

verting chamber. On one side of the vessel or chamber is a projection, *v*, on the upper part of which a ring of fire-brick, *w*, is retained in place by a conical flanged iron ring, *x*. The opening in the ring *w* serves for the admission of the molten metal to the vessel, after which the cone *y* smeared with fire-clay is lowered down into the opening of the moulded fire-brick *w*, and by means of the weight *z* is retained in place and prevents the escape of gaseous matters during the converting process.

The cone, *y*, and its rod and weight, *z*, are suspended by a chain in the position shown during the period of running in the metal. When the metal so run in comes in contact with the nitrate or other oxygen-yielding materials, large volumes of gaseous matters are evolved, these matters instead of escaping freely from the converter rapidly accumulating in the vessel until the pressure within it is sufficient to raise the cone *g*, and escape by the small annular opening thus made, the pressure being regulated by the weight *s*. Hence the combustion of the carbon contained in the molten iron by reason of its union with oxygen derived from the decomposition of the nitrates or other oxygen-yielding materials will be effected under considerable pressure; and the gaseous products, instead of expanding freely as under the ordinary conditions of combustion, will be in a highly condensed state, by which means their temperature will be considerably raised, and the intense heat so generated will be imparted to the metal and cause it to retain its fluidity.

It will be extremely interesting to watch the working of this new process.

### BOTANY

[We have been favoured by the Count Marshal of Austria with the following abstracts of Botanical papers read at the Innsbruck Congress.]

#### Prof. Hildebrand on the Impregnation of Plants

PLANTS intermediate between *Papaveraceæ* and *Fumariæ* gave the greatest quantity of seeds when impregnated with the pollen of another individual of the same species, less when the pollen was taken from another flower of the same individual, and least when the impregnation took place within the flower itself. For *Eschscholtzia Californica*, the proportion of seeds in these three cases was as 24 to 9 to 6. Professor Fenzl says that he obtained abundance of seeds from two species of *Abutilon* by fecundation with pollen from other individuals, and that these operations are best performed between 8 and 9 A.M.

#### Prof. Fenzl on the Genus Lupinus

SEEDS are with difficulty obtained from plants of this genus in the gardens of Vienna, probably on account of the unfavourable condition of the soil. The species of this genus are still very far from being duly determined, and two-thirds of them, at least, may be eliminated. Professor Koch observes, that the greatest amount of seeds is to be obtained in sandy soil, and that the great number of hybrids are merely varieties in form; the different colours of blossoms being a result of external agents, in the same way as *Nymphaea* gives us lengthened leaves when impregnated with the pollen of *Magnolia*.

#### Bail on Androgynous Inflorescence

SUCH inflorescences have been found on *Zea*, *Populus*, *Fagus*, *Carpinus*, *Betula humilis* and *Betula alba*, as also on *Pinus nigra*, the small scale, considered as a part of the female blossom, developing itself into an anther.

#### Prof. Koch on Transformations of Parts of Flowers

IN a fruit of *Solanum melongena*, the five anthers have been transformed into five smaller capsules. A capsule of poppy offers, in the centre of its cavity, a small elevation (the continuation of the axis), bearing a number of smaller capsules.

#### Prof. Bail on Parasitic Fungi on Insects

*Empusa*, attacking especially the larvæ of the Fir-Moth, invades also those of *Bombyx Caja*, which were found, sitting on branches of oaks, birches, and firs, killed by this parasite. Larvæ of *Cossus ligniperda*, of all sizes, all thickly covered with the white mucor issuing from their bodies, were found beneath the bark of a completely dried-up birch. These larvæ being kept in moist pots, *Penicillium glaucum* broke out first from their bodies, and was soon superseded by *Isaria*, the larvæ being covered with moist moss. Those of *Melolontha majalis* are, as well as the perfect insect, destroyed by fungi. The destructive action of the fungi has, however, been exaggerated by the periodical press. Of more than 4,000 larvæ from about ten forest-districts of Prussia and Pomerania, scarcely 29 to 30 per cent. have been destroyed by fungi.

