

description of various galvanic elements. These subjects occupy the first volume, consisting of close on 800 pages. The second volume begins with the electrical properties of dielectrics. The section devoted to this subject is perhaps the most interesting in the volume: it contains the mathematical theory of the behaviour of dielectrics, the experimental investigation of specific inductive capacity, the detailed study of electrical machines acting by friction and by induction, together with various allied matters. Next come thermoelectricity, pyroelectricity, and the thermal effects of the discharge of accumulated electricity and of continuous electric currents. After this follows the section devoted to electrochemical action: this occupies about five hundred pages, and concludes with a chapter on the theory of electrification by contact, which completes the volume. It is intended that the whole work should be finished in four volumes, and the manuscript of the two that still remain to be published is for the most part ready.

Prof. Wiedemann's great work has been so long known to physicists that it is needless for us to dwell upon its special qualities farther than to say that it fully retains in its new form all its old characteristics. It is true that it lacks the originality and unity of treatment of Clerk Maxwell's "Electricity and Magnetism," probably the most original systematic treatise on any great branch of physics that was ever written. Nor does it equal in the clearness and elegance of its mathematical discussions the treatise of Mascart and Joubert, a work which, while not laying claim to originality in respect of matter, exhibits in a remarkable degree consecutiveness and lucidity of exposition. Prof. Wiedemann's plan precludes his attaining to these particular excellences in an equal degree. Some sacrifice of unity and consecutiveness is inevitable in a work which aims not only at giving a complete account of what is known respecting a great branch of science, but also at showing what each author has contributed to the stock of knowledge and how he has presented it. From this point of view Prof. Wiedemann's book is without a rival in any language, and is indeed unapproached by any other work. G. C. F.

FLORA OF HAMPSHIRE

Flora of Hampshire, including the Isle of Wight, or a List of the Flowering Plants and Ferns found in the County of Southampton, with Localities of the Less Common Species. By Frederick Townsend, M.A., F.L.S., &c. Illustrated with Two Plates and a Map. (London: L. Reeve and Co., 1883.)

WE have here an important addition to the already large class of English local floras. To the general botanist, as to people who have made no study of botany, it would seem that the plants of so comparatively small a region as the British Islands must have been catalogued long since, and that there is little to be done in that direction which is worth doing. It certainly is remarkable that, besides facts connected with geographical distribution, which a more minute knowledge of the plants of a country must bring to light, there are actually new plants to be found—new, that is to say, not only to Britain, but to science. A Pondweed (*Potamogeton*

Griffithii), new to science, has recently been described and figured by Mr. Arthur Bennett in the *Journal of Botany*, from specimens brought from a mountain lake in North Wales—the only place in the world where it is known to occur. Not that this is the only species peculiar to these islands. To take one example, there is a species of Centaury (*Erythraea latifolia*),¹ which has never been found anywhere in the world but on the Lancastrian sandhills; and there it is not known to have been seen more recently than 1865, if then. In Mr. Townsend's county, a Spearwort (*Ranunculus ophioglossifolius*), not hitherto found nearer these shores than Jersey, has been detected so lately as to appear only on the very last page of the book; *Spartina Townsendi* is another case in point; and another example of a plant having been long overlooked, and of which the distribution has quite recently been much extended, will be found in *Arum italicum*, which was detected in the Isle of Wight in 1854, and was afterwards found in West Cornwall and Sussex; this was recorded for Dorset last year, and its range has been extended during the present year to Kent (Folkestone). The volume now before us supplies a good illustration of the way in which novelties may turn up in the best known districts. Probably if there is one part of England which has been more thoroughly botanised than another it is the Isle of Wight; yet it was here, and in one of the best known parts—the Downs at Freshwater—that Mr. Townsend first distinguished in 1879 an *Erythraea* (*E. capitata*, var. *sphaerocephala*), which is, as he says, "a peculiarly interesting addition to the British flora. It is," he continues, "a well-marked species, and is not known now to occur anywhere else in the world but in the Isle of Wight and in Sussex. The other form of it was found some fifty years ago somewhere in the neighbourhood of Berlin (the exact locality not being known), and though sought for diligently, it has never been found again."

It will doubtless seem strange to some to learn that a volume of more than 500 closely-printed pages can be occupied by an enumeration of the plants of one English county, especially when it is considered that the pages devoted to descriptions of species are very few. An interesting and instructive article might be written in which the history and development of the local flora should be traced. To undertake such is, however, not our present purpose; but we may note one or two of the more striking features of these later contributions to local botany, of which the "Flora of Hampshire" is the most recent. One thing to be noticed is their historical nature. Messrs. Trimen and Dyer, in their "Flora of Middlesex" (1869), were the first to develop this aspect of the work: their method of quoting the first authority for the occurrence of the species as a Middlesex plant has been followed by subsequent writers, and they also did good service by quoting the synonymy of the older (and pre-Linnean) authors—a work which has been very useful to their successors. When it is considered that a book of this kind is mainly undertaken by persons interested in the history of some particular locality, it seems natural that what has been called the antiquarian side of botany should be represented, although there are those who consider that

¹ The plant so named in Continental floras is certainly not the same as that of the Lancashire sandhills.

this line of action directs attention to persons rather than plants, and is thus out of place.

