

potash bulbs and weighed. Some results obtained by four different methods of estimating the carbon in iron and steel are given at the conclusion of the paper.—“On the Determination of Phosphoric Acid,” by Mr. W. C. Williams. The author suggests a modification of the process for separating phosphoric acid from the alkaline earths originally proposed by Reitsig.

SOCIETIES AND ACADEMIES

BRISTOL

Observing Astronomical Society.—Report of observations made during the period from Aug. 7 to Oct. 6, 1870, inclusive.

Solar Phenomena.—Mr. Thomas G. E. Elger writes:—The magnificent display of solar spots observed in August was repeated, though in a rather less striking manner, during September. Between the 7th and 12th the spots were small, few in number, and mainly confined to the S. hemisphere; on the 11th only three moderately-sized groups were visible. The immense group observed last month, and which was near the centre of the disc on August 30, was due at the E. limb about the 17th, but owing to unfavourable weather and absence from home, I did not notice it till the 24th, when it measured 2' 45" x 1' 50" without including the outlying penumbra which followed it; its length on the 25th was 3' 0". The penumbra of this group presented some remarkable features. It contained four large umbræ and many smaller ones; on the preceding side it was thickly studded with minute dots of every shade from black to light brown. When examined with a power of 180 at 3h on the 25th, the entire group was evidently undergoing rapid and violent changes, the striation of the penumbra and the dark “spurs” and serrated edges of the umbra clearly indicating the cyclonic nature of the forces involved. The above group was preceded by a very long and narrow V-shaped spot, which occupied nearly the same position as a large spot observed in August. Several other groups were observed during the month, which presented interesting details, but they were generally smaller than the August groups. The appearances exhibited by the large group described above, and indeed by most spots of a similar class observed this year, seem altogether opposed to the “deep excavation” theory of sun spots.—Mr. T. W. Backhouse, of Sunderland, reports “a very fine group of spots passed the sun’s centre in the northern zone on September 21; on Sept. 23, at 21h 15m, it contained two very long penumbrae, which were not widely separated; the *f* one was 74,000 miles long, and the *p* one 92,000! On the 25th, at 19h 45m, it was only 66,000 miles long, and the *f* penumbra was divided into two. Another very fine group, also in the N. zone, passed the sun’s centre on the 24th. The dimensions in miles of its chief spot were as follows:—

Date.	Time.	Penumbra.		Umbræ.	
		Length.	Width.	Length.	Width.
Sept. 21	5h 12m	—	47,000	26,000	11,000
”	21h 25m	abt. 72,000	50,000	31,500	—
22	3h 25m	50,000	—	29,500	—
23	21h 25m	63,000	—	—	—
25	21h 30m	abt. 70,000	—	—	—

On the 23rd, at 4h 40m, I found it was divided into four, apparently by a violent current in the middle from *p* to *f*.—Mr. William T. Dunning, of Bristol, observed the large spot visible on September 21; with his 4-inch metallic reflector he could very distinctly see a black nucleus in the S part of the umbra. It did not appear to be actually enclosed within the umbra, but was situated on the margin of the penumbra.—Mr. E. B. Knebel, of Burton-on-Trent, says that on Sept. 25 the large group near the centre of the disc measured 2' 54" by 1' 44"; on the 26th the two largest groups were equal in length to 2' 44" and 2' 36" respectively. They were distinctly visible to the naked eye.—The Rev. S. J. Johnson, of Crediton, writes that on September 21, at 4h 30m, a power of 70 on a 2½-inch *O.G.* showed penumbrae on, at least, 26 spots visible on the sun. On September 20 “seven spots were very large indeed, and arranged in five groups, each scattered over a large surface.”—Mr. Albert P. Holden, of London, referring to the large spot, says that on September 20, “when entering on the solar disc it appeared as an elongated spot with a bright arm stretching over half the umbra till it joined a projection on the N. side. It was followed by a large broken group of broken masses of various dimensions. On the 23rd, at 8 A.M., the chief spot had enlarged considerably, while the broken ones following it had very much decreased. The great spot was very nearly divided into two by a very broad arm

springing from the N.; the W. portion of the umbra being again subdivided by a similar arm on the S. side. This last was on one side broken up very peculiarly, so that it presented the appearance as if a handful of bright straw had been thrown carelessly upon it. The eastern portion of the umbra was crossed by a very bright curved streak, which was so bright and so clearly distinct right up to its edges as to appear more like a carved piece of silver. On the 24th, at 8 A.M., the broken mass before referred to as following the chief spot had almost disappeared, with the exception of one small spot and a small amount of penumbra. The great spot was also a little smaller and quite divided by the broad arm. A large crack appeared in this latter. Each of the two portions of the original spot were also divided by luminous bridges across them. On the 28th the appearance of the umbra was much the same, although the penumbra was entirely changed and a great narrow branch had projected S. to an immense distance. This great arm was dotted here and there with a few patches of umbra. The broken mass which had followed the great spot at its first appearance was now entirely dissipated. On the 29th the two portions of the original spot were widely separated and much contracted, and two spots to the S. which had hitherto been of very small size much increased in dimensions. The rotation of the solar orb then carried the spot out of sight. The principal fact impressed upon the mind by these observations is that a spot becomes dissipated in consequence of its continual division and subdivision by the projection of luminous bridges across its various portions.

DIARY

THURSDAY, NOVEMBER 10.

LONDON INSTITUTION, at 7.30.—Acoustics of the Orchestra: Dr. W. H. Stone.

LONDON MATHEMATICAL SOCIETY, at 8.—Annual General Meeting. Recent Researches on Quartic and Quintic Surfaces: By Prof. Cayley.—The Retiring President’s Address.

FRIDAY, NOVEMBER 11.

ASTRONOMICAL SOCIETY, at 8.

MONDAY, NOVEMBER 14.

LONDON INSTITUTION, at 4.—Chemical Action: Prof. Odling.

TUESDAY, NOVEMBER 15.

ANTHROPOLOGICAL SOCIETY, at 8.—Observations on the Condition of the Blood-Corpuscles in Certain Races: Dr. R. H. Baskewell.—Tribal Affinities among the Aborigines of Australia: Mr. C. Staniland Wake.—Description of Australian Aborigines and Half-Castes, with Exhibition of Skulls: Dr. Robert Peel.

ZOOLOGICAL SOCIETY, at 9.—On the Form and Structure of the Manatee (*Manatus Americanus*): Dr. J. Murie.—Observations on the Salmonidae in Tasmania: Mr. Morton Allport.—On the Anatomy of *Ailurus fulgens*: Prof. Flower.

STATISTICAL SOCIETY, at 7.45.—On the Claims of Science to Public Recognition and Support, with Special Reference to the so-called “Social Sciences”: Dr. Guy, F.R.S.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.

THURSDAY, NOVEMBER 17.

LINNEAN SOCIETY, at 8.—On the *Passifloræ*: Dr. M. T. Masters.—On the White-beaked Bottle-nose: Dr. James Murie.

CHEMICAL SOCIETY, at 8.—Mineralogical Notices: Prof. N. Story Maskelyne and Dr. Walter Flight.

LONDON INSTITUTION, at 8.30.—Acoustics of the Orchestra; Wind Instruments: Dr. W. H. Stone.

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