

11h. 10m., of which one only was a Perseid. The shower had evidently become nearly exhausted.

The following conspicuous meteors were recorded on the several nights of observation, and I give their paths in the hope that they have been observed elsewhere.

1896.	Time.	Mag.	Path		Length.	Radiant.
			From	To		
Aug. 4	9 46	1	343 + 31	335 + 10	27	42 + 56
	6 10 6	2	340 + 31	337 + 58	27	342 - 12
	6 10 6	1	343 + 32	328 + 10	26	42 + 56
	10 9 54	1	103 + 86	202 + 79	13	43 + 57
	10 10 39	2	27 + 48	355 + 39	24	60 + 48
	10 11 24	1	15 + 47	9 + 43	6	44 + 57
	10 11 39	2	66 + 84	210 + 81	15	46 + 57
	10 12 6	2	42 + 45	44 + 39½	6	28 + 72
	10 12 10	2	44½ + 35	53½ + 31½	8	23 + 40
	10 12 15	> 1	28 + 24	24 + 4	20	46 + 57
	10 12 19	2	60½ + 31½	66 + 26½	7	47 + 42
	10 12 46	1	8 + 12½	1 - 3	17	46 + 57
	10 13 8	2	633 + 63	25 + 66	5	45 + 59
	10 13 19	1	23½ + 20	20½ + 12½	8	45 + 59
	10 13 22	1	359 + 69½	334 + 68	9½	45 + 59
	10 14 14	> 1	57 + 76	225 + 77	27	51 + 31
	12 9 24	2	195 + 24	199 + 9	15	46 + 57
	12 10 41	2	26 + 43½	30 + 38	6	331 + 70
	14 9 24	1	265 + 22	240½ + 19	23	356 + 5

On the whole, I regard the display as one much inferior to many observed in past years. Both as regards the number and brilliancy of the meteors there was nothing striking to record. Had the sky proved clearer on August 10, many small meteors would have been visible, which, under the conditions prevailing, were enabled to escape detection; but making every allowance for this, there is no doubt the shower was not a conspicuous one.

As to the displacement of the radiant, which takes place on successive nights, this was indicated from my results on August 6, which gave $42^\circ + 56^\circ$ for the position, while on August 10 it was $45^\circ + 57^\circ$, and on August 12, $46^\circ + 57^\circ$. But my observations this year have not been sufficiently extensive for the full and proper re-investigation of this feature, nor is it required, for no good end is served by the frequent re-observation of a fact already well determined.

The usual minor showers were visible; indeed, there appears to be very little doubt that the great majority of meteor radiants are manifested annually without any great change in their visible strength. Certain showers vary more than others, but many of the differences observed are due to the alteration in the conditions under which they are presented from year to year. In 1893 there was a strong shower of Cygnids observed contemporaneously with the Perseids, but the former was but slightly seen this year, for I recorded only two of its meteors. I registered meteors from radiants at $31^\circ + 20^\circ$, $28^\circ + 72^\circ$, $60^\circ + 48^\circ$, $331^\circ + 70^\circ$, $356^\circ + 5^\circ$, which have been noticed in preceding years, and are among the best assured positions of the August epoch. Feeble showers of this character are extremely numerous, and require long watches before an observer can satisfactorily determine their radiants. Some of them fall so near together that they cannot be disassociated unless the observations are very numerous and accurate.

I observed no fireballs during the recent return of Perseids; but Mr. Blakeley, of Dewsbury, reports that he saw meteors as brilliant as Venus on August 10, at 11.40 and 12.16, both Perseids.

The Rev. S. J. Johnson, of Bridport, writes me that he observed a good many bright meteors this year. One of the finest appeared on August 10, 9h. 50m., travelling from ϵ Cassiopeiæ to a point 7° west of β in the same

constellation. Two second magnitude meteors were seen within fifteen seconds of each other at about 10h. 6½m. on the same night, which were also observed at Bristol. Their heights at beginning were 64 and 65 miles, and at ending 46 and 52 miles respectively. They were both Perseids.

Mr. Blakeley, of Dewsbury, saw about thirty-five Perseids between 11h. and 12h. 30m. on August 10, and the paths seemed to give a sharply-defined radiant at the usual maximum position.

Mr. S. H. R. Salmon, of Croydon, saw, on August 10, 20 meteors (15 Perseids) between 9h. 10m. and 10h., and 18 meteors (16 Perseids) between 10h. 10m. and 11h. The sky was perfectly clear.

