

the Sultan of Bikari they had established a station, commencing operations by rescuing abandoned infants. The Abbé Debaize, on the other hand, had been twice deserted by his porters, had been plundered of a great part of his outfit, and had returned sick and discouraged to Ujiji, where the Algerian and English missions were nursing him. It was not known whether he would recommence the exploration intrusted to him by the French Government.

THE death is announced of Prof. Wappæus, of Göttingen, an industrious German geographer.

THE newly-established Geographical Society of Rochefort has just issued the first number of their *Bulletin*, the more noteworthy contents of which are a paper by M. L. Delavaud on the Portuguese in Central Africa before the seventeenth century, and another by M. Silvestre on Indo-China.

ON THE HETEROSTYLISM OF "MELOCHIA PARVIFOLIA"

MELOCHIA PARVIFOLIA, H.B.K. (nova gen. et spec., pl. v., 325) is a very common plant on the dry plains in the neighbourhood of Carácas, where it flowers nearly all the year round, and not only in the month of January, as Kunth says in his description, which in all other respects is a very complete and good one. I was led to notice the heterostylism of this plant when comparing carefully Kunth's words with a specimen I had brought home. Humboldt's specimen belonged to the long-styled form, for Kunth says:—*Stamina petalis dimidio breviora, Styli longitudine petalorum*. Mine was short-styled, so that I found these proportions to be inverse. I searched immediately our *sabanas* (or plains) for long-styled plants, and came at once across a considerable number of both forms. A comparison of their flowers gives the following result:—

<i>Short-styled Flowers.</i>	<i>Long-styled Flowers.</i>
1. Stamens as long as the petals.	1. Stamens half as long as the petals.
2. Styles scarcely half as long as the stamens.	2. Styles as long as the petals.
3. Stigmata with few and short papillæ.	3. Stigmata with many and rather long papillæ.
4. Styles without stellate hairs.	4. Styles with stellate hairs.
5. Pollen grains:—	5. Pollen grains:—
<i>a.</i> Dry, globular, diam. 0.044 mm.	<i>a.</i> Dry, elliptical, obtusely triangular in cross-section, diam. 0.044 × 0.024 mm.
<i>b.</i> In water, globular, diam. 0.060 mm.	<i>b.</i> In water, globular, diam. 0.052 mm.
<i>c.</i> In alc. abs., globular, diam. 0.036 mm.	<i>c.</i> In alc. abs., elliptical, diam. 0.040 × 0.028 mm.

(My measurements were made with a glass micrometer by Oberhäuser, five divisions of which are equal to 0.02 millimetres for the enlargement I used.)

It would appear that the protoplasm of the pollen-grains of the short-styled form contains a larger percentage of water, their size shrinking more in alcohol than that of the pollen-grains of the long-styled form.

Although the heterostylism of *Melochia parvifolia* might be fairly admitted from the stated morphological differences, I was desirous to try by experiments whether there was also a functional difference, as Darwin and Hildebrand have done in the case of other heterostyled plants.

Both forms of *Melochia parvifolia* seem to be equally common in our flora. This I ascertained in the following manner:—On the *Sabana de San Lázaro*, where this plant constitutes all the higher vegetation, together with *Turnera ulmifolia*, *Pavonia cancellata*, and *Elyptis suaveolens*, all the plants of *Melochia* were examined in a square, the side of which was 100 steps. There were altogether forty-two plants, twenty with long-styled flowers, and twenty-two with short-styled ones. In one single plant of the former two short-styled flowers were discovered, in all the rest each plant had only one kind of flower. I collected seeds from both forms, and began last year my experiments by sowing them in cases placed in one of the yards of my house in town. This circumstance was perhaps of some consequence, the yard being surrounded by walls 12 feet high, so that there could be next to nothing of the influence of the wind, just the reverse as in the open field.

Ten seeds taken from plants with long-styled flowers produced eight plants, which this year flowered, all the flowers being long styled ones.

Ten seeds of the short-styled form gave nine plants; two of these perished before setting flowers; the remainder produced in due time a large number of short-styled blossoms.

The last summer was very rainy, thus not at all favourable to experimental research connected with artificial fecundation. However, I tried my best, and obtained the results given in the following table, which is constructed according to Darwin's models in his "Forms of Flowers":—

Nature of union.	Number of flowers fertilised.	Number of capsules produced.	Average number of seeds per capsule.	Percentage of capsules in reference to flowers.
<i>a.</i> Long-styled form by pollen of short-styled	12	12	5 ¹	100
<i>b.</i> Long-styled form by own-form pollen, from a distinct plant	10	8	3.5	80
<i>c.</i> Long-styled form by pollen from the same flower ² ...	6	1	5	16.6
<i>d.</i> Short-styled form by pollen of long-styled	12	12	5	100
<i>e.</i> Short-styled form by own-form pollen from a distinct plant	10	9	3.3	90
<i>f.</i> Short-styled form by pollen from the same flower ³ ...	8	6	4	75
Cases <i>a</i> and <i>d</i> together (legitimate unions)	24	24	5	100
Cases <i>b</i> and <i>e</i> together (illegitimate unions)	20	17	3.4	85
Cases <i>c</i> and <i>f</i> together (illegitimate unions)	14	7	3.6	50

I think the favourable influence of cross-fertilisation is evident, as in no other case the average number of seeds per capsule reached the normal number, although there were some few capsules in the other crops which also contained five seeds.

