

of February 15, 1917, with the same base, Christiania-Aas.

It seems, then, that the cosmic rays causing the aurora have the same penetrability as those causing the aurora in the aurora zone, and that the southern situation is due to systems of corpuscular currents outside the earth, currents which are also the principal cause of the accompanying magnetic storms (see my Memoir in the *Archives des sciences physiques et naturelles*, Geneva, 1911-12).

The photographs were taken with plates only sensitive to blue and violet rays. As red rays occurred

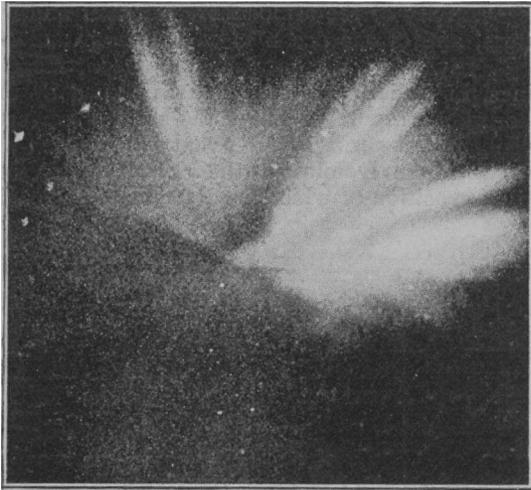


FIG. 3.—Corona, December 16, 1917, 21h. 11m. G.M.T. in Christiania. Stars of the constellation Perseus are seen near the centre, and Capella appears near the left border, though its image is deformed owing to the short focus lens used.

during the aurora, no measurements of these interesting phenomena were obtained. I have written to England for red sensitive plates, and if I succeed in securing them further important results may be obtained.

The illustrations represent a pair of photographic views of aurora rays; and photographs of the corona, showing that the rays are curved a little in their upper parts, which extend to about 400 km. above the earth.

CARL STÖRMER.

University of Christiania, January 28.

Eastern and Western Asymmetry of Solar Prominences.

REGARDING the suggested physical origin of a seeming predominance of solar prominences seen on the east limb as compared with the west limb, referred to in *NATURE* of January 31, p. 425, allow me to direct attention to numerous observations I have made which leave no doubt as to a predominance of deflection effects on and near the east limb being mostly to the violet, whereas west of the central meridian and on the west limb they are mostly towards the red. This feature is confirmed by the observations of M. Deslandres, and an illustrated account is given by him in the *Paris Comptes rendus*, tome 155, p. 1573 (séance du 30 décembre, 1912).

The deflection effects recently reported in the *Astrophysical Journal* by Mr. F. Ellerman are, in my opinion, the spectroscopic disc representation of the brilliant, and in most cases radially set, sharp "spikes" which an active area invariably exhibits when passing

the limbs. I have seen the short-lived brilliant effects on the disc very often and their quick subsidence into dusky and dark forms, the brilliant initial outburst and its dusky sequence being distinctly punctuated by a very brief interval of partial or entire invisibility, owing to the luminosity passing the stage of that of the general disc itself. The life of the "spikes," when seen on the limb, is of the same brevity, and the identity of the two phenomena has long since been recognised by me from these observations and their interpretation.

ALBERT ALFRED BUSS.

22 Egerton Road, Chorlton-cum-Hardy,
Manchester, February 26.

A GRAHAM BELL TELEPHONE MEMORIAL.

THE Duke of Devonshire, Governor-General of Canada, on behalf of the Bell Memorial Committee, presented on October 24, 1917, to the town of Brantford, Ontario, a public park which will be known as the Alexander Graham Bell Gardens, the house in which the invention of the telephone was made, and a memorial monument to the inventor himself. For the accompanying photograph of the memorial we are indebted to the courtesy of Mr. G. H. Grosvenor, editor of the *National Geographic Magazine* of Washington. It is by the sculptor, W. S. Allward, and is allegorical. The figure on each side, one representing the speaker and the other the listener, is in bronze, and mounted on a granite pedestal. The panel on the crest of the memorial represents "Humanity in communication," the three shadowy figures being Knowledge, Joy, and Sorrow. They are bound together by lines representing telephone wires, the curved outline of the upper part of the monument representing the curvature of the earth. On the right and left are two circular panels inscribed as follows: "Opus Telephonica Patri Dedicatum Est." and "Mundus Telephonica Usu Recreatus Est." Underneath the central panel are the words: "To commemorate the invention of the telephone by Alexander Graham Bell in Brantford in 1874."

