left, and others to the right, when walking without the aid of sight. I am familiar with some ambidextrous men, and about the same number of left-handed men, but I cannot recall a single instance of a left-legged man, and think they must be somewhat rare. In the present question it might, perhaps, be well to put aside peculiarities of the arms—as occupation and education enter very largely into the method of their use—and confine observations to the legs alone. Mr. Larden has, I think, very nearly arrived at the solution of the problem with his definition of right or left strong-legged men circling to the right or left respectively. I take exception, however, to his referring the peculiarity to the *strength* of the limb, and think the following suggestion may afford help in the matter, being founded upon observations, and providing a reason for circling in walking in either right- or left-legged men:—It has been frequently remarked of late years that short-leggedness on one side or the other is of common occurrence—the cause is doubtless attributable to a retardation in the growth of the limb caused by one or more of the many illnesses to which we are subject in the earlier years of our life. Excepting when the retardation in the growth of the limb is considerable, it produces no inconvenience, and the possessor of a limb shorter than its fellow by some tenths of an inch may never be aware of the deficiency. To apply this fact to the question (it is another matter why the left leg is more frequently the short one), Mr. Larden's strong leg should correspond to my long leg. The long leg makes a longer step in proportion to the difference in its length over its fellow. If the right be the longer leg, as is oftener the case, the walker will circle to the left, and *vice versa*. In my experiments I fixed a drawing-pin into the sole of each boot, selected a hard, level, untrodden piece of sand on the seashore, about 250 yards in length, and used a measuring-tape which would take ten or twenty paces in one measurement for obtaining the difference in length of the paces; the drawing-pins afford a definite and precise mark in the sand. To insure a good and regular start I always allowed my man a few yards start with his eyes open and fixed on the distant mark. He then, without stopping, put over his head and face a cardboard cylinder open at the top. This allows the eyes to be open, whilst effectually preventing any lateral vision. I think this, small detail as it is, important, as a bandage tied round the head across the eyes is sometimes unpleasant and often confusing.

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THOS. HAWKSLEY

Diffusion of Scientific Memoirs

PROF. TAIT'S letter in your issue of December 27 (p. 196) raises two questions of interest to the Cambridge Philosophical Society. Prof. Tait states that during the last thirty years he has received very few of the publications of the Society. I cannot find from the records of the Society that Prof. Tait has ever expressed the wish to have the publications sent to him. The Cambridge Philosophical Society, like the Royal Society of London, the Royal Astronomical Society, and, I believe, other scientific societies, sends its publications to all Fellows who claim them within a reasonable time from the date of issue. Any Fellow requesting that *all publications* may in the future be sent to him receives them as they appear. The second point is the free distribution of copies. I find that at the present date the *Transactions* or *Proceedings* of the Society, or both, are sent either gratis or in exchange for other publications to the following number of centres:—

Home		Foreign	
London	16	Germany	22
Rest of England	16	France	9
Scotland	8	United States	12
Ireland	6	British Colonies	8
		Other foreign countries	23
Total	46	Total	74
Honorary Fellows	about 40		
Total number distributed	160		

Of this 160 about 40 have been added since the year 1869.

In Edinburgh at present there are three centres receiving the publications of the Society. I doubt very greatly if there are many societies which do as much as the Cambridge Philosophical Society towards spreading their publications.

R. T. GLAZEBROOK,

Secretary Cambridge Philosophical Society

Cambridge, January 19

Recent Low Temperatures in America

ON or about December 19 some very low temperatures are reported to have been registered in Manitoba. At Emerson, in lat. 49°, a cold of 46° below zero, and in Dakota (United States) -49° are recorded.

I do not presume to say that these temperatures are incorrectly given, but they must be received with some distrust, arising from possible, I may almost say probable, defect in the thermometers used.

These sources of error are two, and by no means uncommon. First, the construction of the instrument may be defective. Second, it is not unusual during the heat of summer for a portion of the spirit to become vaporised, and afterwards condensed in the upper end of the tube. If the spirit is colourless, and if the detached fluid extends down to the metal band which keeps the tube in its place, the error, which may amount to 8° or more, is not readily noticed, unless specially looked for. I had several examples of this error in thermometers used by me in Canada, and one not long ago at the house of an English gentleman, who had perfect faith in the correctness of his thermometer.

Of the errors arising from defective construction there were two notable examples among some twenty thermometers which were tested by freezing mercury at Great Bear Lake in the winter of 1848-49. Eighteen of these thermometers agreed very closely with each other, indicating -36°·5, or about 2° too high. Two others, beautifully finished, and made by a London maker of high repute, showed at the same time, and under similar circumstances, 57° below zero, or about 19° of error.

