

Session 1881, drawing attention, under the chief heads of the subject, to the facts and opinions elicited from the examination of a large number of competent witnesses.

Experimental inquiries, which will be the subject of a further report, have been instituted for the purposes of testing the various safety-lamps in use, as well as the numerous modifications recently proposed, and of determining the effect of coal-dust in causing or aggravating explosions. From time to time also experiments have been made with a view to substitute, in the breaking down of coal, some other means for the gunpowder shots which have so often, by their flame, caused the ignition of fire-damp.

The presence of a powerful "blower" of natural gas at the Garswood Hall Colliery, near Wigan, with the facilities offered by the proprietors, induced the Commission to erect suitable apparatus for a long series of these trials, and now that it appears desirable to compare the results with what may be obtained in another district and with a differently constituted fire-damp the whole of the apparatus is in course of erection at a colliery in the Rhondda Valley, where a very permanent "blower" offers similar advantages.

In the course of the lamp experiments it came out very clearly, in confirmation of statements before made, that the greatly augmented ventilation in our larger modern collieries has put an end to the fancied security of the simple Davy and Clanny lamps. Their use in fact, unless they be protected by some farther contrivance, is attended with the most imminent risk when the velocity of a current liable to be rendered explosive, exceeds six feet a second. A high degree of importance thus attaches to the comparative trials of lamps in which the flame is sufficiently shielded against the impinging stream of air, and those which have the property when immersed in an explosive mixture, of rapidly quenching both the flame of the wick and of the burning fire-damp.

The terrible disaster which occurred in September, 1880, at the Seaham Colliery, drew more anxious attention than ever to the question of the part played by coal-dust, and a special reference having been made by the Secretary of State for the Home Department to Prof. Abel, C.B., the experiments at Garswood Hall were largely extended. Some of the results were very remarkable; the proportion of fire-damp present with the air may be so small as to elude detection by the ordinary test of the carefully watched flame in the safety-lamp, and yet the presence of dust in suspension will cause rapid ignition, or even explosion, in a degree varying with the proportion of gas and the velocity of the current. Dust was employed from different parts of the works of several collieries where it was suspected that this agent had borne a serious part in intensifying and spreading explosions; and it was found that some of the varieties were far more sensitive than others. Certain kinds of dust, in themselves perfectly non-combustible, were similarly tested, and proved to have an analogous effect in promoting explosion, even when the percentage of gas was exceedingly small.

It is obvious from these facts that under certain conditions it is very important that a satisfactory indicator of minute proportions of fire-damp should be employed; and the further experiments proposed to be carried out by the Commission will include a particular inquiry into this subject.

The question of the feasibility of the introduction of the electric light into the workings of a colliery has been partially solved. The Stanton Coal and Iron Company were induced by the Commission to make a trial of Mr. Swan's lamps in their Pleasley Colliery, near Mansfield. Not only the inset and main road, but some of the "long-wall" faces of work, were brilliantly lighted in this manner. A second experiment of the same kind has been carried out at the Earnoch Colliery, near Hamilton.

The use and abuse of explosives in mining operations have in the last few years formed a subject of much inquiry, especially with reference to the firing of shots in coal-seams liable to be invaded by fire-damp. A return to mere wedging in all cases, as proposed by some officials, would be to ignore the advance of science as well as the necessities caused by competition; and the Commission hopes by further examination, and especially by practical trials, to contribute useful information to the solution of a difficult but important question.

Among the applications of scientific apparatus the employment of the ingenious protected lime-light lamp, and of the portable breathing arrangement of Mr. Fleuss, during the operations for re-opening of parts of the Seaham Colliery, deserves special notice.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—Messrs. W. M. Hicks and W. W. R. Ball are appointed Moderators in the Mathematical Tripos for the year beginning next May. The Senior Wranglership will in future be adjudged in June.

The Examiners for the Natural Sciences Tripos in 1882 are Lord Rayleigh, Prof. W. J. Lewis, Prof. Morison Watson (Owens College), Drs. Gaskell, R. D. Roberts, and Vines, Mr. A. G. Vernon Harcourt (Oxford), and Prof. A. M. Marshall (Owens College).

Mr. R. T. Glazebrook, Demonstrator of Experimental Physics, is approved as a Teacher of Physics, and Mr. A. S. Lea, Lecturer at Caius College, is approved as a Teacher of Physiology for the purpose of Medical Studies.

Clare College offers a Natural Science Scholarship, examination March 28; subjects: Chemistry, Chemical Physics, Botany, Geology. Candidates must give notice a fortnight previously to the tutor.

GLASGOW.—The matriculations for the present session number 2316, distributed among the various Faculties as follows, viz.:—In Arts 1327, in Medicine 624, in Law 211, in Theology 100, in Arts and Medicine 25, in Arts and Law 9, in Arts and Theology 20. The total number of matriculations last session was 2304, distributed as follows:—In Arts 1406, in Medicine 563, in Law 189, in Theology 85, in Arts and Medicine 29, in Arts and Law 18, in Arts and Theology, 14.

SCIENTIFIC SERIALS

Journal of the Franklin Institute, October.—Experiments on the strength of wrought iron and steel at high temperatures, by Mr. Roelker.—On the proper method of expansion of steam and regulation of the engine, by Prof. Thurston.—On the last experiment with the Perkins machinery of the anthracite, by Ch. Eng. Isherwood.—Radio-dynamic facts, by Dr. Chase.—Universal energy of light, by the same.

Annalen der Physik und Chemie, No. 10.—Photometric researches on absorption of light in isotropic and anisotropic media, by C. Pulfrich.—On the vapour-tension of mixed liquids (continued), by D. Konowalow.—On the heat of formation of water, by A. Schuller.—On the heat-conductivity of gases and its connection with temperature, by L. Graetz.—Past observations on the expansion of water by heat, by P. Volkmann.—On the theoretical determination of vapour-pressure and volumes of vapour and liquid, by R. Clausius.—On heat-conduction in a system of cylinders, and on the experimental determination of the conductivity of water, by H. Lorberg.—On magnetic reaction, by F. Auerbach.—Application of the balance to the problem of gravitation, by Ph. v. Jolly.—On the spectra of hydrogen and acetylene, by A. Willner.—Some remarks on Herr Wesendonck's experiments on spectra of carbon compounds, by the same.—The minimum of deflection of a ray of light in a prism, by K. H. Schellbach.—Contribution to history of natural sciences among the Arabians, by E. Wiedemann.

La Natura, Nos. 21 and 22, November.—The Italian section at the Paris Electrical Exhibition, by R. Ferrini.—Thermal radiation of the sun, &c. (continued), by C. Cattaneo.—On the origin of electricity of storm-clouds and of the air, and on electricity in general, by F. G. Nachs.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, November 17.—"Researches on Chemical Equivalence." By Edmund J. Mills, D.Sc., F.R.S., and J. H. Bicket. Part IV.: Manganous and Nickelous Sulphates.

The authors have examined the precipitability and precipitation of manganous and nickelous sulphates, alone or commixed, by means of sodic carbonate. The chemical events they describe are represented in a series of four hyperbolas, whose equations are given in the memoir. They sum up their results as follows:—(1) Precipitability is a linear function of mass; (2) when the commixed sulphates are precipitated by sodic carbonate, equal weights of them are equally precipitable, the attraction of one of them for the reagent being the inverse of that of the other; (3) when the sulphates are separately precipitated by the same reagent, they are equally precipitable, and do