One of the first and most important matters of business presented was in reference to the proposed meeting of the British Association in Toronto in 1897. The writer offered a resolution cordially inviting the Association, in case they decide to accept the invitations already sent them from Toronto to hold the meeting there, to attend our meeting also as our guests, and requesting them to send early notice of the time of meeting to the Permanent Secretary of our Association, that ample time may be had to make suitable arrangements, and to renew the delightful memories of the Philadelphia meeting in 1884. This was referred to the Permanent Secretary with power.

Should the Association come to America as proposed, it seems probable that the long-deferred San Francisco meeting will then be held, as it is believed that many visitors will desire to cross the continent by the Canadian Pacific Railroad, which was incomplete at the time of the Montreal meeting in 1884; but many who attended that meeting went as far west as the road would then take them. As Sir Wm. C. Van Horne, President of that road, is a member of the British Association, and has been a member of ours, his influence is relied on to secure favourable rates of transportation. Still another factor is that the Christian Endeavour Societies expect to meet at San Francisco in 1897, and as they are a mighty army—70,000 attended the Boston meeting this summer—the railroads usually offer exceptional rates to secure their patronage, and the Associations can share in the benefit of the reduction.

Of the 207 papers read before the several Sections, many might be mentioned. The subject of colour and colour standards, on which Mr. Pillsbury had an article in a recent number of NATURE, was presented by him and others, and resolutions were passed looking toward the establishment of a colour standard. E. R. von Nardroff exhibited and described a new apparatus for studying colour phenomena. Colour photography was discussed and photographs exhibited by F. E. Ives.

A process for photographing the vocal cords in action has been discovered by F. S. Muckey and Wm. Hallock, and it is found that the pitch of a note is raised by rotating the arytenoid cartilages without increasing the tension of the cords, just as a violinist makes high notes by shortening the string with his finger. Voice analysis also has been studied by Messrs. Hallock and Muckey, by an ingenious system of resonators for the fundamental and seven overtones, covering three octaves from the fundamental C. These resonators are so arranged that the vibration of each causes the flickering of a tiny gas jet, and by observing these it can be seen which of the overtones are sounding, and by drawing straight or wavy lines to correspond with each of these, a picture of the tone can be made. This will enable a singer to see every tone in his voice, and learn wherein he needs to correct it.

The Weather Bureau of the United States supplied experts to fill up an afternoon in a joint meeting of four Sections. Willis L. Moore, the new chief of the bureau, spoke of the work in hand and that contemplated. An elaborate scheme of observation of upper strata of the air by kites and balloons and kite-balloons is to be carried out; and regular observations are to be made of "sensible temperature" by the wet bulb thermometer.

Frank N. Bigelow, in his paper on solar magnetic radiation and weather forecasts, made some very remarkable statements. The sun, he says, throws out curved lines of magnetic force. These are connected with sun-spots, and with storms on the earth. They have been studied by him so carefully that he fixes the time of the sun's axial revolution more accurately than ever before at 26·67928 days, with a probable error only in the last or possibly the two last figures. A surprising inference from his studies is that the earth has a crust 800 miles thick, and the sun has also a crust. Future investigation will supply data for a long forecast of seasonal weather conditions, years ahead. Cleveland Abbe followed with a paper on clouds and their nomenclature, and Alfred J. Henry with some very beautiful cloud photographs.

Electro-metallurgy has made rapid strides, and a paper on calcium carbide, by P. de Chalmot and J. T. Morehead, gave an account of the process used at their works in Spray, N.C., for cheap production of this compound by smelting together lime and coke in the electric furnace. This enables them to produce acetylene, the illuminating principle of gas, much cheaper than any other process.

A paper on the new process of making white-lead by electric action was read by R. P. Williams before the American Chemical Society, which met at Springfield two days earlier than the Association. Mr. Williams describes the process, which will work

a revolution in this industry. Instead of acetate of lead, as in the old process, sodium nitrate is used together with sodium bicarbonate. A number of cells are filled with the solution, with plates of lead at one pole and of copper at the other. The current from a dynamo causes nitric acid to be liberated and to combine with the lead. A number of reactions occur, with the final production of white-lead in a very fine and uniform state and of superior colouring quality. The chemicals can be re-used indefinitely. As many as 500 pounds have already been made at one charge.

The Economic Section has always been one of great popular interest. The monetary question, monometallism or bimetalism, by J. W. Sylvester and Henry Farquhar; taxation in the United States, by Edward Atkinson; growth of great cities, by E. L. Corthell; manual training in horticulture, by W. R. Lazenby, were among the matters treated of. An effort was made to widen the scope of this Section by a change of name. Its name—Section of Economic Science and Statistics—was deemed peculiarly undesirable, and after much discussion of the respective merits of "sociology" and "social and economic science," the latter title was adopted as the name of Section I.

Buffalo was unanimously chosen as the next place of meeting, following the practice of the Association to meet at that city every tenth year, beginning with 1866, when 79 members there reorganised the Association after six years of suspended animation, during which no meeting had been held.

