line lye resembled that of an alkaline solution of impure alizarin.

These experiments lead to the conclusion that the red colour of the fabric was produced by dyeing with some kind of madder, either wild or cultivated, the fabric having been previously treated with a mixed aluminous and ferric mordant, and then probably oiled—that it was, in fact really a kind of Turkey red.

Maroon.—The dull chestnut colour of this fabric presented a striking contrast to the bright red of the preceding. Its constitution was, however, similar. Having treated it in the same way as the other, I found that the colouring matter must have been derived from madder; fatty matter was also present, but the mordant contained a larger proportion of ferric oxide, a fact which sufficiently explains the brown tint of the dyed fabric.

Purple.—The fabric in which this colour was seen was made up of a pale yellow warp, and a weft of a dull purple or claret colour. The latter colour was found to be due to an intimate mixture of red and blue, for the threads, on examination under the microscope, were seen to consist partly of red, partly of blue fibres, the former predominating. The two sets of fibres had, of course, been mixed before spinning. The blue fibres were certainly dyed with indigo, the red probably with madder.

Black.—The colour of the black fabric, like that of the green, was a compound of two colours, one overlying the other. Under the microscope the individual threads appeared grey. On treatment with a mixture of alcohol and hydrochloric acid they changed colour, a yellow liquid being obtained, while the fabric itself now appeared blue, and after washing and drying yielded indigo by appropriate treatment. The yellow alcoholic liquid was found to contain purpurin. The colour may be supposed to have been produced in the following manner:—The woollen fabric having first been dyed blue was mordanted, to use a modern phrase, and then dyed with madder, the two colours together producing the effect of black.

EDWARD SCHUNCK.

SCIENTIFIC SERIALS.

IN the *Botanical Gazette* for July, August, and September, there are several papers of general interest. Mr. G. A. Rex presents a further contribution to our knowledge of the Myxomycetes in an account of the genus *Linbladia.*—Mr. D. T. McDougal gives a detailed account of the morphology and anatomy of the tendrils of *Passiflora cærulea.*—Mr. M. B. Thomas describes and figures an apparatus for determining the periodicity of root-pressure in plants.—Mr. C. L. Holtzman has a short paper on the Apical growth of the stem and the development of the sporange in *Botrychium virginianum*, his observations favouring the view that the Ophioglossaceæ are a more primitive form than the typical Filices.—Mr. A. F. Foerste continues his observations on the Relation of autumn to spring-blossoming plants.—Mr. Charles Robertson gives a further instalment of his series of papers on Flowers and insects.—A brief report is given of the botanical papers read at the recent meeting of the American Association for the Advancement of Science.

IN the *Journal of Botany* for September and October, no less than four new species are added to the British flora and to science—*Hieracium hibernicum*, *H. duriceps*, and *H. Bread-albanense*, by Mr. F. J. Hanbury; and *Ranunculus petiolaris* (sect. Flammula) by Rev. E. S. Marshall.—Rev. W. Moyle Rogers continues his Essay at a key to British Rubi; Mr. E. G. Baker his Synopsis of genera and species of Malveæ; and Mr. W. A. Clarke his First Records of British Flowering Plants.

Bulletin of the New York Mathematical Society. Vol. ii. No. 1, October, 1892. (New York.)—Prof. Cajori opens this number with an interesting note on the evolution of criteria of convergence (pp. 1–10), in which he discusses some special and general criteria furnished in the writings of Gauss, Cauchy, Abel, DeMorgan, Bertrand, Kummer, and others, and notices specially the remarkable advance made by Pringsheim (*Math. Ann.* vol. xxxv.).—Dr. A. Martin calls attention (pp. 10–11) to a slip in Ball's "Short History of Mathematics" (p. 102), the probable origin of which is accounted for by Mr. Ball.—There is a slight review of Chapman's "Elementary Course in the Theory of Equations" (pp. 11–12), and the rest of the issue is taken up with the usual list of new publications and notes. In these last Dr. Martin points out a curious error in the Royal Society "Catalogue of Scientific Papers," vol. ix. (:874–1883), where, of the papers accredited, on p. 790, to Ezekiel Brown Elliott, Nos. 5–11, 14–17 should be assigned to Mr. Edwin Bailey Elliott, of Oxford, and not to the late Mr. Ezekiel Brown Elliott, of America, to whom Nos. 4, 12, 13 are rightly attributed.

IN the *Bullettino* of the Botanical Society of Italy, we find in addition to papers of more local interest, a further communication from Sig. Macchiati on the Cultivation of diatoms, in which he states that the presence of infusoria and of diatoms in the water is mutually beneficial to one another, while the most destructive enemies of the latter are bacteria.—A paper by Sig. Piccioli on the Biological relations between plants and snails, is chiefly devoted to the protective contrivances found in the former against the attacks of the latter, the most important of which are of a chemical nature—tannin, latex, oleiferous glands, and poisonous salts such as calcium oxalate: mechanical means of protection, such as hairs and a comparatively thick cuticle, play a subordinate part.—In a further communication by Prof. Arcangeli on the Cultivation of *Cynomorium coccineum*, he states that he does not find such an intimate parasitism with its host as is the case with the Rafflesiaceæ and the Balanophoraceæ.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, October 24.—M. de Lacaze-Duthiers in the chair.—Researches on the fixation of atmospheric nitrogen by microbes, by M. Berthelot. The investigation was made in order to elucidate the mechanism of the fixation of atmospheric nitrogen. It appears that the presence of green vegetable material is not essential to the process. The colourless bacteria are able to absorb nitrogen when supplied with humic acid only as nutriment. The assimilation takes place more readily with natural than with artificial humic acid, probably because the former contains more nitrogen. In experiments with hermetically sealed cultivations it was found that the gain of nitrogen by the organic material under cultivation was 6 or 9 per cent. in excess of that supplied by the humic acid, the difference being derived from the enclosed air. With an occasional stream of dust-laden air this was brought up to 30 per cent.—Coloured photographs of the spectrum on albumen and bichromated gelatine, by M. G. Lippmann. Albumenized and gelatinized plates soaked in bichromate of potash may be employed for photographing in colours. They are used like silver-salt plates, being placed so that the mercury is in contact with the film. The colours will appear immediately after immersion in water, which develops and also fixes the image. It disappears on drying, but reappears as soon as the plate is soaked. The colours are very brilliant, and visible at all angles. Those of gelatine plates are brought out by simple breathing. The theory is analogous to that of silver plates, the maxima and minima of interference producing hygroscopic and non-hygroscopic layers with varying refractive indices.—The irrigation canals of the Rhone, by M. Chambrelent.—A new apparatus, the schiseophone, serving the purpose of exploring the internal structure of metallic masses by means of an electro-mechanical process, by M. de Place. The apparatus consists of a microphone and an induction sonometer. To the microphone is attached a rod of hard steel, kept oscillating once or twice per second, and striking each time against the casting or other mass of metal under investigation. The sonometer, consisting of two coils movable towards or away from each other along a divided scale, with a telephone connected with one of the coils, is placed in another room, and joined by wires to the microphone. The coils being so adjusted that the tapping is scarcely perceptible at the sonometer, the casting is moved so as to expose various portions to the impacts. If the thickness be uniform, any flaw or fissure will be at once indicated by a change in the sound.—Observations of the comet Barnard (D 1892), made at the Paris Observatory, by M. G. Bigourdan.