The Morphology of the 'Corona' of Narcissus.

BY

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With three Figures in the Text.

AS a result of the recent investigation of two unusually interesting abnormal flowers¹ of *Narcissus Pseudo-narcissus* var. *tridymus*, De Graaff, I have been able to confirm the conclusions arrived at by Celakovsky² (as a result of his study of abnormal flowers of *N. Tazetta*) with regard to the morphological nature of the 'trumpet' or 'corona'. In my flowers the three sepals were normal, save for the complete absence of any corona. The androecium and pistil were also normal. The three petals were all partially transformed into stamens, and it was owing to this fact that, as it so happened, the nature of the corona became revealed in its true light. The corona of each petal was bilobed and was confined to these members of the flower, the sepals, as above stated, being devoid of it. As each petal had its own individual corona, it is obvious that the normal corona had become completely split up. In both flowers the corona of each petal was seen to be an intermediate structure *between a petaloid ligular outgrowth from the upper surface of the petal, on the one hand, and the basal lobes of the versatile anther on the other*, in just the same way as the organ bearing it was an intermediate structure between a petal and an anther. In the case of one petal the corona lobes were obviously direct downward extensions, in petaloid form, of the anther lobes, while at the same time continuous on their outer margin with the normal ligular outgrowth from the petal; and the presence of this marginal petaloid portion of the corona was a *result* of the presence of the corresponding marginal petaloid portion of the upper portion of the anther (Fig. 1). This was, perhaps, the best case for demonstrating the absolute oneness of the anther lobes with the corona, the texture and colour of the normal corona being always present. In another petal, besides the downwardly directed narrow

¹ Handed to me by Mr. F. J. Chittenden at the meeting of the Scientific Committee of the Royal Horticultural Society of March 24, 1914.

² Ueber die Bedeutung und den Ursprung der Paracorolle der Narcisseen (Bulletin international de l'Académie des Sciences de Bohême, 1898).

anther lobes having the colour and consistence of a corona, there were, in addition, two upwardly directed, broad, petaloid lobes (Fig. 2), so that in this case the corona was divided into two parts, exactly corresponding to the two parts into which the metamorphosed *petal* was divided, viz. upper anther lobes and lateral petaloid portions. In a third petal the basal anther lobes were partly polliniferous and partly corona-like.

With these clear transitional structures before me, there can no longer be any doubt in my own mind as to the true morphological interpretation of the corona. Moreover, this could never have been arrived at without the aid of these teratological data.

FIG. 1. *Narcissus Pseudo-narcissus* var. Staminoid petal showing 'corona' as a downward prolongation of anther lobes. Lettering as in Fig. 2.

FIG. 2. Ditto; the extreme petaloid portion of 'corona' is upwardly directed. *p.* = petal; *an.* = anther; *con.* = connective; *co.* = corona. (Slightly schematized.)

FIG. 3. *Narcissus Pseudo-narcissus* var. Perianth segment (*p.*) with its two-lobed corona segment (*co.*), showing transition to anther structure. (Semi-diagrammatic.)

But the point of chief interest has yet to be mentioned. In the flowers from whose structure Celakovsky deduced his remarkable conclusions, it was the petaloid *stamens* which exhibited the transitional conditions of the corona, and from which he further deduced the staminal origin of the perianth. In my own flowers it was the staminoid *petals* which exhibited the interesting transformations in the corona, which latter is thus seen to be changing *back* again to its original, primitive condition, viz. of basal anther lobes. Celakovsky's view of corona-morphology becomes thus doubly supported, viz. by the occurrence of the same transformations taking place in *both* directions: progressively and retrogressively!

There is one further point of importance to be noted. In the change which is under way, whereby the three petals become partially transformed into stamens, *the entire corona of the flower appears to become involved*, the sepals being left without any trace of this structure; from which it might be reasonably deduced that in *Narcissus* the normal corona is an outgrowth of the corolla only, and that the sepals, although equally derived from

stamens possessing versatile anthers, no longer have, if they ever did have, any structure corresponding to the basal lobes of the anther. The *petals* of some genera of Amaryllidaceae, although derived by transformation of versatile anthers, are also devoid of any trace of a ligular outgrowth. On the other hand, Celakovsky, from a study of abnormal flowers of *N. Tazetta*, concluded that the calyx possessed a corona as well as the corolla, but that in some of the double flowers in which the stamens produced corona structures, that of the calyx was either greatly reduced or entirely suppressed. Hence it would be best, on the whole, to regard the calyx corona in the flowers I have been investigating as having also become suppressed as a result of the changes undergone by the corolla.

Since writing the above note another abnormal flower, of the same species, has come into my hands, which shows almost equally important features. The corona has undergone complete dialysis, and *each* segment of the perianth bears a *bilobed* corona segment; this character in itself represents, in my opinion, one step in the transition to the two basal lobes of the versatile antler (see above). But in the case of one of the six perianth lobes, the two lobes of its ventral corona segment each possessed an *infolded flap on its inner margin*, the two flaps being united below (i. e. towards the base of the corona segment) to form a short enation from the upper surface of the corona (Fig. 3). This structure, in my opinion, undoubtedly represents a still further step in the direction of transformation of the individualized corona segment into the basal lobes of the versatile anther, of which the perianth segment (*p.*) represents the apical portion.

The following conclusions, therefore, are reached as a result of this investigation:

1. Both sepals and petals, in Amaryllidaceae, have been derived by transformation of stamens in an originally achlamydeous flower.
2. The corona, in this order, has been derived by petaloid transformation of the upturned basal lobes of the versatile anthers, and subsequent fusion thereof to form a continuous rim.

Kew,
March 30, 1914.