absolutely new, are worth recording, and should be well known to forest officers. Thus we are told (page 278) the proportion of water contained in wood varies according to the season. Schubler and Neuffler found in the fir (*Abies*) 53 per cent. in January and 61 in April; in the ash (*Fraxinus*), 29 per cent. in January and 39 in April. These facts prove that trees contain more water at the time of the ascent of the sap than in winter. Besides, it has been found that small branches contain more free water than large ones, and that these last contain more than the trunk, which results agree with the knowledge we possess of the porous nature of the different parts. The presence of the bark retards desiccation considerably.

Uhr having had some trees felled in June, after the ascent of the sap, and then having had them placed in the shade, found that those from which the bark had been removed had lost 34·53 per cent. of water in July, 38·77 in August, 39·34 in September, 32·62 in October; whilst those with the bark untouched had only lost during the same periods 0·41, 0·84, 0·92,0·98. Thus it will be seen that the desiccation of barked wood proceeds much more rapidly. It is only stripped trunks of small size and soft wood that dry up with the rapidity above mentioned.

The numerous woodcuts dispersed throughout the book, and more especially those showing the defects of wood, are accurate representations of the subjects intended to be illustrated. A large portion of the book is devoted to the consideration of felling and cutting up timber, and of machinery used in its manipulation. J. R. J.

OUR BOOK SHELF

Zur lehre der Parallel-projection und der Flächen. Von Prof. Dr. Wilhelm Matzka. (Prag, 1874.)
Grundzüge einer Theorie der cubischen Involutionen. Von Dr. Emil Weyr. (Prag, 1874.)

THESE two reprints from the "Abhandlungen der k. böhm. Gesellschaft der Wissenschaften" are purely mathematical, as may be gathered from their titles. The author of the first treatise states that the *orthogonal* projection of broken lines on given axes, whether in a plane or in space, has been discussed in scientific works on theoretical and practical mathematics, but the *oblique* projection has not obtained so great prominence. The subject is gone into very thoroughly by Dr. Matzka, as may be inferred from the fact of its discussion occupying 70 quarto pages.

The work by Dr. Weyr needs only to be mentioned in these columns, as his exhaustive treatment of any subject he takes in hand, especially of a geometrical character, is well known—"Nihil tetigit, quod non ornavit." The treatise occupies 54 quarto pages.

Practical Hints on the Selection and Use of the Microscope. By John Phin. (The Industrial Publication Company, New York.)

THE contents of the small volume before us fully justify the wording of its title. On the other side of the Atlantic the system of puffing worthless optical instruments seems to be on a much greater scale than in this country. "To the young student whose means are limited, and to the country practitioner whose ability to supply himself with instruments often falls far short of his desires, the offer of a serviceable microscope for a couple of dollars is a great temptation, and when the instrument in question is endorsed by a long list of clergymen, lawyers, and even editors, this temptation becomes irresistible." To show what these worthless microscopes really are, and what ought to be expected of the most ordinary one, are the main objects the author has in view in the earlier pages of the work. Further on he explains the manner of using the instrument, and the method of mounting specimens for examination. Accurate formulæ are given for the preparation of a large number of preservative solutions, amongst which we do not find any sufficiently novel to deserve special mention. It is in the practical nature of its remarks, and not in their novelty, that the value of Mr. Phin's short book rests, and to the tyro it will be found to give information of real value. Beside Mr. R. B. Tolles, J. Grunow, J. Zentmayer, and W. Wales are mentioned as manufacturers of good objectives in the United States; and Mr. McAllister's stands are particularly praised.

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 Sleep of Flowers

IN your "Notes" (vol. xii. p. 484) you mention a recent paper by M. Royer on this little-understood class of phenomena. We are acquainted with the objects of most of the spontaneous and periodical movements of plants, but of the physiological means by which these same movements are effected we know little or nothing. But it is important to remember that phenomena like in effect may be diverse in cause. The folding up of petals may have nothing physiologically in common with that of foliage-leaves. In fact, these phenomena may be divided into several classes. Thus movements due to irritation or concussion must be considered apart from those due to spontaneity, and the movements which form part of the series of processes of growth, such as the first unfolding of leaves and flowers, from those which occur in mature organs, though movements belonging to any two of these classes may be exhibited by the same plant, as in Oxalis and Mimosa. *Cereus grandiflorus* opens between 7 and 8 P.M., *Mirabilis jalapa* between 5 and 7 P.M. There is every probability that these times are those at which the insects which fertilise these two species also come forth, and that the same object exists in the case of other species which open and close their flowers more than once, "waking" and "sleeping;" but in the case of Cereus and Mirabilis the movement is one of growth only, though, no doubt, affected by external influences, such as the variation of heat and light. We have, however, cases of true "sleep" in *Ipomœa nil* and *Calystegia sepium*, which open between 3 and 4 A.M.; *Tragopogon*, the ligulate florets of which behave like petals, and which, opening at the same time, closes again before noon; *Anagallis arvensis*, opening at 8 A.M. and closing when the sky is overcast; the Mesembryanthaceæ, which open generally about 12—*Mesembryanthemum noctiflorum*, which opens between 7 and 8 P.M., being an exception; and *Victoria regia*, which opens for the first time about 6 P.M., closes in a few hours, opens again at 6 A.M., and closes finally and sinks in the afternoon; and in many other cases. Besides the causes mentioned in your note, the movements have been attributed to actinism. That they are not hygrometric is clear from the fact stated by Sachs, on the authority of unpublished experiments by Pfeffer ("Text-book of Botany," p. 798), that they take place under water. These same experiments show them to be due to variations in the temperature, and when the temperature is constant, to variations in the intensity of light, and also to be accompanied, at least in some cases, with an increase of the length of the inner side of the phyllæ of the perianth when opening. Light certainly seems to have more to do with the movements of the "poor man's weather-glass" than heat, though perhaps atmospheric pressure might equally well be argued to be their cause. We must remember that as osmotic action is constantly going on at the root-hairs and in the growing parts of living plants, so a constant molecular diffusion of gases is going on through cell-walls, besides the passage of gases through stomata. "The movements of diffusion," as Sachs says (p. 614), "tend to bring about conditions of equilibrium which depend on the co-efficients of absorption of the gas by