Zeeman Effect in Weak Magnetic Fields.

ACCORDING to Voigt, the displacement of the outer components of the Zeeman triplet plotted against the strength of the magnetic field is represented by a hyperbola, when the light is observed at right angles to the field. The hyperbola approaches asymptotically to a straight line in strong fields, where most of the observations have hitherto been made by different experimenters. Moreover, the intensity of the component towards the red is greater than that towards the violet in weak fields, and gradually tends to equality as the field is increased. Gehrcke and von Baeyer examined the separation of the satellites of the mercury line 546·1 $\mu\mu$ in a field of 535 Gauss, but did not notice the asymmetry as indicated by theory.

On account of the double difficulty of obtaining fine spectrum lines and of using instruments having strong resolving power, the theory of asymmetry in weak fields has not yet been placed under thorough experimental test. When it is impossible to measure the effect on distinctly separated lines, we can infer the nature of the change by measuring the broadening of the lines, provided they are sharply defined. For this purpose, the gold lines $\lambda = 627·6$ $\mu\mu$ and $\lambda = 583·5$ $\mu\mu$ are characterised by having sharp edges in the spark spectrum, when the self-inductance and capacity of the circuit are properly adjusted. By using an echelon spectroscope made by Hilger, of resolving power $\lambda/\delta\lambda = 430,000$ for $\lambda = 500$ $\mu\mu$, I made numerous observations with Mr. Amano, and found that the effect for a triplet of the red gold line is measurable in a field of 240 Gauss, and on following the curve to strong fields it is approximately represented by a branch of hyperbola with very short axis, showing a slight bend in $H = 3000$, which is probably caused by the asymmetry in the intensity of the component lines. A similar result was obtained with the copper line $\lambda = 510·5$ $\mu\mu$, which is divided into a triplet. The utmost care was necessary to have the electromagnet producing the field well demagnetised before each experiment, by a special device of alternately passing gradually diminishing current in rapid succession.

With the quartet of the yellow gold line, the nature of the change of the inner components is somewhat similar to the triplet before mentioned, but the curvature is more pronounced. The displacement of the outer components is more complex in weak fields, but from $H = 5000$ upwards it keeps approximately linear relation with the field. Similar observation was also made with the magnesium line b_2.

The principal source of error in the present experiment is the uncertainty as to the difference in the intensity of the component lines; this will no doubt affect the breadth of the superposed lines. When the lines are separated by applying sufficient magnetic force, the difference in the breadth and intensity of the components is not to be distinguished by mere eye observation.

H. NAGAOKA.

Physical Institute of the University of Tokyo,
    November 25.

Women and the Chemical Society.

THE council of the Chemical Society, at a recent meeting when it was determined to exclude women from the fellowship, but to admit them to the society as "subscribers," decided, "after mature deliberation"—the phrase is the senior secretary's—that the appellation "subscriber" should be printed with a big S!

Daughters of Eve! So zealous to pursue
The work in Life by which you seek to live!
When F.C.S. you claim, as is your rightful due—
The S alone is what they, grudging, give!

Be patient! Time is on your side.
Reason and justice will your cause defend.
Ignoble spite and arrogance of pride
Shall meet their retribution in the end!

T.

Autumn, and After.

THE following table may be of interest at the present time. It indicates the years in which (as in this) all three months of autumn have been dry at Greenwich (1841–

1907), and the character, as regards temperature, of each of the three months of winter following (+ meaning warm and − cold).

		December	January	February
(1)	1847	+	−	+
(2)	1850	+	+	+
(3)	1851	+	+	+
(4)	1854	+	−	−
(5)	1858	+	+	+
(6)	1868	+	+	+
(7)	1881	+	+	+
(8)	1884	+	−	+
(9)	1890	−	−	−
(10)	1900	+	+	−
(11)	1901	+	+	−
(12)	1902	+	+	+
(13)	1904	+	−	+
Warm		12	8	9 = 29
Cold		1	5	4 = 10

Three things may here be noted:—

(1) December has nearly always been warm (twelve cases out of thirteen).

(2) In the total of the winter groups, warm months have been about three times as numerous as cold (twenty-nine to ten).

(3) Excepting 1854–5 and 1890–1, each winter has had two or three months warm.

The present December promises (December 15) to be warm. What the season as a whole will bring forth remains to be seen.   ALEX. B. MACDOWALL.

THE DARWIN COMMEMORATION AT CAMBRIDGE (JUNE 22–24, 1909).

THE Darwin Celebration Committee appointed by the Council of the Senate to make the necessary arrangements has issued invitations to a large number of British and foreign universities, colleges, academies, and learned societies. The committee has already received the names of nearly 200 delegates who propose to attend the celebration in June. Among those nominated by universities and societies in the United States are the following:—Prof. Baldwin (Johns Hopkins University), Prof. Loeb (University of California), Prof. Farlow (American Academy of Arts and Sciences), Prof. Minot (Boston Society of Natural History), Prof. Coulter (Chicago University), Dr. Davenport (Cold Spring Harbour Experimental Station), the president of Cornell University, Prof. Chittenden (Yale University), Prof. Peck (the Connecticut Academy), the president of the Academy of Arts and Sciences (New York), Prof. E. B. Wilson (Columbia University), Dr. Biggs (New York University), Dr. Harrison (University of Pennsylvania), Dr. A. E. Brown (Philadelphia Academy), Dr. Osborn (American Philosophical Society), the president of the Carnegie Institute (Pittsburg), the secretary of the Smithsonian Institute, the president of the Carnegie Institute (Washington), Dr. Howard (Academy of Sciences, Washington).

The University of Chile, Santiago, is to be represented by the Envoy Extraordinary of Chile. From Austria-Hungary the following are expected:—Prof. Ludwig von Graff (Gratz), Prof. Apathy (Kolozsva), Prof. Vejdovsky (Prague), Dr. Steindachner and Prof. Wettstein (Vienna). The Belgian delegates include M. Laneere (pro-rector of the University of Brussels), Prof. van Beneden and Prof. Dupont (Brussels), Prof. Dorlodot (Louvain). Prof. Höffding and Prof. Jungersen are coming from Copenhagen. Among French delegates are Prof. Malaguin (Lille), Prof. Cuénot (Nancy), Prof. Dantec (University of Paris), Prof. van Tieghem, M. Perrier, Prince Roland Bonaparte (Institute of France), Prof. Papillaut, Prof. Metchnikoff, Dr. Manouvrier (Paris).