

plants, in flower, including *Tulipa persica* and *Narcissus dubius*, which have lately been presented to the Garden by Messrs P. Lawson & Son.

Mr Stark exhibited a growing plant of *Fritillaria Kamtschatica*.

11th June 1868.—WILLIAM GORRIE, Esq., Vice-President,
in the Chair.

The Secretary laid on the table a letter from the Secretary of State, in reply to the loyal Address which the Society had forwarded to Her Majesty the Queen, and which she has been graciously pleased to accept.

Professor Balfour intimated the death of Mr William Ivory, who had long taken a warm interest in the Society, and at whose hospitable mansion of St Roque many of the members had met on several occasions to inspect the trees and shrubs which ornamented the grounds. Mr Ivory was an early supporter of the Caledonian Horticultural Society, and took much pleasure in cultivating rare plants. He was long a member of Council of the Botanical Society, and his loss will be severely felt.

The following Communications were read:—

- I. *On the Reproduction and Cross Fertilisation of Passifloras.* By Mr ROBERTSON MUNRO. Communicated by Mr SADLER.

It is well known that many species of *Passiflora* seldom produce fruit when impregnated with their own pollen, and yet they do so frequently when impregnated with pollen taken from another species or even distinct genera. Many self-impotent species are found capable of producing ovaries by merely dusting their anthers with pollen taken from such distinct genera as *Disemma* or *Tacsonia*, although when thus fertilised the ovaries either drop off prematurely or very rarely contain any seed. With a view of further illustrating such singular phenomena, I have, through the

kindness of Professor Balfour, the honour to lay before the Society an account of various experiments performed by me during several years in the Royal Botanic Garden of Edinburgh, and in the Nurseries of Messrs P. Lawson & Son. My attention was first directed to the subject in consequence of a self-impotent species (*Passiflora alata*), being cultivated at Keith Hall for several years without showing the least sign of fertility, although grown under the best possible treatment. Hundreds of flowers have been impregnated from time to time on this plant, with its own pollen, but in no single instance has the gardener (Mr Donaldson) been able to induce it to "set" a single fruit. In the Botanic Garden of Edinburgh there is a plant in the same condition. Many experiments have been tried to induce this plant to produce fruit, but if self-impregnated, failure has been the invariable result. As a curious experiment, I got pollen of the Keith Hall self-impotent species, and impregnated a few flowers on the self-impotent plant at the Botanic Garden; the result was the production of three ovaries, one of which arrived at maturity, and contained a large number of perfect seeds. Seedling plants from this union flowered in the garden in 1864. I impregnated a considerable number of these flowers with their own pollen, every one of which proved abortive. But on impregnating eighteen flowers on the mother plant with pollen from her own self-impotent seedlings, I got eighteen fine plump ovaries full of seed! This remarkable fact has already been published by Mr Darwin, as well as some interesting facts communicated to me by Mr Donaldson, gardener at Keith Hall, showing the very singular circumstances by which *P. alata* was rendered self-fertile at Taymouth Castle by being grafted on another species. Seedling plants obtained from this grafted *P. alata* were found by Mr Donaldson to be irretrievably sterile, not only when fertilised with its own pollen, but also when impregnated with pollen of the self-impotent *P. alata* previously referred to.

In order to test the fertility of *P. alata*, as well as other species of *Passiflora* when crossed, I began by impregnating eight flowers of *P. alata* with pollen of *P. cœrulea*, and had five fine ovaries full of seed, which germinated freely when

