

It adds nothing, either to our previous knowledge of facts, or to our previous conceptions with regard to them, and so is of no use to scientific readers; while the manner in which it treats its subject is so dreary that we fear it is no less ill adapted to the requirements of popular readers. We regret this failure the more because the author, as is well known, is so hard a worker, both in cerebral morphology and morbid psychology, that in writing this book he deserved a success which he has failed to achieve. Having said this much it seems needless to enter on any detailed criticism. We have forced ourselves to read the work from end to end, but cannot advise any one else to follow our example.

Ideality in the Physical Science. By Benjamin Peirce. (Boston: Little, Brown and Co., 1881.)

THIS work is a series of six lectures published posthumously by the author's son. The lectures are of a purely popular character, and their object throughout is to maintain that science is, so to speak, an intellectual handmaiden to Christianity. The arguments, or rather illustrations, are all drawn from the domain of physics and astronomy, of which the writer was himself so distinguished a cultivator, and every page glows with the fervour of a deeply religious mind. Indeed, we may question whether there is not rather too much of this, even in view of the emotional effects which it seems to be the main object of the speaker to produce. The intellectual or argumentative object throughout is to show that the "ideality in the physical sciences" points to ideation in the source of the physical universe, or, to quote the concluding paragraph: "Judge the tree by its fruit. Is this magnificent display of ideality a human delusion, or is it a divine record? The heavens and the earth have spoken to declare the glory of God. It is not a tale told by an idiot, signifying nothing. It is the power of an infinite imagination, signifying IMMORTALITY."

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Mr. Charles Darwin's Letters

WILL you allow me to mention that I am collecting my father's letters with a view to a biography. I shall be much obliged to any of my father's friends and correspondents who may have letters from him, if they will kindly allow me to see and make copies of them. I need hardly add that no letter shall be published without the full consent of its owner.

Down, Beckenham, May 25

FRANCIS DARWIN

Comet (a) 1882

THE following observations of Comet (a) 1882 have been made with the Transit-Circle of the Radcliffe Observatory, Oxford, when passing *sub-polo*:—

		G.M.T.			Observed R.A.			Observed N.P.D. (uncorrected for parallax).			Ob- server.	
	1882.	h. m.	s.		h. m.	s.						
(a)	May 12,	8	57	20.13 ...	0	14	22	90	15	32	53.4 ...	R.
(b)	13,	9	18	33.31 ...	0	39	36.12 ...	15	54	2.9 ...	W.	
(c)	15,	9	57	21.31 ...	1	26	23.60 ...	17	8	33.8 ...	R.	
(d)	16,	10	14	15.71 ...	1	47	17.34 ...	18	0	13.7 ...	W.	
(e)	17,	10	29	20.28 ...	2	6	20.93 ...	19	0	10.5 ...	R.	
(f)	18,	10	42	34.30 ...	2	23	33.69 ...	20	7	31.7 ...	W.	
(g)	19,	10	54	4.86 ...	2	39	2.69 ...	21	21	18.8 ...	R.	
(h)	20,	11	3	59.82 ...	2	52	55.84 ...	22	40	44.3 ...	W.	
(i)	21,	11	12	28 ...	3	5	(22) ...	24	5	(18) ...	R.	
(k)	22,	11	19	38.70 ...	3	16	30.40 ...	25	33	(54) ...	R.	

Observers' notes:—

- (a), (b) Very faint; but observations fair.
- (c) Very faint at times; observation fair on the whole.
- (d) Nucleus sometimes showed as a bright point, but generally not so well defined, and would scarcely stand any illumination of field. Observation, though difficult, very fair.
- (e) Observation good.
- (f) Observation considered very good. Nucleus very sharp at times.
- (g) Difficult, but observation considered fairly good. Nucleus faint at times.
- (h) Faint. Observation good.
- (i) Observation only approximate. Sky cloudy.
- (k) R.A. good. N.P.D. very rough, from a single bisection when extremely faint.

General Notes:—In the telescope, the light of the head on the night of May 18, the nucleus being better defined than on any other night when the observations were made by me, was certainly not brighter than an eighth magnitude star (W.).

Brightness = Eight in star-magnitude (R.).

Observers—W. = Mr. Wickham.

R. = Mr. Robinson.

E. J. STONE

Sea-shore Alluvion—Calshot and Hurst Beaches

WESTWARD of Brighton; Shoreham Harbour, Portsmouth, Southampton, and the Solent roadstead, all derive protection from shingle moles thrown up to windward of their entrances, the most remarkable of which, Calshot and Hurst Points, have each one of Henry VIII.'s stone castles at their extremities. The first incloses a large tidal estuary (Owers Lake) at the entrance to Southampton water, and forms a pier covering the entrance to that fine natural harbour from the south-west.

The condition of this spit is not much altered since Leland's time, A.D. 1539; it terminates in a horn, which forms the lake, and the outfalls of the Beaulieu and Lymington Rivers westward have similar windward moles on a modified scale.

