which traverse these creeks are much injured by some species of shipworm, and so little does the easy remedy of exposing them to fresh-water answer, that the Birmese are in the habit of firing their bottoms from time to time; opportunity is taken of a high spring tide to get the boat well on shore. The ends are supported on blocks of wood, and a shallow saucer-shaped cavity is made underneath which is filled with straw or other combustible matter, which gives a fierce but short-lived flame. Fire is now applied and the bottom of the boat is for some minutes kept wrapt in flame, which steams the worms to death in their holes. I cannot recall any instances of bored wood well above the tide-way, but wherever the water is occasionally brackish, thus far the worms seem capable of settling. What species occur in Pegu I cannot say. Percival Wright has described *Nausitora dunlopei* from the rivers of Eastern Bengal, and it may not improbably extend to the Irawadi delta, as *Novaculina gangetica* and a species of *Scaphula* closely allied to the Gangetic species do. The two Birmese species of *Scaphula* are both estuary forms, whereas the type of the genus in the Ganges is found a thousand miles from the sea, which suggests the plasticity of some species, which if met with fossil would be unhesitatingly regarded as marine.

Camp, Jhilm District

W. THEOBALD,
Geological Survey of India

Hog Wallows or Prairie Mounds

IN NATURE (vol. xv., p. 274), Mr. Wallace quotes a letter from his brother in regard to the so-called Hog-wallows of California, in which their origin is ascribed to debris left at the broad foot of a retiring glacier modified by the erosion of innumerable issuing rills, and asks if this structure is known to occur elsewhere. As I have observed the same formation in many parts of the Pacific slope and have tried to explain it, I hope I may be allowed to say a few words on the subject.

The peculiar configuration of surface so well described by Mr. Wallace, is very widely diffused in America, and has been described under different names. In California the mounds are called *Hog-wallows*, but elsewhere they are known as *Prairie mounds*. This latter is the better name since they are found only in grassy, treeless, or nearly treeless regions. They occur over much of the Prairie region or "plains" east of the Rocky Mountains; also over portions of the basin region, e.g., in Arizona; also over much of the bare grassy portions of California, e.g., along the lower foothills of the Sierra and adjacent portions or the San Joaquin plains; also over enormous areas in Middle Oregon, on the eastern slope of the Cascade mountains, an undulating grassy region; also on the level grassy Prairies about the southern end of Puget Sound, Washington territory.

They have been ascribed to the most diverse causes. In Texas, where they are very small, Prof. Hilgard thinks they are *ant-hills*. In Arizona, where they are also imperfectly developed, Mr. Gilbert thinks they are the ruined habitations of departed *Prairie dogs*. In some portions of California, also, where they are small, they have been popularly ascribed to *burrowing squirrels*. In the Prairies, about Puget Sound, where they are splendidly developed, their great size and extreme regularity has suggested that they are *burial mounds*, and that the Prairies are veritable cities of the dead. It is possible that the cause may be different in different places, but I am sure that no one who has examined them in California, and especially in Oregon and Washington, can for a moment entertain any of these theories for the Pacific slope.

In a paper "On the Structure and Age of the Cascade Mountains," published in the *American Journal* for March and April, 1874, p. 167 and p. 259, among some miscellaneous points suggested by the main subject in hand, I discuss this one of *Prairie mound*. I there attribute them to *surface erosion under peculiar conditions*, these conditions being a *bare country* and a *drift-soil finer and more movable above and coarser and less movable below*. Erosion removes the finer top-soil, leaving it only in spots. The process once commenced, weeds and shrubs take possession of the mounds as the best soil, or sometimes as the driest spots, and hold them, preventing or retarding erosion by their roots. In some cases, perhaps in most cases, a *departing vegetation*, i.e., a vegetation gradually destroyed by increasing dryness, seems to be an important condition. For my full reasons for holding this view I must refer the reader to my paper, but I may say in passing that in the bare hilly regions of Middle Oregon, on the

east side of the Cascade Mountains, every stage of gradation may be traced from circular mounds, through elliptic, long elliptic, to ordinary erosion furrows and ridges.

Mr. Wallace asks in conclusion whether so extensive and uniform a deposit could be due to *glaciers* alone, or is it necessary to suppose *submergence*?

In answer I would say that nothing is to me more puzzling than the drift deposits on the Pacific slope, and I suppose the same is true everywhere. The prairies about Puget Sound have evidently been submerged during the Champlain epoch, and I suppose the mound structure to have been formed after emergence, and the exceptional perfection of the mounds in that region may be due to this fact. But there is not the slightest evidence of submergence in the mound region of Oregon. All the high, bare, grassy, hilly, eastern slopes of the Cascade Mountains are covered evenly with a pebble and boulder drift, graduating upwards into a finer top soil. From this surface-soil are carved the mounds, which cover hill and dale so thickly that, viewed from an eminence the whole face of the country seems broken out with measles. This universal drift-covering, twenty to thirty feet thick over thousands of square miles, I know not what to call it, unless it be the *moraine profonde* of an ice-sheet.

JOSEPH LE CONTE

University of Cal., Oakland, Cal., March 6

OUR ASTRONOMICAL COLUMN

WINNECKE'S COMET, 1877, II.—In a note by Prof. Winnecke in M. Leverrier's *Bulletin* of April 13, it is remarked with respect to the elements of the comet discovered by him on April 5, "a great analogy exists between these elements and those of the comets 1827, II., and 1852, II., and it acquires a certain importance from the fact that the intervals are nearly equal."