The time for meeting was much controverted. The Council recommended a change to Monday as the opening day, which met decided opposition, and on an informal vote 30 were opposed to it and only 27 favoured it; but opposition at length gave way, and the next meeting will begin on Monday, August 24, 1896, at Buffalo.

Officers elected were—President: Edward D. Cope, of Philadelphia. Vice-Presidents: A, Mathematics and Astronomy, William E. Story of Worcester; B, Physics, Carl Leo Mees of Terre Haute, Ind.; C, Chemistry, W. A. Noyes of Terre Haute, Ind.; D, Mechanical Science and Engineering, Frank O. Marvin of Lawrence, Kan.; E, Geology and Geography, B. K. Emerson of Amherst; F, Zoology, Theodore N. Gill of Washington; G, Botany, N. L. Britton of New York city; H, Anthropology, Alice C. Fletcher of Washington; I, Social Science, William R. Lazenby of Columbus, O. Permanent Secretary: F. W. Putnam of Cambridge. General Secretary: Charles R. Barnes of Madison, Wis. Secretary of the Council: Asaph Hall, Junr., of Ann Arbor, Mich. Secretaries of the Sections: A, Mathematics and Astronomy, Edwin B. Frost of Hanover, N.H.; B, Physics, Frank P. Whitman of Cleveland, O.; C, Chemistry, Frank P. Venable of Chapel Hill, N.C.; D, Mechanical Science and Engineering, John Galbraith of Toronto, Can.; E, Geology and Geography, A. C. Gill of Ithaca, N.Y.; F, Zoology, D. S. Kellicott of Columbus, O.; G, Botany, George F. Atkinson of Ithaca, N.Y.; H, Anthropology, John G. Bourke, United States Army; I, Social Science, R. T. Colburn of Elizabeth, N.J. Treasurer, R. S. Woodward of New York.

WM. H. HALE.

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 intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

August Meteors.—Red Spot on Jupiter.

As supplementary to my paper on the August meteors (NATURE, No. 1347, August 22) and to Prof. A. S. Herschel's interesting letter on the same subject (No. 1349, September 5), I may note that a further comparison of the recent observations has revealed two additional instances of doubly observed meteors.

On August 11, 10h. 59m., Prof. Herschel at Slough recorded a meteor equal in brightness to a first magnitude star and moving swiftly along a path of $22\frac{1}{2}^{\circ}$ from $264^{\circ} + 52^{\circ}$ to $252^{\circ} + 31^{\circ}$, or from the head of Draco into Hercules. The meteor left a long, thin, white streak for 2 secs., and the duration of flight was estimated as 1 sec. Mr. H. Corder, at Bridgwater, observed the same object, noting the time as 10h. 58m., and the apparent path as $23^{\circ} + 53\frac{1}{2}^{\circ}$ to $14^{\circ} + 50^{\circ}$ between Cassiopeia and Andromeda.

The meteor was evidently a Perseid, and had a radiant at $36^{\circ} + 57^{\circ}$. It was first seen when at a height of 95 miles above Oxford, and disappeared when 61 miles above Devizes. Its real length of path was 53 miles, and the earth point is indicated in the English Channel about 10 miles south of Lyme Regis, Dorsetshire.

On August 11, 11h. 43m., Prof. Herschel mapped a small bolide, rivalling Jupiter in brightness, and traversing with moderate speed a course of 15° from $229^{\circ} + 59^{\circ}$ to $225^{\circ} + 44^{\circ}$, or from near α Draconis to the head of Boötes. Duration of flight 1.5 sec.; the nucleus was evenly bright all the way, and it left a streak for 3 secs. Mr. Corder registered the same meteor, and gives the time as 11h. 42m., magnitude equal to Jupiter, and path as $60^{\circ} + 62\frac{1}{2}^{\circ}$ to $70^{\circ} + 64^{\circ}$ in Camelopardus.

This object was also a Perseid, the radiant being at $32^{\circ} + 52^{\circ}$ near the cluster at χ Persei. The meteor at its first appearance was 75 miles high above a point 5 miles N. of Stratford-on-Avon, and at its disappearance 52 miles high over a place 5 miles W.N.W. of Great Malvern. Its real length of path was 34 miles, and earth point 6 miles S.E. of Aberdare.

Red Spot on Jupiter.—When twilight became too strong for comet-seeking on the morning of August 25 last, I turned my 10-inch reflector on Jupiter and saw the red spot, indefinitely, near its central transit. The planet had only just risen above the tops of some houses in this locality, and the telescopic image was by no means good, but I estimated the transit of the spot occurred at 4h. 24m. A.M. (August 24, 16h. 24m.), or about 9.4m. after Mr. Marth's zero meridian, System II., so that the longitude of the spot was $5^{\circ}.7$. The shouldering of the great south equatorial belt, east of the spot, was very conspicuous, and afforded an excellent guide to the position of the latter. A few minutes after the transit of the red spot I noticed a large white spot on the north side of the north equatorial belt, passing the central meridian. A power of 312 was used in these observations.

W. F. DENNING.

Bristol, September 7.

Curious Optical Phenomenon.