Another point to which much more attention is given now than was formerly the case is the division of a county into districts. Messrs. Webb and Coleman, in the "Flora Hertfordiensis" (1849), planned their divisions with reference to the river drainage; and this has been carried out in the best floras of later times. If it were generally adopted, and if our list of county floras were complete, we should arrive at a much greater knowledge of plant distribution than we have at present. The arbitrary boundaries of counties would give way to the natural divisions afforded by the various river-basins, and one county flora would fit into another, and form a harmonious whole. This subject has lately been worked out by Mr. Boulger in a careful paper "On the Origin and Distribution of the British Flora," published in the *Transactions of the Essex Field Club*. No one who has not tried it would suspect how greatly the floras of contiguous river-basins will be found to differ from each other.

It is time, however, to speak of Mr. Townsend's important contribution to our knowledge of local botany. As is well known, the work has occupied him during a large number of years: it has, we regret to say, been retarded by the ill-health of its author, or it would have been published two years since; but Mr. Townsend tells us that the delay has enabled him to improve the book in various details. The county is divided into twelve districts, two of which are in the Isle of Wight. A small but extremely clear and useful map showing the boundaries of these is given. The usual lists of books quoted and herbaria consulted are followed by a short sketch of the plan of the flora. The distribution of each species through the districts and subdistricts is then worked out at length. We confess to feeling some disappointment at the comparative fewness of the critical notes upon species. Mr. Townsend's extensive knowledge of British plants, especially in their relations to the Continental flora, had led us to expect that we should have had a good deal of additional light thrown upon some of our critical forms; but this, although not altogether wanting, occupies but a small portion of the volume. Mr. Townsend's notes are for the most part in the appendix—an arrangement which seems to us open to various objections, not the least being the fact that these notes and descriptions are often not mentioned in the index. Two or three varieties are described and named for the first time in these pages; and occasionally a specific name new to the British flora makes its appearance, as in the case of *Glyceria declinata* of Brébisson, with which Mr. Townsend identifies a plant which he had previously considered a dwarf variety of *G. plicata*.

One or two points seem to us open to criticism. "First record" in books of this kind is usually taken to mean first record in print; but this is not Mr. Townsend's view of the phrase. Thus under *Centaurea cyanus* we find, "First record: Herb. Reeves, 1837." It does not seem to us that the existence of a specimen in a private herbarium can be considered a record of its occurrence in the ordinary acceptance of the term. Sometimes we do not quite understand the author's meaning, as when he marks the curious and interesting *Spartina Townsendi* as "certainly introduced," although it has as yet been

found nowhere else in the world. Equally puzzling is this sentence as to the specific rank of the same grass: "I believe this plant must take the rank of a sub-species; the characters which separate it from *S. stricta* being so important and distinctly marked. It is easily distinguished from *S. alterniflora*." This being so, surely it should be ranked as a full species? Mr. Townsend admits *Anthoxanthum Puelii* as indigenous, but its frequent substitution for *A. odoratum* by seed merchants throws much doubt upon its nativity: this plant, first found in Hampshire in 1874, had been collected in Cheshire two years previously, but Mr. Townsend cites the last-named county as one of those in which it "has since been found." We can, from observation of the two plants in several counties, confirm the statement of Mr. Pryor, which is doubted by Mr. Townsend, that *Viola Reichenbachiana* flowers about a fortnight earlier than the allied *V. Riviniana*. Some plants are included as natives of Hampshire on what seems to us insufficient evidence; *Silene noctiflora* is one of these, and *Orchis hircina* another. This latter, we do not hesitate to say, requires much confirmatory evidence before it can be accepted as a Hants plant; its occurrence rests solely on a manuscript note of the late Mr. Reeks, who stated that specimens had been found by a Mr. Lockart at St. Mary Bourne about 1866. The number of misprints is very considerable.

Such criticisms as these—and they might easily be extended—do not, however, prevent the "Flora of Hampshire" from taking a foremost rank among works of its class. A little more attention to uniformity would have improved the book, and, as we have shown, there is room for difference of opinion upon many of the points raised; but British botanists will be grateful to Mr. Townsend for giving them a handbook to the flora of one of the most interesting and beautiful of our English counties.

JAMES BRITTEN

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

On Real and Pseudo-Reversals of Metallic Lines

I AM much indebted to the courtesy of Prof. Liveing for a copy of a paper extracted from the *Proceedings of the Cambridge Philosophical Society*, vol. iv. part 5, p. 256, on the circumstances producing the reversal of spectral lines of metals, by Professors Liveing and Dewar. In this communication the following paragraph occurs:—"Prof. Hartley has lately (*Proc. Roy. Soc.* xxxiv. p. 84) called attention to pseudo-reversals of this class, which may be produced in the case of a strong line by over-exposure. It is well known that over-exposure (solarisation, as we used to call it formerly) produces such an alteration in the sensitive preparation of the photographic plate that the over-exposed parts cease to be developable, so that a very strong line may appear white in the negative where it ought to be black, but with a dark border, and so give the appearance of a reversed line. Prof. Hartley finds it difficult to distinguish real reversals of the class we are now discussing from these pseudo-reversals. His difficulty has not occurred to us, first, because we have always been in the habit of taking photographs in series with varying exposure, in order to get impressions both of the feeble lines in some and of strong lines in others; and