to extend our inquiries. In bringing our labours to a termination, we feel very strongly that many of the subjects with which we have dealt need much further elucidation by perseverance in experimental research of the kind which we have pursued. We are convinced that if the work which we are relinquishing were continued, the knowledge of the conditions to be fulfilled for securing safety from preventable disasters, and the development of resources and appliances calculated to promote the fulfilment of those conditions, could still be much advanced. It is moreover certain that new subjects for inquiry connected with the safe working of coal-mines must continue to present themselves, as has been the case during our seven years' experience. These considerations have impressed upon us the need for the official establishment of some permanent arrangement by which the continuous pursuit of this highly important class of work would be secured, and by which, also, the merits of suggestions and inventions presenting themselves from time to time would be investigated properly and thoroughly, and dealt with authoritatively. We consider, moreover, that the complete investigation of coal-mine disasters would be greatly promoted if the arrangements to which we have referred were utilised systematically, in connection with the usual official inquiries, in dealing with the difficulties which frequently arise in elucidating the causes of these disasters.

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WARINGTON W. SMYTH.   THOS. BURT.
CRAWFORD AND BALCARRES.   R. B. CLIFTON.
GEORGE ELLIOT.   W. THOMAS LEWIS.
F. A. ABEL.   LINDSAY WOOD.
JOHN TYNDALL.

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March 15, 1886

SCIENTIFIC SERIALS

IN the *Journal of Botany* for March Mr. G. A. Holt describes and figures a species of moss, *Thamnium angustifolium*, not only new to Britain, but new to science. It was found sparingly in Derbyshire.—Mr. J. G. Baker concludes his comparison of the British and Continental forms of the difficult genus *Rubus*.

Proceedings of the Linnean Society of New South Wales, vol. x. part 3, Sydney, December 21, 1885.—This part contains the proceedings of this most energetic Society for July, August, and September, 1885, and memoirs by the following :—Dr. R. von Lendenfeld, monograph of the Australian sponges, part 5 (plates 26–35). The Auleninæ, order 3, the Ceraospongiæ, Halme, Aphrodite, Aulena, and Halmopses are established as new genera. part 6 (plates 36–38), on the genus Euspongia.—On a sponge destructive to oyster culture in the Clarence River, a new species of Chalinulæ.—Addendum to the Australian sponges.—Addendum to the Australian Hydromedusæ.—Note on the Glacial period in Australia.—W. A. Haswell, M.A., jottings from the Biological Laboratory of the Sydney University, on an Australian species of Bonellia ; on a greater respiration in fresh-water turtles. From observations on the Australian *Chelodina longicollis*, thinks the phenomena described by S. H. Gage as auxiliary respiration extremely improbable and that the Chelonian can bear with impunity being deprived of oxygen for lengthened periods ; but the facts recorded by Simon and Susanne Gage in the March 1886 number of the *American Naturalist* cannot thus be interpreted.—Capt. Hutton, on the supposed Glacial period in Australia.—N. de Miklouho-Maclay, plants used by the natives of the Macleay Coast, named by Baron Müller.—George Masters, catalogue of the hitherto-described Coleoptera of Australia, part 1, Cicindelidæ and Carabidos (960 species enumerated).—J. Douglas-Ogilby, three new fishes from Port Jackson ; notes on the distribution of some Australian sharks and rays.—A. Sidney Olliff, new species of Australian Coleoptera belonging to the genera Lacordairia, Xanthophæa, Plagioteium, Catosiopus, and Rhysodes.—W. Macleay, on a new genus (Phalacrognathus) of the sub family Lamprimides.—Rev. Dr. Wools, on double flowers.—K. H. Bennettt, remarks on the decay of certain species of Eucalyptus. The species were almost without exception *E. mellidora* and *E. rostrata*, and the cause is ascribed to the enormous increase in the numbers of the opossums. Some idea of the number of this animal in a portion of Gipps' Land may be had from the fact that four men in a short time procured a quarter of a million of skins.