THE following description of an optical phenomenon, and its probable explanation, may be of interest. It will be observed that a similar experience occurring to one not accustomed to making optical experiments would very probably have caused him to believe that he had seen a ghost. It is therefore of importance psychologically.

The facts observed were as follows:—At about 1 A.M., August 26, I went to my bedroom; to get to it I had to pass through a small room which I used as a study. On entering it, though it was dark, and I had no lamp, the small room seemed brightly illuminated, about as bright as an 8 c.p. lamp would make it, apparently. To one side of a window in the room I saw a man standing, whom I recognised to be myself. The whole impression was very vivid and clear.

So far nothing was observed beyond what is described in the ordinary ghost story. I was much occupied with the consideration of a problem at which I had been working, and did not at first grasp the full signification of what I saw. On turning my head, the figure disappeared, but on looking towards the window, through which a very faint line came, the image reappeared. I then noticed that it was apparently standing in a position occupied, as I knew, by a large table. On more close examination, without, however, moving from the spot where I was standing, I saw that it had changed, and that it did not appear to have features; then it appeared to be flat against the wall, and I finally recognised it as an after-image of a shadow. On my first seeing it, however, it did not have this appearance to me, and I had evidently mentally supplied the features as one often does to the face of a friend who is seen at a distance which is really too great to admit of actual recognition.

I then got the impression of having seen the shadow before, and on considering the matter a few seconds, remembered that it was just before I had started for my room. I had been working in another room, endeavouring to solve a physical problem for four or five hours, and for about half an hour, or possibly more, had been steadily looking at a lamp (a habit of mine when abstracted); I then got up, leaving the lamp lit, and went out on my way to my bed-room as mentioned above. On going out of the door my shadow was thrown by the lamp on the wall just to the right of the door. The passages were entirely dark, and it was not until I entered the room used as a study,

that the faint light coming through the window and falling on the same spot of the retina that was previously occupied by the image of the dark doorway, stimulated the after-image.

I may say that my health was of the best, but that I had been smoking heavily for a few days previously, and the fact had begun to force itself upon me.

I would especially remark upon the apparent brightness of the apparition. I had never seen an after-image so bright. On going back to the room where the lamp was, I proved that the appearance of the shadow thrown as I went out of the room corresponded with that of the image seen, minus of course the features and colour, which had been supplied by the imagination.

In speaking of optical phenomena, I would say that an easy way of showing that the colours seen in the colour-top are due to lack of accommodation, is by taking a piece of red paper or cloth, and turning the top till the inner or outer line matches it exactly. Then, without moving or changing the speed of the top, place before the eye a convex glass. The colour on the top will disappear, but that of the cloth will of course remain. Similar experiments to those observed with the top can be observed by drawing dark lines on a piece of glass, and waving dark and white paper behind them.

R. A. F.

A Remarkable Flight of Birds.

THE forms of birds flying at a great height and crossing the solar disc, as described by Mr. Bray in your issue of August 29, have been rather frequently seen here during the spring and autumn months, and the writer has always attributed such flights to migrating birds on passage. They have usually been noticed while observing the image of the sun projected on a card screen from the eyepiece of a small equatorial telescope; occasionally, however, they have attracted attention at night also, crossing the disc of the moon, upon which their forms are very clearly defined, and with careful focussing (which is very nearly the same as for parallel rays) it has almost been possible to identify the species from the shape of the wings and manner of flight; birds of the swallow tribe, in particular, have been clearly distinguished, and others resembling the thrush, possibly redwings or fieldfares, have been noticed. The direction of flight, according to the writer's experience, is nearly always towards the south in August and September, and the reverse in April.

On August 31, a continuous watch was kept on the moon from 8.50 to 9.35 P.M., using a power of 80 diameters on a reflector of 10 feet focus. Only eight birds were seen, however, four of them slowly crossing from north to south, the other two from west to east (nearly). They were evidently very distant. An estimate of the change of focus required for the apparently nearest bird gave .15 inch. This would imply a distance of 7900 feet from the telescope, and the moon's altitude being about 14° the vertical height of this bird would be $7900 \times \sin 14^{\circ} = 1900$ feet (about). Some of the birds, judging from their apparent size, must have been two or three times more distant, and therefore higher in the same proportion.

It would be very interesting to obtain systematic observations of such flights of birds from various localities during the migrating seasons. Possessors of telescopes would find these observations a good exercise in that kind of patience or endurance which is so necessary in observing, for instance, a so-called meteor shower at its maximum!

The writer would be glad to receive notes on the subject from those of your readers who may care to watch for birds during the autumn. Estimates of the angle subtended by the spread wings would perhaps give the most reliable means of ascertaining the height of the birds, and their direction of flight can easily be obtained by reference to the diurnal motion of the sun or moon. It is hoped that by collecting data of this kind some new facts may be learned regarding the mysterious habits of our bird visitors.

J. EVERSLED.

Kenley, Surrey.

THE WOBURN EXPERIMENTAL FRUIT FARM.

ON June 12 last a small party of those interested in agriculture and horticulture, including Mr. Herbert Gardner, Sir John Thorold, Prof. Armstrong, Prof. Warington, Dr. Voelcker, Mr. Charles Howard, Mr.