JOHN RAE

Meteors—Unpublished Notes of November 30, &c.

ON November 30, at 8.27 p.m., a large meteor passed from Dubhe, in the Plough, through the lower part of Auriga, exploding in sparkling reddish light; and at 9 another described nearly the same line, but without explosion. The latter left a very vivid bluish light in its path, which lasted about ten seconds. At 10.55 a very large meteor dropped right down from Psi Ursæ Majoris, and disappeared in a black cloud a few degrees above the horizon. At 11.10 one sped rapidly from Beta Ursæ Minoris through between Epsilon and Zeta (Mizar) Ursæ Majoris, and exploded in very brilliant white light. At 11.20 one proceeded from a point about 1° below Benetnasch, and disappeared in the right shoulder of Hercules without explosion. At 11.25 one blazed out from a point 2° above Etanin, and disappeared near Beta Cygni. At 11.30 a large and brilliant but a transient meteor went from Omicron Ursæ Majoris, and disappeared in the tail of the Dragon. At 11.35 one dashed out from a point about 1° above Pi Ursæ Majoris, and I thought that it would go through Merak, but just before it reached Merak it curved suddenly from it and exploded. About 12 a number of small ones were seen. December 1—Meteors seen at 0.13 a.m., 0.18, 1.12, 1.23, 1.45, 3.30, 3.40, 4, 4.23, 4.40, 4.55, 5.7, 5.10, 5.18. December 4—At 2.15 a.m., 2.20, 2.25, 2.28; and a number of meteors were observed between 5 and 6 p.m. December 5—A goodly number of meteors seen from 1 a.m. to 6, and from 8 p.m. to 10. December 6—1.12 a.m., 1.15, 1.22, 2.10, 2.30, 3.40, 5.21, 5.25. December 7—Three meteors seen. December 8, 9, 10, and 12—Only a few meteors were observed here; and from the unfavourable state of the weather, not a meteor could I manage to see since. I have ascertained the paths of all the above meteors, but to give them all would encroach too much on your space. I will supply particulars if required. On November 30 and December 1 last there was a brilliant display of meteors. A few Leonids, Leo Minorids, Taurids, and Geminids were seen. Six Andromedes made their appearance from December 4 to 8. On December 8 a beautiful bolide rushed through the clouds from south-west to south-east, at 6 p.m. Not a star in that part of the heavens could be seen at the time, but the moon shone dimly a little to the left of it. The point at which it appeared was a few degrees higher than the moon, and it disappeared a few degrees above the earth. It blazed in and out three different times on its way through the black clouds, and a little before the end of its journey it swelled out into a huge magnificent ball of red fire, and by its explosion it illumined the western heavens and earth with its bright crimson light. A few of the spectators were alarmed at the unusual apparition. No intonation. Left in its wake a red belt of fire. The light of

most of the meteors was blue, or the colour of electric light. A number of the meteors curved suddenly round just before disappearing. Numbers of meteors were seen dropping into black clouds, others seen dropping out of them down to the horizon.

Mossvale, Paisley, January 14

DONALD CAMERON

BRITISH APHIDES¹

ENTOMOLOGISTS are fond of attaching themselves to some special group of insects—bees, beetles, or butterflies; but there are very few, we believe, who take an interest in collecting the winged or wingless forms of the Aphides. One is very apt to overlook the value of the work of a mere collector, but it comes home to us when amid a group so large, and so important from an economic point of view, as this of the plant lice is, we find only some half a dozen of our British naturalists collecting specimens of the species or making observations on the marvellously strange habits of their heterogeneous forms. Under these circumstances it was most fortunate that a society like the Ray Society was in existence, for the number of those interested in the subject of the history of British Aphides would have been too miserably small to have justified any publisher, no matter how energetic, from publishing an account of these insects; but, thanks to the Ray Society, we have, as the works published by them for their subscribers for the years 1875, 1877, 1880, and 1883, four handsome octavo volumes by Mr. G. Bowdler Buckton, F.R.S., which seem well entitled to their designation of a "Monograph of the British Aphides." These volumes, besides the text, contain over 140 plates, of which ten are devoted to anatomical details, and the rest to coloured portraits of the species both in their immature and various mature forms, and in some few instances there are representations of the various parasites which feed on them. It is to be specially noted that these figures are both drawn and lithographed by the author, and certainly a more interesting series of life-like figures of Aphides is nowhere to be found.