In the open field the flowers of *Melochia parvifolia* are visited by large numbers of small hymenoptera, which fly about during the hottest hours of the day, when these flowers are open. They have no particular smell, and fade very soon; on cloudy or rainy days they do not open at all, so that not a few wither before getting fertilised, which accounts for the considerable number of seedless capsules to be found on nearly every plant.

The seeds of my crop appeared to be of good quality (their specific weight being greater than that of water). I have sown them already in separate lots, in order to find out how far they will germinate and produce strong and healthy plants, and which forms of flowers these latter will have.

A. ERNST
Carácas, November 2

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—Next term, at Cambridge, practical anatomy in the dissecting-room will commence on January 17. The professor of anatomy is to be assigned (as to his fellowship) to King's College, and not to Caius, as originally proposed; it was thought more advisable not to assign two professorial fellowships in medical science to Caius, but rather to divide the association. Prof. Paget is especially fitted to receive further honour from Caius College, and we trust he will ultimately attain the mastership.

Prof. Newton announces that his lectures will recommence on February 2; and the demonstrator will take an advanced class on Sauropsida, beginning on the same day.

¹ Normal number of seeds in *Melochia parvifolia*.
² The plant was left to itself, foreign pollen being excluded by a fine muslin-bag tied around it. The numbers show that self-fertilisation was difficult in this case; though in the open field, where the wind has its full sway, it may be much easier, and perhaps more frequent.
³ The plant was treated as stated in the foregoing note. Self-fertilisation is no doubt easier in this case, but the result of the crop was not very good.

Candidates for the natural science scholarship at Clare College are to be examined in chemistry and chemical physics, without restrictions in age.

At King's College any candidates for honours are now received, a great improvement on the old exclusiveness. The Vintner exhibition for natural science is worth 90*l.* a year, but only candidates under twenty, and British subjects, may compete, also undergraduates of the College in their first or second year. The scholarships are to be held till M.A. standing, or until election to a fellowship. Candidates in natural science must notify before March 1 in what branches of natural science they wish to be examined.

Every encouragement is now offered to selected candidates for the Indian Civil Service.

It having been decided that there should be a memorial to Prof. Clerk Maxwell, it might be suggested that a Maxwell university scholarship in experimental and molecular physics would be a great benefit, as there are scarcely any mathematical or natural science competitions open to the University. Let it be given for a specified research, rather than spend it on a posthumous bust or portrait.

MANCHESTER.—Mr. J. E. A. Steggall, B.A., scholar of Trinity College, Cambridge, mathematical master at Clifton College, Bristol, has been appointed to the Fielden lectureship in mathematics in the Owens College, vacant by the appointment of Mr. A. T. Bentley, M.A., to the principalship of the Firth College, Sheffield. Mr. Steggall graduated as second wrangler in January, 1878, and subsequently gained the First Smith's Prize. There were twenty candidates.

WE have received a very favourable report from the Liverpool School of Science, which now numbers 800 students. Before long it is hoped that a central college may be established in Liverpool, from which all existing branches with extensions may be worked.

THE Kaiser Wilhelm University at Strassburg is seemingly becoming popular in Germany. During the last term the number of students rose to 810, this being the largest number reached since the University was inaugurated.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 11, 1879.—This opens with a valuable contribution by Herr Hagenbach in support of Stokes's law, the validity of which has been somewhat controverted recently. The author regards Lommel's division of fluorescent bodies as based on no essentially different behaviour of them.—Some curious experiments on electric perforation of glass are described in papers by Herren Mach and Doubrava, and Herr Waltenhofen; the latter considers the phenomenon as "a mechanical work taking place at cost of the *vis viva* of the colliding air-molecules at the part perforated, and this transformation of energy is evidently more easily effected the stronger the molecular motions; which, when they meet an obstacle, are suddenly checked." Herr Doubrava also writes on the motion of plates between the electrodes of the Holtz machine.—A series of experiments, by Herr L. Weber, with electricity of high tension used in the telephone, seem to clear up some sources of error in like observations by other physicists, to give new proof of the availability of the telephone for observing weak periodic discharges of a conductor, and to illustrate the conception of Helmholtz and others as to electric movements in an induction circuit and electrolytes inserted in it.—The relations between velocity of rotation, resistance, current strength, and electromotive force, in the Gramme machine, are set forth by Herr Meyer and Herr Auerbach.—Other papers:—On the true theory of Fresnel's interference phenomena, by Herr F. Weber.—On the relation between galvanic resistance and specific heat, by Herr Auerbach.—On extra currents in iron wires, by Herr Herwig.—Experimental researches in determination of the indices of refraction of liquefied gases, by Herr Bleekrode.—Influence of temperature on tuning-forks, by Herr Kayser.—On galvanic conduction of metallic alloys, by Herr Elsässer.—On phosphorescence-phenomena, by Herr Stürtz.

