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An explosion (?) on the sun

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The only point of the least interest in the matter (if the matter has any interest at all) is the fact that Prof. Newcomb did not discuss the observations of 1769, as I had believed. I have already admitted this, and withdrawn those expressions of commendation which I had founded on the strongly-worded letter of Prof. Smyth, so that I am rather at a loss to know what purpose Mr. Lynn had specially in view when he wrote his letter. I thank him, however, as warmly as though I knew what he meant.

RICHD. A. PROCTOR

SCIENCE AT THE UNIVERSITIES

THE following courses of lectures will be delivered at the University of Oxford in Natural and Physical Science during the ensuing term:—The Sedleian Professor of Natural Philosophy, the Rev. Bartholomew Price, M.A., will deliver a course of Lectures on Light, on Tuesdays, Thursdays, and Saturdays, at one o'clock, commencing October 19th, at the Lecture Room, Museum, Upper Corridor South. The Savilian Professor of Astronomy, the Rev. C. Pritchard, M.A., proposes to give two courses of lectures during the present term; the one on Astronomical Instruments, the other on the Lunar Theory. The Professor of Experimental Philosophy, R. B. Clifton, M.A., will give a course of Lectures on Experimental Optics, on Wednesdays and Fridays, at twelve o'clock, commencing October 20, at the Physical Laboratory, University Museum. The Physical Laboratory of the University will be open daily for instruction in Practical Physics, from ten to four o'clock, on and after Thursday, October 19. The Linacre Professor of Anatomy and Physiology, G. Rolleston, D.M., will lecture on Circulation and Respiration, on Tuesdays, Fridays, and Saturdays, at one o'clock, commencing October 20, at the Museum. The Professor proposes to form classes for Practical Instruction, as in former terms. Persons who join these classes will come to the lectures on Saturdays at one o'clock, and will also come to the Museum on three mornings in the week for study and demonstration, under the superintendence of Mr. Charles Robertson, the Demonstrator of Anatomy, and Mr. C. S. Taylor, of Merton College. The Hope Professor of Zoology, J. O. Westwood, M.A., will not lecture during the present term, being engaged in the classification of the Hope, Burchell, Bell, and other collections, at the New University Museum, where he will be happy to see gentlemen desirous of studying the Articulated Animals, daily, between 1 and 5 P.M. A course of lectures will be given on behalf of the Professor of Chemistry, by A. Vernon Harcourt, M.A., in continuation of the Professor's course, on Tuesdays and Saturdays, at eleven o'clock, commencing October 21, at the Museum. There will also be an Explanatory and Catechetical Lecture on Thursdays, at eleven o'clock, to commence on Thursday, October 26. The Laboratory of the University will be open daily for instruction in Practical Chemistry from 9 A.M. to 3 P.M., on and after Monday, October 16. The ordinary course of instruction in the laboratory includes those methods of Qualitative Analysis, a knowledge of which is required of candidates for honours in the School of Natural Science who make Chemistry their special subject. In addition to this two courses of instruction will be given in the Laboratory, the one on the Methods of Qualitative Analysis, the other a course of elementary practical instruction in Chemical Manipulation, intended for those commencing the study of Chemistry.

At Cambridge the following lectures in Natural Science will be delivered during Michaelmas Term in connection with Trinity, St. John's, and Sidney Sussex Colleges:—On Electricity and Magnetism (for the Natural Sciences Tripos), by Mr. Trotter, Trinity College, on Mondays, Wednesdays, and Fridays, at 10, commencing Wednesday, October 18. On General Physics, Sound, and

Light (for the Natural Sciences Tripos 1872, and following years), by Mr. Trotter, Trinity College, on Tuesdays, Thursdays, and Saturdays, commencing Thursday, October 19. On Chemistry, by Mr. Main, St. John's College, on Mondays, Wednesdays, and Fridays, at 12, in St. John's College Laboratory, commencing Wednesday, October 18. Attendance on these lectures is recognised by the University for the certificate required by medical students previous to admission for the first examination for the degree of M.B. Instruction in Practical Chemistry will also be given. On Palæontology (the Protozoa and Coelenterata), by Mr. Bonney, St. John's College, on Mondays, Wednesdays, and Fridays, at 9, commencing Wednesday, October 18. On Geology (for the Natural Sciences Tripos, preliminary matter and Petrology), by Mr. Bonney, St. John's College, on Tuesdays and Thursdays, at 9, commencing Thursday, October 19. A course on Physical Geology will be given in the Lent Term, and on Stratigraphical Geology in the Easter Term. Papers will be given to questionists every Saturday at 11. On Botany, for the Natural Sciences Tripos, by Mr. Hicks, Sidney College, Tuesdays, Thursdays, and Saturdays, at 11, beginning on Tuesday, October 31. The lectures during this term will be on Vegetable Morphology. Mr. Hicks will also give examination papers in Botany to candidates for the next Natural Sciences Tripos on Mondays, at 1 P.M., beginning October 30. These examinations will be free to those who have attended the botanical lectures of the last term. On the Elements of Physiology, by the Trinity Prælector in Physiology (Dr. M. Foster), Mondays, Tuesdays, and Wednesdays, at 11 A.M., commencing Monday, October 23. A course of Elementary Practical Physiology, on Wednesdays and Thursdays, commencing Wednesday, October 25, at 2 P.M.

