

Speaking at the Birmingham Chamber of Commerce last week, Mr. Neville Chamberlain said they were on the eve of a new departure in the educational life of Birmingham. They were looking forward to the rise of a University which would take up new and special lines, including commercial education. That was a great experiment, and it seemed to him to be the duty of that chamber, as representing the commercial life of Birmingham, to do what it could to ensure the success of the experiment.

### SCIENTIFIC SERIALS.

*Bulletin of the American Mathematical Society*, October.—The number opens with a partial analysis of the papers communicated at the sixth summer meeting of the Society, held at Columbus, Ohio, in August last, by Prof. Holgate.—The President, Prof. Woodward, congratulated the Society on the manifest interest in mathematical study and investigation as evidenced by the large number (twenty-three) of communications presented.—A report on the recent progress in the theory of linear groups is an interesting and thorough report by Dr. L. E. Dickson, which was made before Section A of the American Association for the Advancement of Science at its meeting at Columbus, previous to the above gathering of the Society. It is a supplement to the previous report, drawn up by Dr. G. A. Miller, which appeared in the February (1899) number of the *Bulletin*. The author restricts himself to finite linear groups, and of these he considers first the finite collineation groups and afterwards the linear congruence groups and the more general groups in Galois fields. These reports are very useful to students of the subject.—A few shorter notices (small reviews) follow.—The "Notes" contain many items of interest, but two of them are not quite accurate. For instance, the London Mathematical Society has *not* decided to issue its *Proceedings* in two volumes per annum. The resolution, as stated in the appendix to Volume xxx., says "in future the volumes of *Proceedings* shall contain as nearly four hundred pages as may be found convenient, provided that each volume shall begin with the report of proceedings at a meeting, not necessarily an annual general meeting." This may sometimes result as in the "Notes," but not necessarily so. A statement on p. 40 would lead one to infer that Dr. Graves was professor at Trinity College, Dublin, at the time of his death, and had been so ever since 1843.

*American Journal of Science*, November.—March weather in the United States, by O. L. Fassig. If the earth's surface were uniform, the normal circulation of air would produce two belts of high pressure at a latitude of about 30° north and south. The presence of continents breaks up these areas. The author shows that the "permanent" high pressure areas have a great determining influence upon weather in its general aspects, and that a considerable advance in forecasting work may be expected to result from their study. The March weather of the United States is determined by the relative extent of three such areas, and the course of the March storms lies along the gap between them.—Some new minerals from the zinc mines at Franklin, N.J., by S. L. Penfield and C. H. Warren. The minerals include "hancockite," which has the general formula of epidote, but having lead and strontium isomorphous with calcium; "glaucochroite,"  $\text{CaMnSiO}_4$ , closely allied to monticellite,  $\text{CaMgSiO}_4$ ; and its matrix "nasonite," the empirical formula of which is  $\text{Pb}_6\text{Ca}_4\text{Cl}_2(\text{Si}_2\text{O}_7)_3$ . The authors also investigate the chemical composition of ganomalite, and show that the acid,  $\text{H}_6\text{Si}_2\text{O}_7$ , of which nasonite and ganomalite are salts, is intermediate between orthosilicic acid,  $\text{H}_4\text{SiO}_4$ , and metasilicic acid,  $\text{H}_2\text{SiO}_3$ , and may be regarded as their algebraic sum, or as derived from two molecules of the former by abstraction of water.—Action of acetylene on the oxides of copper, by F. A. Gooch and D. Baldwin. While metallic copper may at comparatively high temperatures induce the polymerisation of acetylene, it is an oxidising action which starts at moderately low temperatures the formation of the peculiar "acetylides." Thus it is found that ferric oxide heated in acetylene at temperatures varying from 150° to 360°, according to circumstances, darkens, glows, and gathers with evolution of heat a dark carbonaceous deposit. In the products of such action the content of iron varies from 2.8 to 5.8 per cent. Silver oxide also acts upon acetylene.—A new mode of occurrence of ruby in North Carolina, by J. W. Judd and W. E. Hidden. Corundum occurs in North Carolina in three

different forms. In the ordinary schists of the district, long prismatic crystals, usually of grey, pink and blue tints, occur. In the peridotites, crystals are found, some of very great size and of great variety of colour, but seldom or never clear and translucent. In certain garnet-bearing basic rocks at Cowee Creek, small tabular and short prismatic crystals are abundant, and these very frequently exhibit the transparency and colour of true ruby.

