

their bases communicating with the sheath to the rear of the tip and adjacent to it. When the sheath separates from the spine (which happens very early), these ends of the fibers at the base of the cones are slightly lifted from the surface of the spine, forming sharp barbs extending backward on the surface near the tip. This conical barbed structure is likewise common to the sheathless, flat-joint *Opuntias*, and extends even to the minute and much-dreaded bristles of the same genus. It is this property of conical arrangement that makes the prickly pear group the terror of all who have made its acquaintance.

While many of the characters brought to light in these investigations are artificial as must naturally result in tissues so responsive to environment as epidermal structures, the constancy of character within the same species, together with the requisite variation in features presented by different species, can not but be of service to those engaged in a critical study of the family.

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THE GENUS *CACTUS*. By E. M. FISHER.

The genus *Cactus*, as it stands at present, consists of about 350 species and varieties from North America, of which only twenty-five species and seven varieties have been reported from the United States. All these forms are small, ranging from one-half to three inches in diameter, and are distinguished by their disconnected tubercles.

In this paper it is proposed to consider briefly the history of the genus, and the classification of its species. To give an accurate and satisfactory history of this genus or any of the genera of *Cactaceæ* is a very difficult thing, because of the meager descriptions and the scarcity of early literature. Taking 1753 (the date of the first edition of Linnæus' "*Species Plantarum*") as our datum-line, and tracing both backwards and forwards, we reach the following results: In this first edition of the "*Species Plantarum*," Linnæus published all the *Cactaceæ* with which he was acquainted under one genus, *Cactus*, which he subdivided into four groups called *Echinomelocactus* (subrotund), *Cerii* (erect, angular), *Cerii* (creeping with lateral roots), and *Opuntia* (jointed, compressed, proliferous). Previous to this (1737), in the first edition of the *Genera Plantarum*, Linnæus published *Cactus* as embracing the genus *Cereus* of Jussieu's *Acta Gallorum* (1719), and *Opuntia* and *Melocactus* of Tournefort's *Institutiones* (1719). *Melocactus*

of Tournefort, in which we are interested at present, is equal to *Ficoïdes* or *Ficus* of Commelinus' Hortus Amistel (1697), equal to *Ficoïdes* or *Ficus* of Plukinet Almag. Botanica (1696), equal to *Echino-melocactus* of Hermannus Hortus Lugdbt. (1687).

Commencing again with Linnaeus (1753), we find that he first described the species *Cactus mamillarius*, which thus seems to stand as the type of the genus. This genus of 28 species was not disturbed until 1812, when Haworth, in his Synopsis Plantarum succulentarum, separated it into five genera, *Mamillaria*, *Echinocactus*, *Melocactus*, *Cereus*, and *Opuntia*, discarding Linnaeus' name, *Cactus*. He called *Cactus mamillariïus* Linn. *Mamillari simplex* Haworth, which was the only species of Linnaeus that would fall in the new genus *Mamillaria*. At this time (1812), *Mamillaria* consisted of five species. In 1830 eight species were recognized. This state of affairs was not molested until last year, when Dr. O. Kuntze published his Revisio Genera Plantarum and re-established the Linnæan genus *Cactus*, which thus equals *Mamillaria* Haworth, changing over 300 species of *Mamillaria* to the genus *Cactus*. In summary, we have *Cactus* L., re-established by O. Kuntze (1891), *Mamillaria* Haworth (1812), *Cactus* L. (1753), *Melocactus* Tourn. (1719) in part, *Ficoïdes* or *Ficus* Commelinus (1697), *Ficoïdes* or *Melocactus* Plukinet (1796), *Echino-melocactus* Hermannus (1687).

The revision of the genus *Cactus*, like the other genera of Cactaceæ, is made under great difficulties, because of the lack of types, and insufficient flowering material. Since this is true, and because a specimen is almost useless without flowers, according to the present system of keys, we have attempted with the types at command to revise the genus without using flower characters but by using those parts of the plant which are always present, the tubercles and spines.

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SOME CAUSES ACTING PHYSIOLOGICALLY TOWARD THE DESTRUCTION OF TREES IN CITIES. By J. C. ARTHUR.

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AN AUXANOMETER FOR THE REGISTRATION OF THE GROWTH OF STEMS IN THICKNESS. By KATHERINE E. GOLDEN.

The main feature of this auxanometer for measuring growth in thickness is a balanced glass arm, supported near one end. The long end has a bristle fastened to it that comes in contact with a blackened glass rod carried round on a brass spool, the spool being revolved by a clock.