AN EXPLOSION (?) ON THE SUN*

ON the 7th of September, between half-past 12 and 2 P.M., there occurred an outburst of solar energy remarkable for its suddenness and violence. Just at noon the writer had been examining with the telespectroscope an enormous protuberance or hydrogen cloud on the eastern limb of the sun.

It had remained, with very little change since the preceding noon, a long, low, quiet-looking cloud, not very dense or brilliant, nor in any way remarkable except for its size. It was made up mostly of filaments nearly horizontal, and floated above the chromosphere, with its lower surface at a height of some 15,000 miles, but was connected to it, as is usually the case, by three or four vertical columns brighter and more active than the rest. Lockyer compares such masses to a banyan grove. In length it measured 3' 45", and in elevation about 2' to its upper surface, that is, since at the sun's distance, 1" equals 450 miles nearly, it was about 100,000 miles long by 54,000 high.

At 12.30, when I was called away for a few minutes, there was no indication of what was about to happen, except that one of the connecting stems at the southern extremity of the cloud had grown considerably brighter, and was curiously bent to one side; and near the base of another at the northern end a little brilliant lump had developed itself, shaped much like a summer thunder-head.

What was my surprise, then, on returning in less than half an hour (at 12.55), to find that in the meantime the whole thing had been literally blown to shreds by some inconceivable uprush from beneath. In place of the quiet cloud I had left, the air, if I may use the expression, was filled with flying *débris*—a mass of detached vertical fusiform filaments, each from 10" to 30" long by 2" or 3" wide

* From the *Boston Journal of Chemistry*, communicated by the author.

brighter and closer together where the pillars had formerly stood, and rapidly ascending.

When I first looked, some of them had already reached a height of nearly 4' (100,000 miles), and while I watched them they rose with a motion almost perceptible to the eye, until in ten minutes (1.5) the uppermost were more than 200,000 miles above the solar surface. This was ascertained by careful measurement; the mean of three closely accordant determinations gave 7' 49" as the extreme altitude attained, and I am particular in the statement because, so far as I know, chromospheric matter (red hydrogen in this case) has never before been observed at an altitude exceeding 5'. The velocity of ascent also, 166 miles per second, is considerably greater than anything hitherto recorded.

As the filaments rose they gradually faded away like a dissolving cloud, and at 1.15 only a few filmy wisps, with some brighter streamers low down near the chromosphere, remained to mark the place.

But in the meanwhile the little "thunder head," before alluded to, had grown and developed wonderfully into a mass of rolling and ever-changing flame, to speak according to appearances. First it was crowded down, as it were, along the solar surface; later it rose almost pyramidally 50,000 miles in height; then its summit was drawn out into long filaments and threads which were most curiously rolled backwards and downwards, like the volutes of an Ionic capital: and finally it faded away, and by 2.30 had vanished like the other.

The whole phenomenon suggested most forcibly the idea of an *explosion* under the great prominence, acting mainly upwards, but also in all directions outwards, and then after an interval followed by a corresponding inrush: and it seems far from impossible that the mysterious coronal streamers, if they turn out to be truly solar, as now seems likely, may find their origin and explanation in such events.

The same afternoon a portion of the chromosphere on the opposite (western) limb of the sun was for several hours in a state of unusual brilliancy and excitement, and showed in the spectrum more than 120 bright lines whose position was determined and catalogued—all that I had ever seen before, and some fifteen or twenty besides.