Mr. D. Booth, of Leeds, on August 11, saw eighteen meteors in the forty-five minutes from 10h. to 10h. 45m., and found the Perseid radiant at $47\frac{1}{2}^\circ + 58\frac{1}{2}^\circ$.

W. F. DENNING.

THE LIVERPOOL MEETING OF THE BRITISH ASSOCIATION.

III.

IT is possible now to forecast to some considerable extent the work of the various Sections from the information already received from presidents, recorders, and authors.

In Section A (Physics), Prof. J. J. Thomson's opening address will deal, we believe, with (1) the teaching of physics; (2) the kathode and Röntgen rays; (3) the passage of electricity through a gas; and (4) the movement of the ether. Friday will be devoted in this Section chiefly to phenomena connected with the Röntgen rays; and on Saturday the Section will divide into the two departments of mathematical physics and meteorology.

In Section B (Chemistry) the address of the President (Dr. Ludwig Mond) will deal with the development of the industrial manufacture of chlorine. Technical papers will probably occupy a large portion of Friday's sitting, including a report, by Prof. Bedson, on the composition of coal. On Monday, Prof. Ramsay will read a paper on helium, and there will be a number of other communications on helium and argon. On the same day, a paper will be read on the synthesis of the elements. It is hoped that this will lead to a discussion, to which several have promised to contribute. Other matters of interest will be an exhibition of photographs of explosions in various gaseous mixtures, by Prof. Dixon, and the report of the Committee on science teaching in elementary schools, which will be followed by a paper on science teaching in girls' schools, from Miss Walters.

It is hoped that the numerous chemical works in the neighbourhood may prove attractive to the members of the Section, and arrangements are being made for members of the Section to visit several of the most interesting works on special afternoons.

Mr. Marr's address to Section C (Geology) will be devoted to recent advance in stratigraphical geology. He will notice at some length the imperfection of the geological record, especially in the earliest times. He will advocate the continuance of that work in detail which has been the cause of our best discoveries in the past. Doubt will be thrown upon the advantage of too rigid an adherence to uniformitarianism. Lastly, he will discuss the advantage of geology as an instrument of education. In the work of the Section, more prominence than usual will be given to the reports of the research committees, several of which are likely to lead to considerable discussion. The excavations at Hoxne have been successful in proving the relation of Palæolithic man to the glacial epoch, besides yielding new evidence as to alternations

of climate during the Pleistocene period. Sir William Dawson will deal with pre-Cambrian fossils, and a number of papers are promised on local geology.

In Section D (Zoology), the President (Prof. Poulton) will take as his subject a naturalist's contribution to the discussion on the age of the earth. His object is to show that the appearance in time, and succession, of the various groups of animals in every way supports evolution, but an evolution which took its rise in a very much more distant past than the Cambrian or Laurentian. The general result will be to strongly support the geologists against certain of the physicists. The other arrangements in Section D are: On Friday forenoon a debate on Neo-Lamarckian theories, probably introduced by Prof. Lloyd Morgan; and in the afternoon, a report and discussion on the fauna and flora of the Irish Sea; on Saturday, a report on the migration of birds, and then a dredging and trawling expedition in Liverpool Bay; on Monday forenoon, a debate on the ancestry of vertebrates, introduced by Dr. Gaskell; on Tuesday forenoon, a joint meeting with the Botanical Section for a discussion on the cell theory; while Wednesday and the remaining afternoons will be occupied by papers which have been announced by Prof. Minot and Messrs. Macbride, Newstead, Benham, Traquair, Hartog, and others. Sir William Dawson brings some fresh evidence in regard to *Eozoon*, and Dr. Traquair will give the latest information in regard to *Palaospondylus*, illustrated by recently acquired specimens and an enlarged model.

In Section E (Geography), the address by the President (Major L. Darwin) will deal largely with African railways. Papers have been promised by a number of travellers and others, including Mr. Moir (climate of Nyassaland), Mr. Heawood (African geography), Rev. C. H. Robinson (Hausaland), Mr. Fletcher (journey in Tibet, with Mr. Littledale), Mr. J. Coles (photographic surveying), Mr. Vaughan Cornish (sand-dunes), Mr. H. N. Dixon (marine research in North Atlantic), Mr. E. A. Fitzgerald (the New Zealand Alps), Mr. A. W. Andrews (geography and history in schools), Mr. A. J. Herbertson (geographical teaching), Prof. J. Milne (Japan and its earthquakes), Dr. H. R. Mill (local geography of England), Mr. Harry Lake (the Gambia and Senegal). It is hoped that papers will also be offered by Count Pfeil, Mr. Lewin, Mr. Howard, Colonel Woodthorpe, the Archduke Ludwig Salvator, Captain Vandeleur, Colonel Trotter, Mr. Hull, and Mr. Fowler. There will also be reports on African climatology and on geographical education.