While it seems true that the Aphides are not general favourites of the collector, it is also true that no group of insects has attracted more attention. For nearly a century and a half the mysteries of their growth and development have been laboriously inquired into, and the researches of Réaumur and Charles Bonnet in the eighteenth, and those of Huxley in this our nineteenth century, have not exhausted all the marvels of these strange forms. Their history makes them in many ways attractive. Thus, to those interested in the details of embryology, these Aphides present questions for solution of the greatest importance, and concerning which there is still no absolutely settled opinion. Even the brilliant investigations as to this branch of the subject by Huxley still left work to be done. To the general naturalist they present a source for abundant study—not only their varied and often strange forms, but their curious habitations and the defences which they seem to have against hosts of different insect foes; while to the practical economist they have an immense interest when he thinks that by their success in the struggle for life they cause distress to human nations, often bringing about decrease in the amount of our food material and an increase in the amount of our taxation. To name the Hop Fly or the Vine Aphis is to at once illustrate our meaning.

It is not our intention to write a criticism on Mr. Buckton's learned monograph; it pleases us better to introduce it to our readers as a scientific work full of many easily read and wonderful histories of our native species of plant lice—one that the reader will not lay down in a hurry when he once takes it up; one in which, open where he will, he shall find something in it to interest and attract him. In order that we may in some measure

prove this we will give a brief sketch of the chief subject-matter of these volumes. Passing over the disquisition as to the origin and meaning of the word "aphis," we have a general history of the group; included under this heading we find a sketch of their anatomy, an account of the most noteworthy contributions to their history by the early writers, and a sketch of what is known as to their metamorphoses and their very strange reproduction. This is followed by the classificatory portion, in which full diagnoses are given of the genera and species.

Mr. Buckton would account for the want of activity in our entomologists in their study of this group by the confusion into which the group has fallen with reference to its synonymy. One species of Aphis possesses no less than thirty synonyms, while in another case the same name has been given to no less than six different species of the group. There is this further difficulty in their study, that the distinctive characters are far less marked than in most other insects. As to colour, not only are the young sometimes in this respect quite unlike their parents, but their hues vary with the hour, and even the adult forms may undergo as great a change in their tints as the autumn leaves amongst which they nestle.

The family itself belongs to the order of the Hemiptera and to the sub-order Homoptera, where it is located between the families Coccidæ and Psyllidæ. Among the anatomical peculiarities it may be noted that the winged forms are provided with no less than three different kinds of eyes—ocelli, compound eyes, and supplementary eyes. The larvæ of some have eyes; in others the eyes are quite rudimentary; while in some subterranean forms they are absent. Though all the winged forms have ocelli, yet their nocturnal habits are not marked. All the Aphides are suctorial in their habits; as the source of their food varies so does the structure of the mouth parts, especially the rostrum and setæ. In *Stomaphis quercis*, feeding in the alburnum of the oak, the rostrum is nearly twice the length of the insect, and the setæ are much longer; and in the genera *Lachnus* and *Schizoneura*, in the young forms, the rostrum projects beyond the end of the abdomen, and is carried as if it were the tail of the insect; while in the young of *Chermes laricis* the long and delicate setæ are coiled into a spiral, which would seem to act as a kind of spring cable by which the insect moors itself so to its feeding ground that it is not easily dislodged by the rough winds of early spring as they play among the larch branches. The punctures are not made by the rostrum, which seems only to act as a sheath, but by the setæ, which can be seen to lance open a number of the parenchymatous cells, and so cause a plentiful flow of cell-contents.

On the question as to the function of the cornicles, the author does not agree with Kalténbach that they are organs connected with the respiratory apparatus, but rather regards them as the external terminations of excretory ducts. As to honey-dew, the remarks of Kirby and Spence, ascribing it to a secretion of Aphides, is accepted as true by almost all who have written on the subject—including the author—though others, among whom may be mentioned Liebig, Sir J. Hooker (1873), Boussingault (1872), still combat this view.

The chapter on the bibliography begins by alluding to the work of the celebrated anatomist and philosophical lens grinder, Leuwenhoek, in 1690, glances at that of Réaumur (1737), Charles Bonnet (1779), De Geer (1778); the more modern writings of Schrank, Hausmann, Burmeister, Harting, Kalténbach, Kyber, Morren, Leuckart, von Siebold, Ratzeburg, and Koch among the Germans; Passerini among the Italians; Signoret, Balbiani and Claparède among the French writers; Newport, F. Walker, Haliday, and Huxley among the English writers on the subject.

Aphides are to be found almost everywhere throughout Britain. Some are hardy enough to thrive on the stony

¹ "Monograph of the British Aphides." By George Bowdler Buckton, F.R.S., &c. Four volumes; being the volumes issued by the Ray Society of London to their subscribers for the years 1875, 1877, 1880 and 1883.