Hurst Point is two miles in length in a north-west and south east direction, formed of rounded siliceous pebbles on an argillaceous base, which last terminates in a nearly perpendicular submarine cliff 200 feet in height; this physical peculiarity of position has been described by Webster and other writers; it has for centuries acted as a breakwater to the Solent and the small natural harbours eastward of it on the Hampshire coast, but has also limited their capacity by promoting a rapid deposition of silt along their foreshores. In the storm of November, 1824, its position was, and remained for some time, considerably altered, as has been described by Lyell. Still, however, the maps in the Cottonian and Burleigh collections all show the peculiar horn-like termination due to the indraught into the Solent, and the general outline of the spit much as at present, which doubtless has preserved its main features for centuries, subject, however, to local disturbance and variation. Half a mile landward of the lighthouses the beach curves eastward, and forks into three or four gradations of "fulls," showing modern variations and additions to the extremity locally termed the "Point of the Deep," a quarter of a mile long, and running nearly at right angles to the main mole; two smaller spits called "Rabbit Point" and "Shooting Points" (a double formation), tail out from the main spit, within or landward of the extremity.

Parallel to the entrance to the Solent, a bank of shingle three to four miles in length, with about six feet water over it at low water of spring tides, varying in level with the weather, easterly winds banking it up, stretching from the extremity of Hurst Point, south-westward to opposite the ledge called the "Bridge," off the "Needles" rocks, leaves the small entrance channel (the "Needles" Channel) intervening.

Hurst Beach presents many characteristics peculiar to the Chesil, Calshot, and other similar formations such as a low, flat shore to leeward or eastward, and a highly-inclined beach seaward, with a tendency to curve round north-eastward, and ultimately to inclose a tidal mere or lake; the elevation and size of the pebbles increase towards the summit and termination, and in places patches of sand and shingle conglomerate of an early date crop out through the shifting modern "fulls."

The degradation of the cliffs to the westward has been very great, and they are much serrated and water-worn, with frequent slips in the upper strata of sand and gravel on a clay base, and

in the neighbourhood of Hordle huge masses of fallen cliff alternate with hollow chimes. At Barton also the loss is great, averaging over certain periods one yard per annum, and the whole frontage of Christchurch Bay is similarly affected.

The shingle immediately westward of Hurst becomes smaller, as is universally the case with these spits. Hurst Beach in effect, with alternating withdrawals and renewals, due to change of wind, represents by its height and the size of its pebbles the general leeward accumulating drift.

General observation leads to the conclusion that littoral shingle travels mainly along the shore, as in all cases the coarse pebbles are succeeded by fine shingle, and this ultimately, by sand, silt, or clay; but that spits of shingle grow out into deep water, creating a base for themselves the numerous nesses on our coasts amply show; but before arriving on the shore that shingle does travel at very considerable depths is shown by such cases as the above-mentioned submarine shingle bank west of the Needles passage and the "Boulders" off Selsea Bill.

Here the "Park Anchorage" eastward of the Bill is the traditional site of the bishop's see, and hydrographic authorities cited in the English Channel Pilot describe the gravel bottom as rough and thinly covering a strong clay. J. R. REDMAN

6, Queen Anne's Gate, Westminster, S.W., May 18

Difficult Cases of Mimicry

IN the very interesting communication by Mr. Wallace, in NATURE, ante p. 86, on some difficult cases of mimicry, there is one statement which apparently challenges comment.

Mr. Wallace states that although it has been so suggested, it is highly improbable that young birds have a hereditary instinct enabling them to distinguish uneatable butterflies antecedent to experience. Mr. Wallace has not alluded to the very thorough and careful experiments made by the late Mr. Dougl. A. Spalding on this point. It is unnecessary to refer to the results obtained by Mr. Spalding in proving the inherited acquisition of ideas and experience in young chickens; it will at least suffice to repeat the observations made by him, on the actions of a young turkey which he had adopted—"When chirping within the uncracked shell." Now this young turkey, not only on the tenth day of its life, exhibited the most intense terror at the sound of a hawk's voice which was confined in a cupboard but also proved its *inherited* knowledge of uneatable insects.

"When a week old my turkey came on a bee right in its path—the first, I believe, it had ever seen. It gave the danger chirp, stood for a few seconds with outstretched neck and marked expression of fear, then turned off in another direction. On this hint I made a vast number of experiments with chickens and bees. In the great majority of instances the chickens gave evidence of instinctive fear of these sting-bearing insects, but the results were not uniform, and perhaps the most accurate general statement I can give is, that they were uncertain, shy and suspicious."

If domesticated fowls and turkeys exhibit such inherited "instinct," may we not postulate a much greater excess of the same in purely insectivorous birds in a state of nature. And if this is so, it will be unnecessary to explain away, what appears to be one of the most philosophical considerations in the doctrine of "mimicry."

