

6. *Spectrum of the oxyhydrogen flame.*—Professors G. D. LIVEING and J. DEWAR find that the spectrum of water extends with diminishing intensity, into the visible region on the one hand and far into the ultra-violet on the other. The latter portion they have photographed by means of a single calcite prism, using a long exposure. "The spectrum exhibits the appearance of a series of rhythmical groups more or less overlapping one another, and the arrangement of the lines in these groups is shown to follow, in many cases the law that the distances between the lines, as measured, in wave-lengths, are in arithmetical progression." Their researches apparently confirm the theoretical conclusions of Dr. Grünwald of Prague, for they discovered a number of lines which apparently occupy the positions which they should according to his hypothesis.—*Royal Society*, Feb. 2; *Nature*, Feb. 16, 1888, p. 383.

J. T.

7. *Application of the Electrolysis of Copper to the Measurement of Electric Currents.*—In the process of standardizing Sir William Thomson's new electrical instruments, Mr. GRAY has been led to examine the accuracy of the method by means of the deposition of copper, and concludes that the constant of an electric current instrument can be obtained with certainty, by this method, to one-twentieth of one per cent.—*Phil. Mag.*, March, 1888, p. 179.

J. T.

8. *Influence of light upon electrical discharges.*—Hertz in a previous number of the *Annalen der Physik* having called attention to a remarkable influence of the ultra-violet rays upon electrical discharges, E. Wiedemann and H. Ebert repeated his researches and have confirmed his results. When a spark will no longer pass between the terminals of a Ruhmkorff coil, if a beam of ultra-violet light falls upon the electrodes the spark will traverse the interval between the electrodes. Wiedemann and Ebert show that the effect is also produced by the light of burning magnesium and that the effect is confined to the ultra-violet rays; red and green producing no effect. The effect is produced at the negative electrode and not at the positive. The authors studied the effect in various gases, and at different pressures. The phenomenon varied with the pressure and with the medium. The same number of the *Annalen* contains a paper by W. Hallwachs on the influence of light upon electrostatically charged bodies. He finds that the ultra-violet rays modify the charge and the insulating properties of bodies.—*Annalen der Physik und Chemie*, No. 2, 1888, pp. 241-264, 301-312.

J. T.

9. *Wave-lengths of standard lines.*—In a long paper continued through two numbers of the *Annalen der Physik*, F. KURLBAUM discusses the various methods of measurement of wave-length, and gives the results of the most refined methods which his experience has led him to adopt. His measures of the wave-length of one of the components of the sodium line, D<sub>1</sub>, compare as follows with those of previous observers:

D<sub>1</sub>=589, 625, Müller, Kempf.

607, } Bell.

603, }

602, Peirce.

589, 590, Kurlbaum.

—*Annalen der Physik und Chemie*, No. 2, 1888, pp. 381-412.

J. T.

## II. GEOLOGY AND NATURAL HISTORY.

1. *On the distribution of strain in the Earth's crust resulting from secular cooling, with special reference to the growth of continents and the formation of mountain chains*; by CHARLES DAVISON. With a Note by G. H. DARWIN.—Starting from the results reached by Sir W. Thomson and independently by Prof. Darwin in regard to the rigidity of the earth, and from the conclusions of the former as to the secular cooling of the earth, Mr. DAVISON has gone forward and discussed the distribution of strain in a solid globe resulting from secular cooling with reference to the effect of this distribution on the great features of the earth's surface. His conclusions, as will be seen, throw much light upon what he terms "the beautiful contraction-theory of mountain evolution" to which the work of Thomson and Darwin leads up.

The author starts by supposing that the earth is bounded by a smooth, spherical surface and is made up of a great number of very thin concentric shells, each so thin that the loss of heat may be considered throughout as uniform. The first conclusions reached are:

1. "That the rate at which any shell parts with its heat increases to a certain depth below the earth's surface, where it is a maximum, after which it decreases toward the center, and the depth of the surface of greatest rate of cooling is continually increasing, and varies as the square root of the time that has elapsed since the consolidation of the globe." Also,

2. "Folding by lateral pressure takes place only to a certain depth below the earth's surface; at this depth it vanishes, and, passing through it downwards, folding gives place to stretching by lateral tension."

Accepting now, for the sake of simplicity, 174,240,000 years as the time that has elapsed since the consolidation of the earth, a period which lies well between the limits set by Sir W. Thomson and for which the depth at which the rate of cooling becomes practically insensible is 400 miles, the following conclusions are reached:

3. "(1) Folding by lateral pressure changes to stretching by lateral tension at a depth of about five miles. (2) Stretching by lateral tension, inappreciable below a depth of about 400 miles, increases from that depth toward the surface; it is greatest at a depth of 72 miles, that is, just below the surface of greatest rate of cooling; after this, it decreases, and vanishes at a depth of

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