*Wiedemann's Annalen der Physik und Chemie*, No. 10.—Explosions in air, by W. Wolff. The effect of an explosion in air is propagated by a process analogous to the propagation of sound, except in the immediate neighbourhood of the source, where a bodily translation of the air is superadded. But that translation does not extend further than about 25 m. Up to that point the propagation of the wave is more rapid than the propagation of sound.—Glow-light phenomena with high-frequency alternate currents, by H. Ebert. There is a residual effect of the positive charge in the glow-light, which persists for a short time after the glow has ceased. This produces a repulsion between the two electrodes.—Influence of impurities upon a gaseous spectrum, by P. Lewis. The addition of very small quantities of mercury vapour to hydrogen gives rise to the green mercury line, which only disappears at -20 degrees. When oxygen is added to hydrogen in increasing quantities, the maximum of emission is shifted towards lower pressures. Resistance to projectiles in air, by R. Emden. The resistance offered by air is jointly proportioned to the square of the velocity,  $v^2$ , and to another function of the velocity,  $f(v)$ . The latter quantity is constant up to the point where  $v$  becomes the velocity of sound. Then it abruptly increases to about three times its former value, remaining constant at high velocities. The increase is due to the energy expended in producing and maintaining the head wave.—Electric pictures, by L. Fomm. The author produces pictures of sections of different kinds of wood by covering them on one side with tinfoil and on the other with bromide paper, with the film in contact with the wood. A metallic point negatively charged by an influence machine, mounted at 5 cm. from the paper surface, produces a good impression in about half a minute.—The Macfarlane-Moore vacuum vibrator, by J. Elster and H. Geitel. To avoid the sticking of the vacuum interrupter the authors keep it vibrating by a separate interrupter outside the vacuum tube, in unison with the one inside.—A fault in Lippmann's photography, by O. Wiener. There is always a difference of phase between the wave reflected by the gelatine surface and that reflected by the first elementary stratum. The remedy consists either in eliminating the surface reflection altogether, as by immersing the plate in benzol, or in producing a large difference of path, by coating the gelatine with a film of collodion. With a suitable thickness of the latter, very brilliant and true effects are obtained.

### SOCIETIES AND ACADEMIES.

#### LONDON.

**Royal Society**, June 15.—"On the Resistance to Torsion of certain forms of Shafting, with special reference to the Effect of Keyways," by L. N. G. Filon, M.A., King's College, Cambridge, Fellow of University College, London.

In this paper solutions of the torsion problem are obtained for cylinders whose cross-sections are bounded by confocal ellipses and hyperbolas. The method employed is that of conjugate functions, suggested by Saint-Venant, Thomson and Tait, Clebsch, Boussinesq and MacDonald, and applied by them to other cases.

The strains and stresses are obtained in the form of infinite series of circular and hyperbolic functions. There are two types of sections specially studied.

The first is bounded by an ellipse and by the two branches of a confocal hyperbola. The solution is worked out numerically for various values of the eccentricity of the ellipse and of the angle between the asymptotes of the hyperbola.

The position of the fail-points, or points of maximum strain and stress, is investigated at length.

It is shown that the maximum stress does not always occur, as is usually assumed, at the point of the boundary nearest to the centre of the section, but that in some cases there are four fail-points symmetrically distributed round the contour, on the broad sides of the section.