Botanics. — Prof. J. W. MOLL presents a communication of Miss T. TAMMES at Groningen, entitled: „*Pomus in Pomo*".

By Professor C. A. J. A. OUDEMANS a monstrous apple was given to the Botanical Laboratory of the University of Groningen. This apple is originary from Dr. A. C. OUDEMANS, who got it accidentally in 1894. Within the apple is a second, quite loose from the external. In an added writing of MAXWELL T. MASTERS he tells us, that he has often seen similar apples, but always the inner one joined to the external.

In the literature of teratology we meet now and then with descriptions of cases where within a fruit a smaller one is found. The greater number of these cases relates to the genus Citrus; but the abnormality occurs with other plants also.

So mention is made of some Cruciferae [1]), where the pod contains internally a smaller one; further, of so called fructus in fructu of Gentiana lutea [2]), Carica Papaya [3]), Passiflora alata [3]), Passiflora Alpinia [3]) and Piper nigrum [4]). Usually the communication is limited to one or mostly two cases; with the Citrus-species [5]) on the contrary, the phenomenon is by no means rare. It seems to occur so often in this genus that double oranges are known in the Canaries by the name of „Narangas pregnadas" [6]); whilst also at Nizza such fruits can be bought as „oranges doubles" [7]).

The descriptions of the internal fruit are not always in accordance with one another. In some cases the internal fruit has seeds, in others not. It is also described with and without a fruit-wall; the phenomenon seems not always to be quite the same and of its explication relatively very little is known.

The described apple is in alkohol and is here figured, in natural

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[1]) The Gard. Chron. 1882. Part I. p. 10 and p. 601.

[2]) Bull. Soc. Botan. de France. 1878. p. 252.

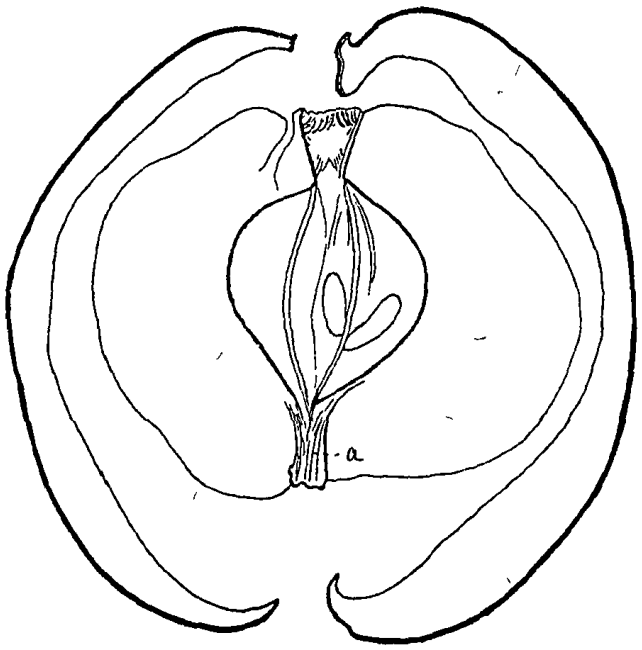
[3]) Flora Jahrg. 73, 1890. p. 332.

[4]) B. TORR, B. C., vol. 18. New-York, 1891. p. 151.

[5]) JAGER, Ueber die Missbildungen der Gewachse 1814. p. 222, und Verh. Naturhist. Ver. Rheinlande, 1860. p. 376.

[6]) Hanausek, Z Oest. Apoth. 1888, No. 16.

[7]) Levende Natuur 1899—1900. No. 2.



size, in longitudinal section. The apple is composed of an envelope, which, probably at the cutting, has fallen into three parts, and an inner apple, cut longitudinally and of which the halves are quite loose from the envelope.

The thickness of the layer of the outer apple differs from a few m.m. to about 1 c.m. The inner-side of it cannot be distinguished by the naked eyefrom the common fruit-flesh. On the top are in the usual way fragments of the calyx; but at the base no peduncle is to be found. When fitting the parts together an opening remains at that spot. The internal apple is flat globular, the section from base to apex is $\pm 4^1/_2$ c.m. long, the vertical section $\pm$ 6 c.m. This apple has no separate peel. The fruit-flesh seems to differ from that of the external one; for in the alkohol-material it is softer and of lighter colour. This portion, also, wears on its summit a dried, hard, dark-coloured part, which in everything resembles the apex of a normal apple. The whole apple being cut through longitudinally the core is visible. This core is of normal structure. At the base it passes in the usual way into the peduncle *a* which here, as is the case with many apples and pears, is continued in the interior of the apple till near the core, rather markedly separated from the fruit-flesh. The peduncle does not stick out of the fruit-flesh of the inner apple, yet, it must have been somewhat longer, as through the envelope, it must have been united with the branch.