In Section G (Mechanical Science), the President's address, on Thursday morning, will be followed by a report of the Committee on Tides, and after that comes a paper by Mr. G. F. Lyster on the Dock development of Liverpool. There will be other papers on local engineering works, the Atlantic steamships, the overhead railway, and the Liverpool waterworks. Papers are also announced by Mr. Wolf Barry on the Tower bridge, by Prof. Mengarini on the electric light and tramway systems of Rome, and by Mr. A. R. Sennett on horseless carriages—a number of which, it is expected, will be shown in operation.

In Section H (Anthropology), following the precedent which proved so successful at Ipswich last year, it is proposed to group the proceedings of the Section round a limited number of large questions which seem more particularly ripe for discussion at this time. The fact that the President, Mr. A. J. Evans, the Keeper of the Ashmolean Museum at Oxford, has taken a leading part in recent exploration and discovery among the remains of early civilisation in the Levant, and that a public lecture by Prof. Flinders Petrie, last year's Sectional President, is announced on a kindred subject, suggested the early history of mankind in the Mediterranean as an appropriate subject for discussion.

The President's address, which will be delivered late in

the morning of Thursday, may be expected to deal, in part at least, with this department of anthropology, and will be followed by lantern demonstrations of recent Palæolithic discoveries in North-east Africa and elsewhere. Friday will be devoted to physical anthropology, and the opportunity will be taken of commemorating the centenary of the birth of Dr. Retzius, the celebrated Swedish anthropologist, whose son, himself a distinguished observer, has signified his intention of probably being present. Dr. Dubois will discuss *Pithecanthropus*, and Dr. Brinton and Dr. Sergi the physical aspect of Mediterranean and, especially, of North African races. Dr. Topinard is expected to be present, and a communication is promised on the pygmies of Central Africa. Saturday is assigned to reports and discussions on the collection and registration of ethnographic data, and a resolution in favour of an Imperial Bureau of Ethnology will be brought forward by Mr. C. H. Read, of the British Museum. Folk-lore and descriptive anthropology will also be represented on this day. Monday opens with papers on the early distribution of copper and of iron in Europe and the Mediterranean; followed by a general discussion of the modes of the transference of culture, and illustrated by an exhibition of the early ornament of North-west Europe. On Tuesday, a general discussion of early Mediterranean civilisation has been arranged. Communications are expected from the President, Dr. Montelius, Mr. Salomon Reinach, Dr. Naue, Dr. Stolpe, Prof. Ridgway, and others. On Wednesday, Prof. Flinders Petrie's proposal of a national ethnographic storehouse comes up for discussion, and a number of separate communications will be presented. It is hoped that it may be possible to announce somewhat in detail the probable course of each day's discussion during the meeting.

In Section I, the President (Dr. Gaskell) will give his address and a paper on the origin of Vertebrates on Monday morning, and after that a joint discussion with the Zoological Section will take place. Other discussions have been arranged within the Physiological Section: (1) on the organisation and correlation of bacteriological work, to be opened by Dr. Sims Woodhead; and (2) on the presence, and effect, of bacteria in various food matters, by Dr. Kanthack. Profs. Boyce and Herdman will bring forward a report on oysters and typhoid; and various other papers are announced dealing with excitability in muscle and nerve, metabolism, gas exchange, &c.

In Section K, the President (Dr. D. H. Scott) will deal in his address with the present position of morphological botany, discussing modern work bearing on the origin and affinities of the main groups of plants with reference to fossil as well as to recent forms. The chief features, after the address, will be (1) an afternoon lecture on the geographical distribution of plants, by Mr. W. Thiselton-Dyer, Director of the Royal Gardens, Kew; (2) the joint discussion with Section D on cell and nuclear structures, to be opened by Prof. Farmer; and (3) a discussion on the ascent of sap, to be opened by Mr. Francis Darwin of Cambridge.

We understand that Prof. Flinders Petrie's aim in his evening discourse, entitled "Man before Writing," is to bring forward the character of civilisation in different countries just before the introduction of writing, to show what man is and does before the great change produced by unalterable record and transmissible message; also to point to the methods of research where no written record remains. This period covers what is now the main field of interest in European history, and also the culture of the new race in Egypt. Dr. Francis Elgar's lecture will be on "safety in ships," and Prof. Fleming's lecture to the operatives will be on "the earth a great magnet."

W. A. HERDMAN.