Gazetta Chimica Italiana, fasc. x, 1879.—Researches on cobalt and nickel, and methods for distinguishing them when mixed, by Dr. Papisogli.—On the constitution of ellagic acid, by S. Schiff.—On determination of acetyl by means of magnesia, by the same.—Ozone with some noble metals, by Prof. Volta.—On paraoxymethylphenyl-cinnamic acid, and on oxymethylstilbene, by Dr. Ogliarolo.—On the action of perchloride of

phosphorus on molybdic anhydrides, by S. Piutti.—On some derivatives of naphthols, by S. Marchetti.—Researches on the diffusion of copper in the animal kingdom, by Dr. Giunti.—On amines corresponding to a toluic alcohol, by Dr. Spica.—On the preparation of hydroxylamine, by Dr. Berton. —Transformation of hydroxylamine into nitrous and nitric acid, by Dr. Berton.—On an easy and rapid process for determining at any time the nitrogen, sulphur and chlorine, in organic substances, by Dr. Spica.

Bulletin de l'Académie Royale des Sciences de Belgique, Nos. 9 and 10.—M. Montigny here describes a case of supernumerary rainbows which were only visible at the lower extremities of the principal bow (a phenomenon overlooked in works on meteorology).—M. van Mensbrugge shows how the ventral and nodal appearances of liquid veins may be explained on principles he lately enunciated.—Dr. Jorissen contributes a note on the employment of chloride of zinc as reagent for certain alkaloids, glucosides, &c.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, December 18, 1879.—"Chemico-Electric Relations of Metals in Solutions of Salts of Potassium," by G. Gore, LL.D., F.R.S.

In this investigation the author has determined the chemico-electric positions of about twenty-four elementary substances in a number of solutions, of various degrees of strength, and both cold and hot, of chloride, bromide, iodide, and cyanide of potassium, and has drawn from the results of the experiments various general conclusions. The results are exhibited in a series of tables. The experiments were made with the intention of also determining by means of a capillary electrometer the quantitative differences of electromotive force between each two consecutive elementary substances of the entire series; but after making many attempts the author was unable to construct such a form of that instrument as might be relied upon for accurately measuring such differences.

Chemical Society, December 18, 1879.—Mr. Warren De La Rue, president, in the chair.—The following papers were read:—On the specific volume of water of crystallisation, by T. E. Thorpe and J. J. Watts. Some years ago Playfair and Joule pointed out that the volumes of certain highly hydrated salts, for example, sodium carbonate with ten molecules of water, are equal to that of the water, considered as ice, which they respectively contain. This law does not hold good for salts less highly hydrated. The authors of the present paper have determined the precise relations between the specific volumes of various sulphates of copper, magnesium, zinc, nickel, cobalt, iron, and manganese, and their respective degrees of hydration. They conclude that in the case, at least of the so-called magnesian sulphates, the volume occupied by the several molecules of water varies with the degree of hydration. The first molecule occupies less bulk than any other, its mean relative value is 10.7, the value of the second molecule being 13.3, of the third 14.5, the fourth 15.4, the fifth 15.6, the sixth 15.7, the seventh 16.2. These results accord with the fact that the different molecules of water in a hydrated salt are held with various degrees of tenacity. The authors point out the importance of estimating the amounts of heat resulting from the combination of successive molecules of water.—Note on the formation of ozone during the slow oxidation of phosphorus, by H. McLeod. The active substance formed during the slow oxidation of phosphorus is probably either ozone or peroxide of hydrogen. Air in which phosphorus is slowly oxidising, was drawn through a U-tube 9½ inches long (filled with fragments of glass containing in succession sodic carbonate, a mixture of potassic bichromate and sulphuric acid, and potassic permanganate), the U-tube was at the temperature of the air or at 100° C., in both cases the gas which passed through rendered blue a solution of potassic iodide and starch, hydroxyl under these circumstances would be completely decomposed. In another series of experiments the gas was passed through a narrow U-tube heated to 150° to 200° C., but no water was formed. It is extremely improbable that ozone and hydroxyl are simultaneously formed, as these substances decompose each other. The author therefore concludes that the gas obtained during the slow oxidation of phosphorus possesses the properties of ozone and not those of hydroxyl, the only known peroxide of hydrogen.—On the analysis of organic bodies containing