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## THE COTTON PLANT.

*The Wild and Cultivated Cotton Plants of the World. A Revision of the Genus Gossypium.* By Sir G. Watt. Pp. xiv+406. (London: Longmans, Green and Co., 1907.) Price 30s. net.

SINCE the appearance, in 1877-8, of Todaro's classic monograph on the genus *Gossypium*, no serious attempt has been made to deal systematically with the botany of the plants that provide the world's supply of cotton. Todaro's work—at once the first and last of any practical utility—owes its value to the fact that he worked for the most part with living plants grown by him from seed received from many parts of the world; the success this method met with justifies the dictum of De Candolle in his "Prodromus" when, speaking of this genus, he says, "Hic species a Botanicis admissas recenseam, monens tamen hoc genus monographiæ accuratæ et *ex vivo* elaboratæ maxime egere." (The italics are not in the original.) Todaro's work requires only to be continued and extended, not to be corrected.

Any attempt at a classification of cotton plants that is based on herbarium specimens is doomed to failure owing to the impossibility of eliminating the effects that differences of soil and rainfall have in inducing differences of appearance in the leaves and other parts of specimens of the same variety that are *not grown under identical conditions*. Many varieties of the genus, even under the most uniform conditions of growth, show a sufficiently wide range of fluctuations to necessitate great care in their determination even when living plants are being examined; when we work on dried specimens, often very fragmentary, grown in widely distant parts of the world under conditions of rainfall that are not recorded, imaginary differentiations occur to such an extent as to make it impossible to deduce a classification of the varieties that more than indicates broadly the groups into which they fall; to attempt anything more than this with herbarium material is to court failure.

The latest attempt at a monograph of the genus *Gossypium* is the volume now under review. This, unfortunately, belongs to the category for which success is an impossibility, being based entirely—except possibly in the case of a few Indian forms—on herbarium specimens.

The volume contains some most interesting photographic reproductions of a few type-specimens in the Kew, British Museum and Linnean herbaria, and also (often in colours) of early drawings of plants. These reproductions form by far the most valuable portion of the work.

It is impossible in the space at our disposal to give even a general impression of the contents of the volume, much less to point out in detail the very numerous errors into which the herbarium method has led its author. No new information is given us, though several new species and more varieties are created on imaginary differentiations, while nearly

every variety that has hitherto been described and named receives a new name.

Thus, of the forty-two varieties mentioned in the volume, Nos. 10 to 25 are cultivated Asiatic or African forms, and out of these sixteen varieties, classified as belonging to four species, all except the species themselves receive new names unnecessarily. When we state that many of the synonyms given fail under investigation, and that the descriptions of plants stated to belong to particular species often differ radically from the descriptions given by the authors of the species, it can well be imagined that the volume is rather a retrogression than an advance on the work of Todaro.

Throughout the book the reader is allowed no opportunity of judging of the correctness of the identification given, since the original definition of the variety is practically never quoted, and must be looked for in the very scattered literature on the genus. It would also have been fairer if, in the case of species here created, a photographic reproduction of the type had been given, and not merely outline drawings, which, throughout the volume, are not good and would not assist in the identification of the plants in the field.

As an example of erroneous synonymy we may take the following case:—

*G. obtusifolium*, Roxb., var. *Wightiana*, Watt, is stated to be synonymous with *G. Wightianum*, Tod., and to be the plant constituting the Surtee-Broach growth of India. Now, all botanical considerations apart, Todaro states that the seed that gave rise to his *G. Wightianum* was as follows:—"Cotone Hingunghatt di Bombay," "Oomrawatt di Bombay," "Howers Barree (*sic*) di Bombay," "Khandeisk (*sic*) from American seed di Bombay," "Cotone Hingunghatt Barree (*sic*)," and "Old Dhollera, provenienza di Bombay." Now, in none of the places mentioned—Hingunghat, Oomrawati, Barsee, Khandeish, Dhollera—will the Surtee-Broach plant grow except in Dhollera; and, curiously enough, Todaro mentions that another sample of Dhollera seed received *directly* from Bombay gave rise to plants belonging not to the species *Wightianum*, but to the species *herbaceum*, and giving "un prodotto di bellissima qualità."

Todaro having already placed the Surtee-Broach plant in the species *herbaceum*, it would appear unnecessary that, as in the volume before us, it should be removed into the species *obtusifolium*, to which it is certainly, to say the least, not more closely related. This removal is further objectionable owing to the great uncertainty as to what plant Roxburgh intended to indicate by the latter name. On this point, again, our author is at once confused and confusing; he states (p. 140) that *G. obtusifolium*, Roxb., is "fairly common in the hedges of Gujarat," while (p. 135) *G. nanking*, var. *roji*, is also said to become sub-scandent in hedgerows in the same district. The present writer has collected and sown in Gujarat many samples of seed from these hedgerow cottons, and the resulting plants have invariably been identical with one another, and also with the crop known as "roji," which our author classifies as *G. nanking*, Meyen,

var. *roji*, Watt. It can safely be said that the last varietal name is superfluous, being synonymous with *G. obtusifolium*, Roxb., as interpreted in this book.