Whether the fine aurora borealis which succeeded in the evening was really the earth's response to this magnificent outburst of the sun is perhaps uncertain, but the coincidence is at least suggestive, and may easily become something more, if, as I somewhat confidently expect to learn, the Greenwich magnetic record indicates a disturbance precisely simultaneous with the solar explosion.

C. A. YOUNG

Dartmouth College, September 1871

THE KEA—PROGRESS OF DEVELOPMENT

A NOTICE of the development of a striking change in the habits of a bird may be considered by naturalists interesting enough to justify a brief record in your journal. The Kea (*Nestor notabilis*) may be seen and heard in certain localities amidst the wild scenery of the Southern Alps in the middle island of New Zealand, for it is not so rare as has been described. This fine bird belongs to one of our indigenous genera, an examination of its structure proves that it shares with the *Kaka* a claim to a position amongst the *Trichoglossinae* or Brush-tongued Parrots; the under side of its thick tongue near the tip is fringed with papillæ, enabling it to collect the sweets of its favourite blossoms. Through how many years has this species been content to range over shrub-covered heights and rock-bound gullies, gathering its subsistence from the nectar of hardy flowers, from the drupes and berries of the dwarfed shrubs that contend with a rigorous climate, and press upwards almost to the snow line of our Alpine giants? To these food-resources may be added insects

found in the crevices of rocks, beneath the bark of trees, and its aliment not wholly vegetarian, yet such as called forth no display of boldness in order to procure a sufficient supply. This peaceful demeanour was observed under the ascendancy of Moaic conservatism. The European has been the means of corrupting the simplicity of its ancient habits; the meat-gallows of the back-country squatters attracted the attention of our mountain-parrots in the winter season. To them they became points of interest in their wanderings, and furnished many a hearty meal torn from the dangling carcass as it swung in the frosty air; neither were the drying sheepskins, stretched on the rails of the stockyard, neglected. The Paneka has been destined to supply the enterprising Kea with a dainty only equalled perhaps by that which the epicurean African cuts warm from his bovine victim—our *educated* bird now tears his food from the back of the living sheep. From a local paper one learns that, for the last three years the sheep belonging to a settler "in the Wanaka district, (Otago) appeared afflicted with what was thought to be a new kind of disease; neighbours and shepherds were equally at a loss to account for it, having never seen anything of the kind before. The first appearance of this supposed disease is a patch of raw flesh on the loin of the sheep, about the size of a man's hand; from this matter continually runs down the side, taking the wool completely off the part it touches, and in many cases death is the result. At last a shepherd noticed one of the mountain parrots sticking to a sheep and pecking at a sore, and that the animal seemed unable to get rid of its tormentor. The runholder gave directions to his shepherds to keep watch on the parrots when mustering on the high ground; the result has been that during the present season when mustering high upon the ranges near the snow line, they saw several of the birds surrounding a sheep which was freshly bleeding from a small wound in the loin; on other sheep were noticed places where the Kea had begun to attack them, small pieces of wool having been picked out."

From the recent settlement of the country, it would be quite possible to date each step in the development of the destructiveness of the Kea, the gradual yet rapid change from the mild gentleness of a honey-eater, luxuriating amidst fragrant blossoms when the season was lapped in sunshine, or picking the berried fruits in the more sheltered gullies when winter had sternly crushed and hidden the vegetation of its summer haunts. Led, perhaps, to relish animal food from its partly insectivorous habits, its visits to the out-stations show something like the bold thievery of some of the Corvidæ, whilst its attacks on sheep feeding on high ranges exhibit an amount of daring akin to the savage fierceness of a raptorial. Is the position of Nestor in our avifauna an anomalous one? A sucker of honey, devourer of fruit, destroyer of insects, render and tearer of flesh—will the difficulty be met by classing our mountain bird as omnivorous, or is it to be considered as only one other instance in which system puzzles and hampers the field naturalist?

THOS. H. POTTS

ON A NEW FORM OF CLOUD*

THE accompanying figure on p. 490, represents a form of cloud which I have seen but twice in my life; * the first time about the commencement of June 1871, at five o'clock in the evening, at Washington, U.S.; the second at Beloit, Wisconsin, U.S., during the same year, and at the same hour. The state of the atmosphere presented similar meteorological conditions at both times. The appearances coincided with

* See my new classification of clouds with sixteen engravings in the *Rural New Yorker*, January 29, February 26, April 9, May 21, June 4 and 11. It will be reprinted in the Report of the Smithsonian Institution for 1870, with an historical introduction, in print now for the next number of the *Annales Hydrographiques* of Paris.