MAGNETISM OF DIAMOND DRILL RODS.

THE fourth report of the Michigan Academy of Science, 1904, contains a short paper by Dr. A. C. Lane on 'Magnetic Phenomena around Deep Borings,' in which attention is called to the magnetism of iron or steel casings in deep wells due to their position in the earth's magnetic field. Cases were referred to in which the magnetism was sufficiently strong to hold large-sized spikes or even heavier wrenches, while difficulty was experienced in lowering heavily weighted steel tapes into the wells, the tape being attracted and held against the side of the casing.

An instance has recently come under my observation in which it appears that diamond drill rods have become quite strongly magnetized because of their position in the earth's magnetic field. While prospecting for bodies of magnetite in a basic hornblende-chlorite schist enclosed on either side by more acid rocks, the drillers found that the drill rods became strongly magnetic. They attributed the phenomenon to the influence of nearby ore bodies, and one mining engineer, in reporting on the property, referred to the observed magnetic effects as a conclusive proof of the proximity of large bodies of magnetite in depth. At the time the magnetism was noticed and reported the drill was cutting through the acid series of rocks, practically free from magnetite. Similar effects were reported from two different borings, but not from other borings near by.

Both of the drill-holes referred to are inclined several degrees from the vertical toward the north, thus approaching parallelism with the lines of force of the earth's magnetic field. As is well known, an iron bar held in this position becomes more strongly magnetic than when held in an east-and-west line. It seemed to me, therefore, that the conditions in the case of the drill rods were especially favorable for the production of strong magnetic effects. According to the reports of several witnesses the drill rods would hold heavy spikes, while the pull on heavier masses of iron was very noticeable. I did not observe the phenomena myself, the holes in question having been abandoned and a new one commenced at the time of my visit. D. W. JOHNSON.

SPECIAL ARTICLES.

THE TERMINOLOGY OF THE PARTS OF THE GRASS SPIKELET.

PERHAPS in no group of plants has there been more variation in the use of terms than in the use of those employed in botanical descriptions of the grass spikelet. This multiplicity of terms and the resultant confusion have been largely, but not altogether, the result of confused morphology. This has been ably discussed by Bentham and his conclusions, as to both morphology and terminology, have been widely adopted. Of late years there has been more or less tendency to discard Bentham's terms in favor of others. This has led the writer to investigate the whole matter with the end in view of adopting the terminology which best serves the purposes of description.

Using as a starting-point such a spikelet as that of *Bromus* and the terminology of Bentham, we have first the two *empty glumes* at the base of the spikelet. The remainder of the spikelet consists of distichous lateral *florets*. Each floret has a large outer scale or *flowering glume*. Opposite and above this is the two-nerved *palet*. Opposite and above the palet are the two delicate *lodicules*. Still above these are the reproductive organs, the whorl of three stamens and the pistil.

Important modifications from this typical form of spikelet occur as follows:

The empty glumes may be entirely absent, as in *Coleanthus*, solitary as in *Nardus*, mere rudiments as in *Homalocenchrus* and *Zizania*; or the lateral spikelets may each have but one empty glume, while the terminal has two as in *Monerma*. In *Uniola* and the Bambuseæ there are from three to six so-called empty glumes. These are most probably sterile flowering glumes and not proper empty glumes. Such is clearly the case in the so-called third empty glume of the Paniceæ, which often encloses more or less rudimentary sexual organs. It is likewise very common for the terminal florets in the Festuceæ to be reduced to an

empty flowering glume. In *Melica* several such become strangely modified.

The palet is frequently reduced to a rudiment, as in some species of *Agrostis,* or it may be entirely absent, as in other species of the same genus.

The lodicules, two in most grasses, are three in number in many Bambuseæ and altogether wanting in *Alopecurus* and *Anthroxanthum.*

As to the morphology of these organs, it is now generally agreed that the empty glumes and flowering glumes are bracts on the main axis, while the palet is a bractlet on a lateral branch. The lodicules have been supposed to be the vestiges of a perianth.

The empty glumes are variously named by authors. Linnæus and Adanson called them the *calyx;* Jussieu, Kunth and others the *glumæ;* Agardh the *glumæ exteriores;* Link the *glumæ valvæ* or *perigonium externum;* Scheuchzer the *glumæ steriles;* Trinius the *glumæ calycinæ;* Blumenbach the *glumæ vacuæ;* Schleiden the *valvæ glumæ;* Watson the *lower glumes.* With Beauvois they constitute the *tegmen;* with Richard the *lepicena;* with Nash the *empty scales;* with Panzer the *peristachyum;* with Reichenbach the *bracteæ.*

The two empty glumes have been commonly distinguished by the adjectives lower and upper, outer and inner, first and second, or their Latin equivalents. Watson, however, in the 1890 edition of Gray's 'Manual' calls the upper the middle glume when the spikelets are but one-flowered.

The flowering glume and the palet together constitute with Linnæus the *corolla,* or the *valvulæ corolla;* with Trinius the *valvulæ* or *glumæ corolla;* with Jussieu the *calyx;* with Reichenbach the *calyx exterior;* with Beauvois the *stragula;* with Richard and with Link the *glumellæ;* with Malpighi, Schleiden, Lindley and others the *paleæ;* with Agardh the *glumæ interiores;* with Scheuchzer the *folliculi;* with Robert Brown the *perianthium;* with Link the *perigonium internum.* These likewise have been distinguished by the adjectives inferior and superior, exterior and interior, or their equivalents.

With the use of the word flowering glume, the word palea or palet has by almost universal usage been confined to the organ opposite the flowering glume. However, Döll quotes the term *spathella,* said to be used by Turpin.

The lodicules have also come in for their liberal share of names. They are, with Malpighi the *loculi;* with Adanson and most later authors the *lodiculæ;* with Linnæus the *nectaria;* with Jussieu the *squamæ;* with Richard *glumellæ* in common with the flowering glume and the palea; with Agardh the *glumæ intimæ;* with Reichenbach the *calyx interior;* with Schleiden the *squamulæ;* with Link the *periphylla, paropetala* or *perigynium;* with Turpin the *phycostemon;* with Gray in earlier writings the *hypogynous scales;* with Desvaux the *glumellulæ;* with Nees the *perianthium.*

It would seem that with this large mass of terms and multiplied resulting combinations of terms, there is little excuse for introducing a new one. And yet in all this flood of names no one seems to have realized the convenience of having a simple and distinctive name for the organ most used for systematic purposes, the flowering glume. It has been called a valve of the calyx or corolla as the author conceived, or associated with the glumes below it or the palet above it, but never has it received an exclusive designation.

This it seems to the writer is demanded not only by the taxonomic importance of the organ, but as matter of great convenience, incidentally limiting the terms *glumes* strictly to the empty glumes, and obviating any confusion with the palet. In a recent publication I have, therefore, introduced the word lemma (Greek *Λέμμα,* a husk or scale) for the 'flowering glume.' For the 'empty glume' the simple word glume is adopted. Palet and lodicule are used as heretofore. The so-called third glume of the Paniceæ is a *sterile lemma,* as perhaps are the supernumerary 'empty glumes' in *Uniola* and the Bambuseæ.

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NOTE ON THE MOLECULAR FORCES IN GELATINE.

Some time since, while engaged in a research on fluorescence it became necessary to