The chief morbidic fungi were *Isaria farinosa*, identical in all details of structure with *Penicillium*, and *Cordiceps militaris*. The *Melanospora parasitica* Tulasne, found (1858) on all specimens of *Isaria* in the environs of Meran, and on those which had come to their full development, is considered by Dr. Bail to be the higher form of fructification of *Botrytis Bassiana*. *Cordiceps militaris*, with thick, caraneous, orange-yellow fructiferous clubs, differs altogether from *Isaria*.

#### Prof. Koch on the Formation of the Germen

THIS is not, as generally supposed, a concretion of so-called "Fruit-leaves." The germen is part of an axis, supporting the parts of a flower; it may be longer or shorter, as these parts are more or less distant from each other. The apex of the receptacle, or of the axis in general, may become suddenly stationary, and be wrapped up in plastic cellular tissue, a cavity open above, including the ovules (inferior germen), being thus formed; or this cavity includes the germina, either non-connate with the inner wall (*Rosa*, *Calycanthus*, etc.), or connate with it (*Cotoneaster*, many *Leptosperms*), or mutually connate, as in the Pomaceous fruits. Such a fruit-receptacle not infrequently includes whole blossoms (*Ficus*). The development of the genuine apex proceeds in two ways. Either the formation of cellulules proceeds from the apex itself (as generally in inferior germens), and then its basis is the newest and the apex the oldest portion; or the new formations proceed from the margin of the wall, enlarging upwards, the increase ending in the uppermost portion, as in the fig. Professor Schuler observes, that this takes place only in figs ripened in the second half of the year, whenever the refrigerating action of the north wind has retarded their growth. Professor Koch replies, that the same increase of the margin is observable in the fruit of the *Leguminosæ*. Probably the germina of *Papayaceæ*, *Passifloræ*, *Capparidæ*, and genuine *Liliaceæ*, likewise take their origin from the axis. The abnormal growth often observed on roses, a sudden prolongation of the axis through the cavity of the fruit-bearing blossoms (sometimes 3 above each other) and leaves, proves the new formations to proceed from the included centre of the extreme apex.

#### Prof. Martins on the Flora of Southern France

MANY genera of the miocene and pliocene deposits of this and other countries are represented in the living flora of South France. Such are *Laurus nobilis*, L. (= *Laura canariensis*), *Ficus carica*, *Punica granatum*, *Pinus Aleppensis* (found fossil in Unalaska), *Cercis siliquastrum* (near Aix), and *Nerium oleander*, in some localities near Toulon and Nice. All these species have lived through the glacial period; they exist now, however, only on the banks of rivers and rivulets, in localities protected against cold. It must be observed that severe cold is not the necessary consequence of extensive glaciers. A decidedly Indian form, not yet found fossil, is *Anagyris fetida* (*Piptanthus Nepalensis*, Don.), which brings forth its leaves in October, and its blossoms in January and February. Other extraneous forms are: *Myrtus communis* (represented in Peru by *Myrtus myricoides*), *Chamerops humilis* (near Villefranche and Toulon, represented in the Caroline Islands by *Cham. serrulata*, Pursh, and *Cham. hystrix*), and *Ceratonia siliqua*, whose native country is still doubtful. *Cham. humilis* is now extirpated by the avidity of collecting botanists. Professor Koch says that *Anagyris fetida* belongs rather to the Cytiseæ, or Genisteæ, than to any exotic family, and doubts *Ceratonia siliqua* being a leguminosæ. Professor Martins replies that he thinks *Anag. fetida* to be closely related to *Thermopsis*, and observes that about 200 Lapland species occur in South France; that the littoral plants are partly the same as those on the coasts of the Atlantic, except *Spartina versicolor*, an exclusively American form, and hints at the importance of the study of fossil plants for the thorough knowledge of those existing in the present period.

#### Prof. Hildebrand on Marsilia

SPECIMENS of this plant, growing beneath the surface of water, regularly produce leaves which spread over its surface, and follow its level, while, if kept dry, they never produce such leaves. The leaves grown in air have stomata on both their surfaces; those grown in water have stomata only on their upper surface. Dr. Reichardt observes, that wild specimens of *Marsilia* have constantly been found provided only with large floating leaves. Professor Hoffmann says, that abundant fruits are obtained from *Marsilia* by cultivating it in slimy soil. Professor Hildebrand remarks, that specimens grown in water, and not bearing fruit, propagate themselves with astonishing rapidity without any fecundation.