W. L. DISTANT

Deaf-Mutes

J'APPRENDIS seulement aujourd'hui par M. Graham Bell que *La Nature* a bien voulu mentionner mes communications à l'Académie des Sciences sur l'accent des sourds muets. Je regrette que les *Comptes Rendus* n'aient pas reproduit mes communications *in extenso* et que M. le Secrétaire perpétuel se soit borné à en faire une analyse incomplète. Je prends donc la liberté de vous adresser ces quelques lignes afin que vos lecteurs sachent au juste la portée de ma communication.

J'ai dit que nous sommes frappés de la ressemblance des visages et quelquefois aussi des mains parce que se sont les seules parties du corps, qui ne soient pas couvertes par les vêtements, mais qu'évidemment la ressemblance s'étend à toutes les parties du corps. J'ajoute même que la ressemblance ne s'arrête pas aux traits extérieurs, on doit la retrouver entre les organes. Pourquoi les organes de la voix feraient-ils seuls exception à la règle générale?

M. le sénateur Robin et M. Milne-Edwards, de l'Institut, à qui on ne saurait refuser la compétence en ces matières, nous disaient qu'il ne comprenait pas qu'on pût faire des objections sérieuses

au fait que j'ai signalé touchant la transmission héréditaire de l'accent; que la voix, avec ses diverses propriétés, hauteur, intensité, timbre, accent, est une manifestation des organes-vocaux au même titre que toutes les manifestations dont notre corps est le siège. Rien ne se produit au dehors qui n'ait sa cause ou son siège au dedans; c'est dans la constitution intime de notre corps qu'il faut chercher la raison de tous les phénomènes externes. Ainsi s'expliquent les transmissions par voie d'hérédité, soit des aptitudes comme celles pour les mathématiques, les arts graphiques, etc.; soit des affections malades comme la goutte, le cancer, la folie, etc.; soit des monstruosité comme les doigts surnuméraires, le bec-de lièvre, etc. Pourquoi dans les ressemblances, les organes vocaux seraient-ils exceptés?

Il faut chercher la ressemblance dans la cellule; sans doute, il n'est pas facile de la saisir, mais nous n'osons pas dire, que c'est chose impossible. Une longue expérience est nécessaire pour arriver à saisir des nuances imperceptibles au grand nombre. Ne sait-on pas qu'un berger reconnaît et distingue chaque mouton de son troupeau, tandis que pour nous tous les moutons sont les mêmes à fort peu près.

Ne serait-il pas possible, d'ailleurs, qu'il y eût moins de nuances d'accent chez les sourds-muets et les entendants-parlants américains que chez les Français du Nord et du Midi, de l'Est et de l'Ouest. La voix de nos chers Alsaciens est teintée de sons germaniques, tandis que celle de nos Provençaux a acquis une sonorité et un timbre particuliers qui lui viennent sans doute du long séjour des Romains dans le Midi. Peut-être nous est-il plus facile de constater ces nuances dans la voix chez les sourds-muets de notre pays.

Voici un nouveau fait très curieux sur lequel j'appelle votre attention.

Nanterre (Seine)

FELIX HEMENT

Caution to Solar Observers

IN the interest of solar observers I send you a caution. A first-class sample of black glass was set with a bit of white paper behind it, and exposed for an instant to the focus of a 7-inch lens. The paper was charred where an eye would be placed. A longer exposure of a few seconds made the glass burst asunder.

J. F. CAMPBELL

Niddry Lodge, Kensington, London, W.

Aurora Borealis

WHAT was, probably, the termination of the aurora seen at Worcester and Dublin on May 14 was observed here, by me, between midnight and 1 a.m. of the morning of the 18th. At that time, and for some time after, I saw along the north-west horizon a strong, green, auroral glow. The evening of the 14th was bitterly cold; the sunset clouds threatened snow, wind, light north-north-east light, cloudy. At dawn, the sky was cloudless and wonderfully clear. The 15th was warm and pleasant.

Glasgow, May 24

S. MAITLAND BAIRD GLENNILL

ON THE MUTUAL RELATIONS OF CARBON AND IRON IN STEEL¹

IN this paper the author sets himself to prove the following four propositions concerning steel: (1) the carbon of steel is (primarily) in a state of simple absorption in the iron; (2) the hardening of steel is due to a metamorphic change in the condition of the carbon, which then assumes a crystalline form closely analogous to the diamond; (3) the varying temper of steel results from the dissociation of this crystalline carbon, at varying but low temperatures; (4) the real strength of steel does not vary to any material degree with a varying content of carbon—that is, *ceteris paribus*, steel is not increased in tensile strength by an increased percentage of carbon.

With regard to No. 1, the author rejects the idea that carbon in steel can be in chemical combination. The only possible hypothesis would be that it is found as a carbide of iron dissolved in excess of iron; and this no modern author holds. It may be alleged in its support that hydrocarbon gas is evolved on dissolving steel in hydrochloric acid; but the great variation in the results and the fact that more or less carbon is at the same time deposited, forbid us to suppose that we have here a definite chemical decomposition. The Eggerty colour test, again, which was supposed to be founded on the same theory, has been in great measure abandoned on account of its inaccuracy. The

¹ Abstract of paper by Mr. George Woodcock, read before the Iron and Steel Institute.