sown. Six flowers of *P. alata*, impregnated with *P. racemosa*, proved abortive, but conversely nine flowers of *P. racemosa* impregnated with *P. alata* produced five ovaries full of seed. Eight flowers of *P. alata*, impregnated with *P. macrocarpa* (evidently a variety of *P. quadrangularis*, and like that species perfectly fertile when impregnated with its own pollen), yielded four fine ovaries full of excellent seed. Six flowers of *P. alata*, impregnated with *P. Kermesina*, proved abortive; but two flowers of *P. Kermesina*, impregnated with *P. alata*, produced two ovaries which contained no seed. I may here observe that many species, as well as hybrid *Passifloras*, are often found destitute of pollen; but I have invariably found species thus rendered self-impotent from the imperfect development of their reproductive organs could easily be excited to produce seed when impregnated with good pollen. Eight flowers of *P. alata*, impregnated with *P. Loudoniana*, proved abortive; two flowers of *P. alata*, impregnated with *P. fulgens*, proved abortive; six flowers of *P. alata*, impregnated with *P. Belottii*, proved abortive; four flowers impregnated with *P. Newmanii*, yielded one ovary containing good seed; eight flowers of *P. alata*, impregnated with *P. palmata*, proved abortive; two flowers of *P. alata*, impregnated with *P. cardinalis*, produced no fertile ovaries. On *P. racemosa* I impregnated thirty-eight flowers with its own pollen, but failed to get a single fertile ovary. Nine flowers, *P. racemosa*, impregnated with *P. alata*, produced five ovaries full of seed; fifteen flowers of *P. racemosa*, impregnated with *Tacsonia pinnatistipula*, produced six ovaries, which dropped off before they arrived at maturity, and contained no seed; five flowers of *P. racemosa*, impregnated with *Tacsonia mollissima*, yielded two ovaries, which arrived at maturity, but contained no seed; sixteen flowers of *P. cærulea*, impregnated with their own pollen, proved abortive. A plant at Trinity Cottage, however, has frequently produced plenty of fruit, but on dissecting a great number of ovaries I found that they contained no seed, nothing but the seed walls being developed. Four flowers of *P. cærulea*, impregnated with *P. racemosa*, produced one ovary which arrived at maturity, but contained no seed; six flowers of *P. cærulea*, impregnated with *Tacsonia pinnatistipula*, proved abortive;

ten flowers impregnated with *T. mollissima*, yielded eight ovaries, which dropped off at an early stage, and contained no seed. *Passiflora Belottii* proved abortive when impregnated with its own pollen, and also with the following species:—*P. alata*, *P. cærulea*, *P. palmata*, *P. Kermesina*. I have tried this species at different hours of the day, but I have not yet been able to induce it to yield a single ovary. Six flowers of *Tacsonia pinnatistipula*, impregnated with its own pollen, produced six ovaries full of fine seed. Three flowers, impregnated with *T. mollissima*, produced one ovary which arrived at maturity. It contained a few apparently good seeds, none of which, however, germinated when sown. Sixteen flowers of *P. Kermesina*, impregnated with its own pollen, proved abortive. Two flowers, impregnated with *P. alata*, yielded two ovaries which contained no seed. Twenty-three flowers of *P. holosericea*, impregnated with its own pollen, proved abortive. Seventeen flowers, impregnated with *Tacsonia mollissima*, produced twelve ovaries, which arrived at maturity, but on dissection I found they contained no seed. On *Passiflora fulgens* I impregnated three flowers with its own pollen, but failed to get an ovary. Fifteen flowers of *P. cardinalis*, impregnated with *P. alata*, proved abortive. Three flowers, impregnated with *P. palmata*, proved also abortive. One flower, impregnated with *P. Loudoniana*, has produced an ovary which I fear will not contain seed.

On a hybrid passiflora between *P. alata* and *P. racemosa* (*P. alata* being the mother) I impregnated six flowers with *P. alata*. This union produced six ovaries, some of which dropped off in three weeks, but three remained until nearly mature; these, however, contained no seed. I tried the same plant with pollen of *P. cærulea*, but failed to get an ovary.

Specimens of the following species and hybrids were laid on the table:—*Passiflora alata*, *P. cærulea*, *P. Loudoniana*, *P. fulgens*, *P. cardinalis*, *P. Kermesina*, *P. racemosa*, *P. laurifolia*, *P. Houletii*, *P. macrocarpa*, *P. Newmanii*, *P. palmata*, *P. Belottii*, *P. edulis*, *P. alata* crossed with *P. cærulea*, *P. alata* crossed with *P. racemosa*, *P. alata* crossed with *P. macrocarpa*, *P. alata* crossed with *P. Newmanii*, also *Tacsonia pinnatistipula* and *T. mollissima*.