Rivista Scientifico-Industriale, February 28.—Description of a new telescope, the "plesiotelescope," by Prof. Nicodemo

Jadanza. This is an astronomical instrument intended for the study of near and distant objects. It is constructed with an achromatic objective, M, to the second focus of which is attached a second lens, N, at a less focal distance than that of the lens M. These two lenses form a compound objective, which brings into view objects at short and great distances.—A new application of electrolysis, by G. F. The anonymous author describes a process for producing damascened work rapidly and economically by electrolysis.—Note on the explosion of boilers in steam-engines, by Prof. Giovanni Luvini. The author traces the bursting of boilers to their chief causes, suggests a practical remedy, and offers some remarks on a means of generating steam with a saving of fuel.—A description of Prof. E. Lommel's aërostatic scales for determining the specific weight of gases, by G. Faè.

Bulletin de l'Académie Royale de Belgique, January.—Description of some crystals of calcite, by Prof. C. Casaro. The author describes a first series of Belgian calcites, comprising the crystals found along the left bank of the Meuse and in some other localities. These are reduced to thirty-two simple forms, of which three are new. — On the difference of sea-level in winter and summer, by Gen. Commines de Marsilly. It is argued that the Polar seas must be higher in summer than in winter, when the accumulation of ice increases the salinity, consequently also the density, of the water.—Note on the display of meteors observed throughout Belgium on November 27, 1885, by F. Folie. The maximum of intensity was generally about 6 p.m., when as many as 155 meteors were observed in a single minute at Louvain.—A contribution to the study of the germ-cell in the lower animal organisms, by C. Van Bambeke. —On the coefficient of internal friction of fluids : determination of its variations according to temperature. Theoretical considerations suggested by the observation of these variations, by P. de Heen.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 11.—"On Systems of Circles and Spheres." By R. Lachlan, B.A., Fellow of Trinity College, Cambridge. Communicated by Prof. A. Cayley, F.R.S.

This memoir is an attempt to develop the ideas contained in two papers to be found in the volume of " Clifford's Mathematical Papers " (Macmillan, 1882), viz. " On Power Co-ordinates " (pp. 546–55), and " On the Powers of Spheres " (pp. 332–36). The conception of the "*power* of two circles," or spheres, as an extension of Steiner's use of the "*power* of a point with respect to a circle," is due to Darboux.

The memoir is divided into three parts : Part I. consists of the discussion of systems of circles in one plane ; Part II. of systems of circles on the surface of a sphere ; and Part III. of systems of spheres.

The power of two circles is defined to be the square of the distance between their centres less the sum of the squares of their radii.

Denoting the power of the circles $(1, 2)$ by $\pi_{1, 2}$ it is proved that the powers of any five circles $(1, 2, 3, 4, 5)$ with respect to any other circles $(6, 7, 8, 9, 10)$ are connected by the relation—

$$\begin{vmatrix} \pi_{1,6} & \pi_{1,7} & \pi_{1,8} & \pi_{1,9} & \pi_{1,10} \\ \pi_{2,6} & \pi_{2,7} & \pi_{2,8} & \pi_{2,9} & \pi_{2,10} \\ \pi_{3,6} & \pi_{3,7} & \pi_{3,8} & \pi_{3,9} & \pi_{3,10} \\ \pi_{4,6} & \pi_{4,7} & \pi_{4,8} & \pi_{4,9} & \pi_{4,10} \\ \pi_{5,6} & \pi_{5,7} & \pi_{5,8} & \pi_{5,9} & \pi_{5,10} \end{vmatrix} = 0,$$

which may be conveniently written—

$$\pi \begin{pmatrix} 1, & 2, & 3, & 4, & 5 \\ 6, & 7, & 8, & 9, & 10 \end{pmatrix} = 0.$$

This is the fundamental theorem of the paper ; it is shown that, if the power of a straight line and a circle be defined as the perpendicular from the centre of the circle on the straight line, and the power of two straight lines as the cosine of the angle between them, then the theorem is true if any circles of either system be replaced by points, straight lines, or the line at infinity.

The general theorem is then applied to prove some properties of special systems of circles, and more particularly those systems