BOTANY

British Museum Herbarium

THE national Herbarium at the British Museum, though not equal in extent to that at Kew, is one of very great value to botanists from the numbers of "type-specimens" it contains; that is, specimens named by the original discoverer or describer, thus serving as a standard for reference. According to the official report lately issued by the Curator, Mr. J. J. Bennett, the herbarium has received large and important additions during the past year, by purchase and donation, from all parts of the world, including flowering plants, ferns, lichens, mosses, sea-weeds, the microscopic Diatoms, fossil plants, sections of wood, &c.; while collections previously received have been arranged and incorporated.

Wood for Gunpowder

ALTHOUGH the materials of which gunpowder is made have not varied since its first invention, there has been considerable variety in the kind of wood from which the charcoal has been obtained. Dense woods are always rejected and the lighter kinds chosen, especially those most free from silica, and capable of producing a friable porous charcoal which burns quickly and leaves the least possible quantity of ash; the kind now generally used by gunpowder manufacturers is known as "Dog-wood," and is usually described as being obtained from the small tree popularly known under that name, the *Cornus sanguinea*. Dr. Hooker has, however, recently discovered that this is a popular error, and that the wood is really almost universally obtained from the Buckthorn, or *Rhamnus frangula*; the former tree being now never used for this purpose, if indeed it ever was. Till a few years since, the bulk of the Buckthorn wood used in this manufacture was supplied from English plantations in Suffolk, Norfolk, Essex, and Kent, but the great increase recently in the demand for the finer descriptions of gunpowder has rendered this source insufficient; and it is now cultivated in immense districts of forest and marsh in North Germany, lying between Berlin and Frankfort, where it forms the natural undergrowth. From the high price obtained for the wood, 10*l.* to 15*l.* per ton, its cultivation would be exceedingly lucrative in this country, as it will grow in almost any soil.

Action of Ether on Plants

THE action of ether as an anæsthetic on the animal frame has induced Dr. Maxwell Masters to experiment on its effects on plants. He states that if a drop is placed gently on the leaf of the Sensitive plant, it produces a paralysing effect, rendering it insensible to subsequent contact. If, however, the ether impinges on the leaf with force, or is allowed to drop from a considerable height, contraction of the leaf immediately takes place, the impact of the falling drop counteracting any paralysing power. It is well known that in the contraction of the leaves of the Sensitive plant a certain amount of vital force is expended, and that if often repeated the plant becomes exhausted, and a time of rest is required before the phenomena are repeated.

Viridescence of Leaves

M. PRILLIEUX has established, as the result of a large number of observations on the leaves of barley, that viridescence is more rapid in diffused light than in the direct light of the sun, in contrast to the production of oxygen, which is more abundant the stronger the light. He introduced into a dark chamber a pencil of solar rays, and, by means of a lens, produced a diverging cone, in which he placed the barley at different distances from the lens, consequently under different intensities of light determinable with precision. He found that near the lens, that is, placed in a very intense light, the etiolated leaves scarcely became green, while at a greater distance the viridescence took place more rapidly, and attained its maximum at a distance of three or four metres, beyond which the activity decreased; so that in a too feeble light the effect was the same as in too strong a light. [L'Institut].

MÖLLER has prepared a beautiful microscopic slide, containing 300 distinct species of Diatoms, showing an extraordinary variety of form, and arranged with marvellous regularity. It forms one of the most interesting objects for the microscope we have seen.

THE "Prodromus Systematis naturalis Regni vegetabilis," the work of three generations of De Candolles, is now approaching completion, as it is not intended to continue it beyond the Exogens. The first section of the sixteenth volume, just published, includes two important monographs, the *Urticaceæ* by Weddell, and the *Piperaceæ* by Casimir De Candolle.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 20.—The following papers were read:—

"On the mechanical performance of logical inference," by W. Stanley Jevons, M.A. Lond., Professor of Logic, &c., in Owens College; communicated by Professor E. Roscoe, F.R.S. The author first referred to the general use of mechanical contrivances for the purpose of mathematical computation, and then contrasted this fact with the utter absence of machines for aiding logical operations. This absence he attributed to the incompleteness of the old logical doctrines. The problem of logical science in its complete generality was first solved by Boole. His logical views, when simplified and corrected, give us a method of indirect deduction of extreme generality and power, founded directly upon the fundamental laws of thought. A proof of the truthfulness and power of this system is to be found in the fact that it can be embodied in a machine just as the calculus of differences is embodied in Mr. Babbage's calculating machine. To explain the nature of the logical machine alluded to, it may be pointed out that the third of the fundamental laws of thought allow us to affirm of any object one or the other of two contradictory attributes, and that we are thus enabled to develope a series of alternatives which must contain the description of a given class or object. Thus, if we are considering the propositions,

Iron is metal,
Metal is element,

we can at once affirm of iron that it is included among the four alternatives:—

Metal, element,
Metal, not element,
Not metal, element,
Not metal, not element.

But according to the second law of thought, nothing can combine contradictory attributes, and this law prevents us from supposing that *iron* can be *not-metal*, while the first premise affirms that it is *metal*. The second premise again prevents our supposing that the combination *metal*, *not-element*, can exist. Hence the only combination of properties which the premises allow us to affirm of *iron* is *metal*, *element*. In a similar manner a complete solution of any logical problem may be effected by forming the complete list of combination in which the terms of the problem can manifest themselves, and then striking out such of the combinations as cannot exist in consistency with the conditions of the problem. The logical machine actually constructed represents the combination, 16 in number, of four positive terms, denoted by A, B, C, D, and their corresponding negatives, *a*, *b*, *c*, *d*. The instrument is provided with eight keys, representing these terms when appearing in the subject of a proposition, with eight keys, placed to the right hand of the former, representing the terms when occurring in the predicate of a proposition, and with the certain *operation* keys denoting the *copular* of the proposition, the *full stop* at the end of it, and the conjunction *or*, according as it occurs in the subject or predicate. There is also a key denoting the *finis* or end of an argument, which has the effect of obliterating any previous impressions, and making the machine a *tabula rasa*. If now each of the letter terms, A, B, C, D, be taken to represent some logical term or noun, and propositions concerning them be, as it were, played upon the machine, as upon a telegraphic instrument, the machine effects thereby such a classification and selection of certain rods representing the 16 possible combinations of the terms, that only those combinations consistent with the propositions remain indicated by the machine at the end of the operations. When once a series of propositions is thus impressed upon the machine, it is capable of exhibiting an answer to any question which may be put to it concerning the possible combinations which form any class. The machine thus embodies almost all the powers of Boole's logical system up to problems involving four distinct terms, and to represent problems of any complexity involving any number of terms only requires the multiplication of the parts of the machine. The construction involves no mechanical difficulties, and depends upon a peculiar arrangement of pins and levers, which it would not be easy to explain without drawings. In this arrangement of the parts the conditions of correct thinking are observed; the representative rods are just as numerous as the laws of thought require, and no rod represents inconsistent attributes. The representative rods are classified, selected, or