Microscopically the external apple presents at the outside an epidermis with thick cuticle, under which some layers of cells with rather thick walls. The parenchyma, which follows inwardly is a very loose tissue with great intercellular spaces. The cells are more

or less isodiametrical, whilst the walls are thin and, in accordance with the jodine-sulphuric-acid reaction, consist of cellulose. The inside of this envelope shows no separate differentiation; the parenchyma extends unchanged until this inside.

The structure of the inner apple accords in so far with that of the envelope, that it is also composed of a loose parenchyma of about isodiametrical cells, whose thin walls show cellulose reaction. The whole tissue is however filled up with a mycelium, the hyphae of which are in some places so numerous that in the glycerine-preparation the parenchyma cells can only be found with much trouble. The cellulose reaction, in which the hyphae are coloured yellow by jodine-kaliumjodine whilst the parenchyma cells grow dark blue, renders the latter distinctly visible. The mycelium is not everywhere equally compact. At the outside the hyphae are much more numerous than more inwardly; they form by their conglomeration at the surface a kind of layer which, on nearer view, is even visible to the naked eye. In all portions of the core, even in the seeds, the hyphae are to be found. In the interior of the endocarp the mycelium is also very compact and there the hyphae are of a stronger structure than in the surrounding fruit-flesh.

As follows from the above description this apple not only deviates from the normal one by its monstrous structure, it moreover presents another curiosity: the presence of a fungus in the inner part, and the absence of it in the envelope. To my opinion this fact explains the monstrosity. I think that the fungus has grown at first in the interior of the quite normal apple, and using some constituents of it as food, has more and more extended itself. The portion sucked out by the fungus has had a disposition for shrivelling and the tension between the healthy and the sick part of the fruit-flesh has finally become so strong that on the limit of both a splitting has originated, so that the apple was divided into two parts; an outer normal part and an inner one full of hyphae. The greater accumulation of hyphae at the surface of the inner portion of the apple has then probably taken place after the division, as the fungus will by preference develop there, where, in consequence of the splitting, a space filled with air was present. With this explanation the following facts perfectly agree. The remains of the calyx and other flower-parts at the top of the inner apple fit precisely in the opening which exists between the dry fragments of the outer portion when these fragments are joined together. These remains have evidently formed one whole, so that there can be here no question of a flower within another. The longitudinal section of a normal apple shows

clearly that it is quite well possible that the dried part at the apex might divide itself into two concentric portions; the inner member of which, wearing chiefly the stamens, would belong to the central body of the apple and the circular exterior to the envelope. On a nearer inspection of the different portions of the described apple it is evident that such has undoubtedly been the case here, and it is, moreover, to be observed in the figure. At the top of the envelope there are only fragments which remind of the calyx, whilst, the top of the inner apple wears, besides a few remnants of the calyx, the whole circle of dried stamens.

How the fungus has entered the apple; from whence the growth of the mycelium has begun; when the severing of the two parts has taken place, — these are questions not to be answered with the help of this one object. But the case appeared to me remarkable enough to describe it in short, whilst it will be of importance henceforth in the appearance of similar monstrosities, to pay attention to the presence of fungi.

Chemistry. — "*On the Theory of the Transition Cell of the third kind*". By Dr. ERNST COHEN. (First part.) (Communicated by Prof. H. W. BAKHUIS ROOZEBOOM.)

1. The theory of the transition cell of the third kind, to which VAN 'T HOFF [1]) first drew attention, has not yet been considered.

In a former paper [2]) I have pointed out that it may be verified by means of JAEGER's [3]) measurements, but that a number of experimental data needed for the complete calculation are still lacking.

In what follows I propose to develop in the first place the thermodynamic theory of these elements, then to describe the experiments which have been made for the determination of the quantities required in the calculations, whilst, finally, the results of theory and experiment will be compared with one another.

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[1]) VAN 'T HOFF, Vorlesungen über die Bildung und Spaltung von Doppelsalzen, Leipzig (1897), S. 29. Also: Vorlesungen über theoretische und physikalische Chemie, Erstes Heft. 5. 179. — ERNST COHEN, Ueber eine neue (vierte) Art Umwandlungselemente, Zeitschr. für phys. Chemie, 25 (1898) 300.

[2]) Zeitschrift für phys. Chemie 25 (1898), 300. — Maandblad voor Natuurwetenschappen, 22 (1898) 17.

[3]) WIEDEMANN's Annalen, Bd. 63 (Jubelband) (1897) 354.