The second comet of 1827 was discovered by Pons at Florence and Gambart at Marseilles, on June 20, and was observed at Florence until July 21; the original observations will be found in *Astron. Nach.*, No. 128. The best orbit is by Heiligenstein.

The second comet of 1852 was detected by M. Chacornac at Marseilles on May 15, and was observed at Vienna till June 8. On the suggestion of d'Arrest, the elements were calculated by Hartwig, without any assumption as to the eccentricity, and the resulting orbit proved to be a hyperbola, which, as d'Arrest remarked, rendered the identity of this comet with the second of 1827, which had been suspected by several astronomers very unlikely. Now, however, that a comet has made its appearance after a like interval with elements bearing a certain resemblance to those of the comets of 1827 and 1852, it may not be without interest to examine into the possibility of identity a little further. The elements of the three comets may be taken to be as follow:—

	1827, II.		1852, II.		1877, II.
T ...	June 7 ^h 84 ...	April 19 ^h 58 ...	April 18 ^h 14		
π ...	297° 31' 7 ...	280° 0' 6 ...	252° 0' 0		
δ ...	318° 10' 5 ...	317° 8' 4 ...	317° 51' 3		
i ...	43° 38' 8 ...	48° 52' 9 ...	56° 42' 7		
q ...	0.8081 ...	0.9050 ...	0.9283		

The motion is retrograde.

It is evident from a comparison of the three orbits that if they applied to the same comet, great perturbation must have taken place between the successive returns, the line of apsides in particular having considerably retrograded, and the inclination of the orbit increased by several degrees. This suggests an examination of the path of the comet near the nodes with respect to proximity to the orbits of the planets.

Assuming the mean of the two intervals for the period of revolution, we have 24.93 years, and for the semi-axis major 8.5338, and taking as sufficient for our present purpose the perihelion distance of 1852, the angle of eccentricity is 63° 22' 4. Hence it will be found that the radius-vector at the ascending node is 1.0008, which is less than 0.013 from the orbit of the earth; but to bring the two bodies together at this point the passage through perihelion must take place about September 3, which is not the case in any of the above years. At the opposite node the radius-vector is 5.966, not so very much greater

than the radius-vector of Jupiter in the same longitude as to forbid the hope of finding a much closer approach. Accordingly on calculating the distances at different points of the orbit about the descending node, it appears on the assumption we have made with regard to the period of revolution, that in heliocentric longitude 139° the comet would be distant from the orbit of this powerful planet only 0.15 of the earth's mean distance from the sun, and it would arrive in this longitude about 480 days after perihelion passage, and therefore at the end of September, 1828, and the middle of August, 1853, but at these times the heliocentric longitude of Jupiter was about 232° and 265° respectively, and the planet was far removed from the comet in both years.

The case is a very curious one and possibly unique of its kind: similarity of elements at three epochs separated by very nearly equal intervals, and on the assumption of a corresponding period of revolution, a very near apparent approach to the planet which so greatly disturbs the cometary orbits, yet action to account for outstanding differences of elements, could not have taken place on either occasion of the comet's passage through the part of its orbit where great perturbation would be looked for.

A NEW COMET.—On Monday morning telegraphic intimation of the discovery of a new comet by M. Borrelly on the evening of the 14th reached England from Marseilles, and its position was determined the same night at Mr. Barclay's Observatory, Leyton. The place is thus given in M. Borrelly's telegram:—April 14, at 9h. 30m., R.A. 16° 31', N.P.D. 34° 56'; daily motion in R.A. + 120', in N.P.D. — 50'. On the 16th the comet was visible enough in a large-sized Berlin "Cometen-sucher," but was not a bright object in such an instrument.

OBSERVATIONS AT CORDOBA.—Dr. B. A. Gould, director of the National Observatory of the Argentine Republic at Cordoba, writes with respect to several objects to which allusion has been made in this column. Referring to μ Doradus—after remarking that it was noted as 5 m. by Lacaille, 6 m. by Rümker or Dunlop about 1825, and 8½ m. or 9 m. by Moesta, between February 1860 and January 1865, Dr. Gould says: "Our observations of it here have been on the following dates:—1870, Dec. 27; 1871, Jan. 19, 30, March 16, April 13; 1873, March 7, on which days it was looked for in the work upon the Uranometry. Also it has been observed with the meridian circle 1874, Jan. 12, 26; 1875, Jan. 5, 9, 11, 20; 1876, Jan. 5, Feb. 12, 14. Some difficulty was experienced in recognising it on account of several other stars of the same order of brightness being situated in its immediate vicinity. The identification was confirmed, however, as soon as the equatorial telescope was mounted. The estimates of magnitude were from 8 to 8½, but I see no reason to believe that it has changed since December 1870. * * Mr. Thome estimated it as 8.3 m. last night" (March 3). Dr. Gould proceeds, "While writing, let me add a word regarding the red star in Sculptor, mentioned in the same number of NATURE. This is one of the most intensely red stars which I know in the sky. But I should neither call it 'orange-red' nor 'red purple,' nor 'couleur rose,' but a brilliant scarlet. In such cases, however, different eyes bear different witness, and different individuals express themselves very differently to communicate the same idea." Dr. Gould intends at the earliest opportunity, to obtain numerical values for this and some other stars, by means of a Zöllner's colorimeter. The star to which we are alluding is in R.A. 1h. 21m. 10s. N.P.D. 123° 11' 48" for 1874.0, according to observations at Cordoba.

The cluster γ Argus, respecting which Gillis reported changes since Sir John Herschel's observations, has been photographed several times, and Dr. Gould adds that he has similarly eight plates of η Argus and its surrounding stars—of which a very large number are secured upon the photograph by an exposure of eight or ten minutes.