We congratulate the Canadians on having acquired such an interesting memorial of the great inventor. Dr. Bell's invention laid the foundation of a great and flourishing industry, which employs many hundreds of thousands of men and women, and in which many hundreds of millions of pounds are invested. He is one whom every man of science and engineer delights to honour.

It is interesting to remember that Dr. Bell's father, Mr. Alexander Melville Bell, the inventor of a well-known "visible speech" system, was for many years a lecturer on elocution in Edinburgh. His mother was a daughter of Surgeon Symonds, R.N. He himself was born in 1847, and educated at the Royal High School, Edinburgh. When fourteen years old he came to London, and was instructed by his grandfather, Alexander Bell, in elocution and the mechanism of speech. He was a teacher at Weston House Academy, Elgin, for a year, and then entered Edinburgh University, where he studied Latin under Sellar and Greek under Blackie. After being a schoolmaster again at Elgin

and also at Somerset College, Bath, he became assistant to his father, who was then lecturer on elocution in University College, London. In 1868-70 Dr. Bell matriculated at London University and attended medical classes at University College. As he was very delicate and as two of his brothers had died from tuberculosis, his father decided to emigrate to Canada in the hope of saving his life, and took a house at Brantford, near Tutela Heights, Ontario. In 1871 Dr. Bell gave instruction to the teachers of deaf-mute children in Boston, and in 1873 he was appointed professor of physiology at Boston University.

Dr. Bell began his career as an inventor very early. When sixteen years of age he invented a method of removing husks from wheat, and in conjunction with one of his brothers made a speaking automaton. In 1874 he invented a system of harmonic multiple telegraphy, and greatly improved his "articulating telephone." Amongst his

him fame and wealth, he is one of the most modest of men. As he is only seventy-one years of age, we hope that he will yet be spared for a long time, so that he may see the great expansion of the telephone industry which we anticipate in the immediate future.

A. R.

THE RADIO-ACTIVITY OF SOME CANADIAN MINERAL SPRINGS.

DR. J. SATTERLEY, whose work on the radio-activity of the atmosphere, of river and well waters, and of the ocean is well known, and Mr. R. T. Elworthy, of the Canadian Department of Mines, in Bulletin No. 16, part i., issued by that department, report on the radio-activity of forty-seven mineral springs and twenty-three deep-well waters of the Dominion, the chemical character and composition of which are later to be dealt with



Memorial erected at Brantford, Ontario, to commemorate the invention of the telephone.

later inventions we may mention the photophone, the induction balance, the telephone probe, the spectrophone, and, with C. A. Bell, the graphophone. In 1903 he invented tetrahedral kites, and in conjunction with the Aerial Experiment Association (1903-8) suggested numerous improvements in connection with aeroplanes. The outcome of their joint work was the "Red Wing," which made the first public flight in America at Hantsport, Mass., in March, 1908.

This country was in no hurry to honour Dr. Bell. It was not until 1906 that Oxford University made him a Doctor of Science, and not until 1913 that the Royal Society gave him a Hughes medal and the Institution of Electrical Engineers made him an honorary member. Surely never were honours better deserved. He is held in universal esteem by electricians the world over, and although his inventions have brought

in part ii. The examination was undertaken in view of the belief that the therapeutic value of mineral waters may be ascribed to their radio-activity, a hypothesis which, on account of the high radio-activity of many of the spas, celebrated from very early times, and the lack of virtue in the same water, transported from the spa, or waters artificially prepared to identical chemical composition, is certainly a plausible one.

The content of the water, both in radium emanation, which, of course, disappears spontaneously on keeping, and in radium itself, which acts as a permanent source of fresh emanation, has been investigated, the Canadian waters being characterised usually by the absence of dissolved radium, although frequently possessing relatively considerable amounts of the emanation. Fifty of the springs and wells examined were situated in eastern Ontario and western Quebec, a map of