

IN THE second place, the claim that no library is needed for such work, and that all that one needs is a microscope, is a mischievously false notion. It is far easier to-day to command a literature that will enable one to do some systematic work upon the flora of North America, than one which will enable an anatomist to properly discuss an anatomical subject. The absence of references to literature (and by this is not meant foot-note references) in such investigation leaves the work "in the air." It is like shooting with a shotgun in the general direction of the game in the hope of hitting something. If the investigator is not prepared to say what he has found that is new, no one else is apt to take the trouble to do it for him. The sooner we can get rid of the notion that a microscope is a magic instrument, which when touched transforms one into an original investigator, the better. It is just as magical as a hand-saw, of which tool one may possess a chest-full, and yet not be a carpenter.

CURRENT LITERATURE.

The grasses of dry climates.¹

The author of this paper calls attention to some hitherto unknown peculiarities in the grasses of dry climates, among them being the singular development of the lowest internodes of the culms, shoots and basal leaves. He considers these characters just as important as the interior structure of the leaves for adaptation to a dry climate. He distinguishes: 1. tuberous and bulbous grasses; and 2. tunic-grasses. Tuberous grasses are such as *Phleum pratense* var. *nodosum* Gaud. and *Arrhenatherum avenaceum* var. *nodosum* (*Avena nodosa* L.), of which one or more of the basal internodes of the culm and shoots attain a tuberous development, while *Poa bulbosa* L. represents a bulbous grass, since here the bases of some of the sheaths of the leaves have increased in thickness and form a bulb very much like that of an *Allium*. The tuberous grasses are relatively rare in comparison with those whose culms are not thickened, a circumstance which has led to their being ranked as mere varieties. Such forms are especially prevalent in the Mediterranean countries. The same is also the case with *Poa bulbosa*, which occurs more commonly in these countries than further north. Besides the above mentioned, are the tuberous

¹ E. HACKEL.—Ueber einige Eigenthümlichkeiten der Gräser trockener Klimate.—Verhandlungen der k. k. zool.-botan. Gesellsch. Wien, Jahrgang 1890, pp. 125-138.

Alopecurus bulbosus L. and the bulbous *Festuca spadicea* L., the only ones of this group which occur in Middle-Europe.

The author, has, however, observed similar forms to be abundant and more characteristic of other parts of the world. Those he enumerates from our own country are as follows: From California and the Western States the tuberous *Melica bulbosa* Gey., *Californica* Scribn., *spectabilis* Scribn., *fugax* Bol., *bromoides* Gray and *subulata* Scribn., *Beckmannia eruciformis* Host. and finally from Mexico the tuberous *Panicum bulbosum* Kth., *scaberrimum* Lag. and *Torreyi* Tourn.

These tuberous and bulbous forms only occur in countries with periodical dry seasons, and none have been observed in the moist parts of the tropical region. It is very interesting to learn that the author does not consider these tubers or bulbs as reservoirs of starch or sugar, as are the similar organs of Liliaceæ, Iridaceæ, etc. Though they are structurally homologous with these, physiologically they are water-reservoirs. The author has shown that *Poa bulbosa* on being cultivated in moist soil almost lost its bulbous character.

The second group, *Gramina tunicata*, includes forms in which the base of the culms and shoots are covered with at least three faded sheaths. These all inhabit dry localities. In those forms which prefer damp or shaded places, there is usually but one faded sheath present, and even that disappears very soon. The typical tunic-grasses are especially characteristic of the Mediterranean region, and besides the tuberous and bulbous forms, all the other perennial Mediterranean species belong undoubtedly to this group. The author distinguishes between straw- and fiber-tunics; in the former the sheaths remain complete, although faded, in the latter the sheaths break up into fibers. Of these two groups the fiber-tunics are characteristic of the Mediterranean region, while the straw-tunics occur in all the other countries with similar climate. Some forms from Australia, Capland, India, Brazil and North America show the development of wool or felt on the sheaths, as for instance *Eragrostis eriopoda*, *Danthonia lanata*, *Bouteloua eriopoda* and others, representing wool- and felt-tunics. The function of these different tunic structures is undoubtedly to serve as reservoirs of water, as has been proved experimentally in the case of *Koeleria setacea* and a variety of *Andropogon contortus*. The author of this interesting paper calls the attention of botanists for further studies upon this subject.—THEO. HOLM.

Minor Notices.

MR. A. S. HITCHCOCK, of the Shaw School of Botany, has just published a catalogue of the vascular plants in the vicinity of Ames, Iowa. It is no. 7 of the contributions from the Shaw School. The