

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 fast 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 cut 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