As examples of cases in which a plant is wrongly assigned to an old-established species, the following cases may be cited:—

(1) *G. peruvianum*, Cav., is stated (p. 217) to have fuzz-coated seeds, though Cavanilles states that the seeds are black, *i.e.* devoid of fuzz, and figures them so. This discrepancy would have been immaterial had not the presence or absence of fuzz on the seed been made the basis of classification (see later). This plant is stated to produce the Imbabura cotton of Peru, while the Piura cotton is stated to be produced by a somewhat similar but hairy plant, which is identified as *G. vitifolium*, Lamk. It suffices to say first that Piura cotton is produced by the plant Cavanilles called *peruvianum*, which has, as that author states, naked seeds; and secondly, that Lamarck states that his species *vitifolium* has the under sides of its leaves glabrous.

(2) Of *G. microcarpum*, Tod., its author mentions specially that the two lobes on either side of the central one were unequal, and gives a good figure of this. Our present author not only gives (plate 36) a plant with much broader lobes, but one which does not display the peculiarity of lobes mentioned, is called "red Peruvian cotton," and differs from ordinary Peruvian only in bearing brown cotton instead of white. The reviewer has grown the real *G. microcarpum*, which is an exceedingly characteristic variety, and can be distinguished with certainty at a glance. It is, indeed, the plant for which our author has created a new species, *viz.*, *G. Schottii*, two specimens cited as types in the British Museum being exactly the plant as figured and described by Todaro, and as grown by the present writer. Examples of this kind might be multiplied almost indefinitely.

Turning to the system on which the varieties are classified in the volume under review, we find it is as follows:—

Section i., Species with fuzz but no floss.

Section ii., Fuzzy seeded cottons with united bracteoles.

Section iii., Fuzzy seeded cottons with free bracteoles.

Section iv., Naked seeded cottons with bracteoles free, or nearly so, and glands conspicuous.

Section v., Naked seeded cottons with bracteoles quite free and floral glands absent.

It will be noted that the presence or otherwise of a fuzzy covering to the seed below the cotton is made the primary basis of classification. Now it is hardly too much to say that every cultivated species of cotton comprises varieties some of which bear a fuzzy and others do not. The present writer has found among others completely naked seeded varieties in the species (to adopt the nomenclature of our author) *G. nanking* (Chinese and Japanese cottons), *G. nanking*, var. *roji*, *G. obtusifolium*, var. *Wightiana*, *G. herbaceum*, *G. punctatum*, *G. hirsutum*. The naked-seeded varieties show not the slightest trace of hybridisation with a member of sections iv. or v.,

and, indeed, a hybrid between any of the first four varieties named and a member of sections iv. and v. is by no means readily produced even by artificial means. Yet our author seeks to explain the occurrence of naked seeds in the "jowari hathi" (=country cotton) of Madras by the supposition of a naturally produced cross between *G. obtusifolium*, var. *Wightiana* (section ii.), and Bourbon cotton (*G. purpurascens*, section iv.). Similarly, those of American upland varieties that have naked seeds are said to be crosses with a naked-seeded variety for this reason alone.

If any further proof of the fallacy of this method is required, it is found in the fact that fuzzy-seeded American has in India been converted into a naked-seeded variety in a few generations by the present writer through the simple process of growing it under irrigation in well-manured soil. That such a change occurs is well known to cultivators in the West Indies and other parts of the world.

If we take the second point on which the classification is based, *viz.* whether the bracteoles are free or united, we find the same impossibility of applying the characteristic in the field, in some varieties there being found, *on the same plant*, flowers with the bracteoles all free, others with them all united, and still others with two united and one free.

The last chapter (thirty-one pages) is devoted to a discussion of "The Improvement of the Cotton Plant." This consists merely of a general description of the process of selection equally applicable to all crops, an attempt to trace the history of some varieties now grown, and a description of the pollen grains of some species of cotton.

Throughout the book no attempt is made to give the character of the cotton produced under given conditions of soil and climate by the several varieties described, though the author hopes in his preface that the book will be useful to "planters and seed producers throughout the world."

F. FLETCHER.

#### A CONCISE WORK ON EVOLUTION.

*Evolution and Animal Life. An Elementary Discussion of Facts, Processes, Laws and Theories relating to the Life and Evolution of Animals.* By David Starr Jordan and Vernon Lyman Kellogg. Pp. xi+489; illustrated. (New York: D. Appleton and Company, 1907.) Price 2.50 dollars net.

THERE is growing up a generation of biological students that does not read its Darwin, its Weismann, or Galton; instead, it cons manuals and text-books on the works of these masters. It is so very much less trouble, if the student's object is to satisfy an examiner, to "get up" a text-book on evolutionary problems than to extract from original sources a clear conception of the authors' theories; and yet what a world of difference is there between the *ipsissima verba* of a master and the cut-and-dried phrases of the manual-maker! The one is the advocate pleading his cause with all the eloquence in his power, the other the reporter compressing the living words and phrases into the limits of a column. The