of influencing conditions, their relative importance in producing the common effect is not easy to determine.

Evidently, since the temperature is nearly always lower at night than during the daytime, the upper layer of the soil thus cooled is usually damper in the early morning than in the afternoon; and whenever the temperature falls very greatly, the corresponding large increase in the tension and in the condensation at the cold surface will take much moisture from the warmer soil beneath. It is largely, if not wholly, this that leads to wet soils so often seen on cold mornings when there has been no rain, and to the surprising depth of mud that frequently follows a thaw. It accounts too for the considerable supply of moisture from the deeper soil in the production of ice columns—spewing of the ground.

This temperature effect on surface tension, on condensation and on evaporation also greatly conserves that moisture already in the earth and keeps it in motion. That is, the moisture is brought to the surface in greatest abundance only when the temperature there is low and therefore the rate of evaporation into the air small; and whenever the surface temperature is increased, leading to a higher rate of evaporation into the air, the moisture is drawn away to the colder portions of the soil beneath, where it is protected from the winds by the top layers which it has just left.

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BOTANICAL NOTES

A NEW EDITION OF ENGLER'S SYLLABUS

THE fifth edition of Engler's "Syllabus der Pflanzenfamilien" (Borntraeger, Berlin) which appeared during the present year, differs very little from the fourth (1904). A few slight changes are made here and there, but the book is essentially unchanged. Yet it has been reprinted from beginning to end, illustrating afresh the fact that in book publishing the Germans do things better than we. Had this book been published in this country the first edition would have been electrotyped, and it is safe to say that this fact would have made it impossible for us to have had four subsequent editions in the short time which has elapsed since the appearance of the first. The electrotyping of a scientific book ought not to be permitted, for it always means that the publisher proposes to keep it in essentially its present form for as long a time as possible. Why should not American botanists insist that their publishers shall not electrotype their books, and that the editions be of a limited number of copies? We ought not to be tied to our dead and disowned ideas merely because our publishers prefer to embalm them by electrotyping.

Another suggestion which comes to one who examines this book is that the term "Thallophyta" is passing. It has long stood as an omnibus term to cover many different groups of plants. In the third edition (1903) the term was abandoned, and in its place appeared eleven coordinate terms, which were reduced to ten in the fourth and fifth editions. One looks in vain for this time-honored name for the lower plants. It has apparently gone to the limbo to which have been banished "cryptogam" and "phenogam." The Vegetable Kingdom is now divided into twelve grand divisions or phyla, namely; *Phytosarcodina, Schizophyta, Flagellata, Dinoflagellata, Zygophyceae, Chlorophyceae, Charales, Phaeophyceae, Rhodophyceae, Eumycetes* (all of which formerly were lumped together as "Thallophyta"), *Embryophyta asiphonogama* (*Bryophyta* and *Pteridophyta*), and *Embryophyta siphonogama* (*Spermatophyta*). And yet we shall doubtless have the text-books speaking about "Thallophyta" for years to come, as though the group had not been long since abandoned.

A NEW LABORATORY MANUAL

AN interesting and no doubt useful laboratory manual is Müller's "Mikroskopisches und Physiologisches Praktikum der Botanik für Lehrer" (Teubner, Leipzig), a little book of 240 pages and 235 text illustrations. Twenty pages are given to the microscope and micro-

scopical technique, and this is followed by 27 pages on the cell, 147 on the structure of phanerogams, and 44 on experimental plant physiology. The topics are well chosen, the directions clear and explicit, while the numerous illustrations help to make the text still more easily understood.

MORE AGRICULTURAL BOTANY

In preparing a book on "Forage and Fiber Crops in America" (Orange Judd Co.) for the farmer and the student of agriculture, Professor Hunt, of Cornell University, has at the same time rendered a valuable service to botany and the botanists. He has brought together many important structural and economic facts in which the general botanist is interested, but which have been difficult of access, because so widely scattered in botanical and agricultural books and periodicals. Here the botanist will find good, if rather popular, descriptions of the common grasses and other plants used for forage, and such fiber plants as cotton, flax, hemp, jute, ramie, etc. The scientific side of the discussions has been unusually well done, and the botanist is not constantly shocked, as he is too often in books of this kind, by anachronisms in nomenclature and spelling. The illustrations are well selected, and were put in to help the text, and not as pretty pictures to help sell the book. Every picture has its use as fully as every sentence in the text, which is more than can be said of many books, botanical as well as agricultural.

STUDIES IN PLANT CHEMISTRY

Under the title "Studies in Plant Chemistry, and Literary Papers" (Riverside Press) have been collected the papers and addresses of the late Mrs. Helen Abbott Michael. They are of interest to botanists as being among the first of their kind published in this country. They include such titles as "A Chemical Study of *Yucca angustifolia*" "Certain Chemical Constituents of Plants considered in Relation to their Morphology and Evolution," "Plant Analysis as an Applied Science," "The Chemical Basis of Plant Forms," "Comparative Chemistry of Higher and Lower Plants," etc. Of the author and her work Dr. Wiley, of Washington, says: "She was among the very first investigators in this country who began in a systematic way to study the relations of chemical composition to species of plants and to plant growth." And again, "The most important result of her investigations pointed out in a clear way the regular existence of certain classes of chemical bodies in certain species of plants."

Many botanists remember the author of these papers with pleasure as an attractive young woman (Miss Helen C. De S. Abbott) who twenty or more years ago used to be one of the most interested members of the American Association for the Advancement of Science. To a charming personality she added a deep and intelligent interest in the scientific work of the association, especially in chemistry and botany. In the appreciative biographical sketch by Nathan H. Dole, which fills the first hundred pages, we learn much of her life of helpfulness and usefulness, of her marriage, her travels, her scientific and philanthropic plans, and of her untimely death on the twenty-ninth of November, 1904. Her name deserves to be placed high in the short list of scientific women in America, and the botanists especially should remember her as one who wrought well and faithfully in her efforts to add to the upbuilding of a neglected department of their science.

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THE DENSITY OF THE ETHER[1]

1. The theory that an electric charge must possess the equivalent of inertia was clearly established by J. J. Thomson in the *Phil. Mag.* for April, 1881.

2. The discovery of masses smaller than atoms was made experimentally by J. J. Thomson, and communicated to Section A at Dover in 1889.

3. The thesis that the corpuscles so dis-

[1] Abstract of a paper read by Sir Oliver Lodge before Section A of the British Association for the Advancement of Science, Leicester, 1907.