

HYBRID RHODODENDRONS.

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INTRODUCTION.

IN giving some account of the hybrids and crosses raised by Messrs. Veitch & Sons between species of East Indian Rhododendrons, the following observations refer almost entirely to the effects produced in the forms and colours of the flowers, as well as in the shapes of the leaf-blades. Other observers and experimenters on hybrids have paid great attention to the question of the relative degrees of sterility and fertility amongst true hybrids and crosses of subsequent generations. As the Rhododendrons in question are raised for commercial purposes, the methods of multiplication and propagation adopted, besides having the advantage of keeping the different sorts true, are entirely by cutting and grafting, as affording a more rapid means of increasing the stock. Hence the sole object of crossing is to raise new varieties in which form and colour are the only points attended to, apart from a more compact habit of growth than that which some of them are liable to affect. Such being the case, no statistics of importance are retained upon which generalisations can be framed in reference to relative degrees of sterility or fertility. Such observations as Mr. Veitch has made I have supplied. Still, from the point of view above stated, the results will not, I think, be found devoid of interest.

General Effects of Crossings on Flowers and Foliage.—It has been often asserted that a hybrid resembles the male parent in the flowers, and the female parent in foliage. One chief result, however, observed in studying the comparative effects of the male and female parents in the present case is to modify considerably, if not to render nugatory, this supposed rule; for it is by no means absolute. It would be more correct to say that the offspring may resemble either parent in either way and in various degrees, according to some unexplainable prepotencies in them respectively. Moreover, characters observable in the grandparents or higher ancestry may reappear, having been more or less in abeyance in the parents; or, again, a trace of colour of an

ancestor, retained either in the corolla as a delicate tint, such as of pink, or in the anthers alone, may suddenly become very pronounced.

With regard to flowers, prepotency in the transmission of colour is usually, and I may say generally, recognised by florists as being correlated with its intensity: so that, if they wish to "improve" a flower, they select the best coloured as the male parent; but as far as the East Indian Rhododendrons herein described are concerned, it sometimes happens that a paler tint, such as a primrose-yellow or a shade of pink, is retained in the offspring, notwithstanding the fact of one of the parents being of an intense golden yellow or crimson, respectively.

With regard to colours, it may be remarked here that they are all reducible to two, yellow and rose-red. The former is produced by the presence of yellow granules scattered within the cells of the epidermis or underlying tissue; while the reds are due to various degrees of concentration of a coloured fluid both in individual cells as well as by superposition of cells containing the rose-coloured fluid. The buffs or orange-colours are due to combinations of the pink fluid with yellow granules, either in the same cell, as occurs in some epidermides, or in adjacent cells, as occurs in orange-coloured anthers examined. If there be a pink throat with a yellow or orange border to the corolla, this is due to the epidermal cells containing a more concentrated solution of the pink fluid.

Another point worth noticing, especially from a practical point of view, is that better results as to the production of colours occurred by using true species as the male parent, rather than a cross. Hence it will be observed that in the following cases of crosses a true species was much more often employed than a cross as the staminate parent. The same rule, however, holds good when a true species is used as the seed-bearing plant and a cross as the male, rather than when both parents are crosses. Nevertheless, some excellent results were obtained when both parents were crosses.

With regard to the forms of the corolla of the hybrid or cross, this is by no means necessarily correlated to the size and shape of that of either one parent rather than the other; but it depends upon some inherent prepotency in the plant. Thus the small-flowered *B. multicolor*, and its variety *Curtisii*, invariably brings

down the size of the corolla of the larger-flowered species with which it may be crossed, whether it be used as the male or female parent, to some approximation to its own in the offspring. Mr. Veitch has thus obtained a series called the "Multicolor section," with corollas intermediate in size between the larger and smaller species.

In several crosses described it will be seen how even the tube and the limb may each have its own particular influence respectively on the offspring. Again, if two forms, having about equal-sized corollas, be crossed, the result may be a flower in every way larger than that of either parent. In a few cases the number of lobes seems to be permanently increased (*see* p. 271).

Hence from the results obtained from the Rhododendrons in question, it would appear that no precise rules as to the transmission of floral characters can be laid down. Special influences may, however, be discovered by experiment, and certain peculiarities of any particular species of form ascertained; so that the florist can then readily see whether it is worth while proceeding along certain special lines.

With regard to foliage the same uncertainty prevails. The leaf of the offspring of a hybrid or a cross may resemble either parent entirely, mainly, or in part only, or not at all.* The four points to be noticed are length, breadth, apex, and base of the blade.† Each of these may affect the offspring together, or independently of one another. Again, an ancestral character may reappear, as *e.g.* the truncated base of the leaf of the species *R. jasminiflorum* reappears in certain offspring, both of whose parents may have had blades attenuated at the base. Lastly, of two plants raised from seeds out of the same pod, one may resemble one parent, the other the other parent.

The general dimensions of the leaf may be reduced or not. All one can say is that such or such features are prepotent or not, as the case may be; but it does not appear possible to say why they are so.

FERTILISATION.

With regard to the question of degrees of sterility or fertility

* Of about twenty crosses taken at random, about half appeared to bear a stronger resemblance to either parent respectively.

† As the margin is "entire" in all the species, no incisions of any kind occurred.

amongst true hybrids and crosses, it is now well known that they range from zero to infinity in both cases; but that hybrids, as a rule, are more sterile than subsequent crosses. In the case of the East Indian Rhododendrons, Mr. Veitch detected no differences in the fertility of the seedlings he raised, whether of first hybrids or of subsequent combinations—the average number of seeds in any pod being roughly estimated at 500, no accurate measurements having been taken.

It has been asserted that seedlings of true hybrids, which resemble one parent very much, are usually very sterile; but Mr. Veitch did not find it to be so in the present instance. His results, however, conformed to the rule that there was greater uniformity in first hybrids than in subsequent crosses. Similarly his reciprocal hybrids were, as is usually the case, very like one another; there appears to be no difference in their fertility.

As Mr. Veitch found great difficulties in crossing species of *Cypripedium* from the two hemispheres, so likewise attempted crosses between the E. I. Rhododendrons and Sikkim or American species have met with little success, though the seven species utilised cross amongst themselves with great facility.

As an illustration, Princess Royal (fig. 35) (= *R. jasminiflorum* × *R. javanicum*) × *R. Aucklandii* from Sikkim (fig. 34) gave rise to a small white-flowered cross called "Pearl." It closely resembles Princess Alexandra (fig. 37). In fact, the white male parent simply eliminated the pink from Princess Royal, scarcely affecting the size of the corolla at all.

M. Naudin found that colours were sometimes associated with sterility and affinity, but nothing of the sort obtains amongst these species of Rhododendron.

On examining the pollens I found that several of the grains from the true hybrids were shrivelled, or else refused to swell with water. On the other hand, the pollen grains of the first and subsequent crosses were all good, and swelled up vigorously in water. *E.g.* "Hippolyta," which contains five species in its constitution, is one with composite grains, and all good.

SUMMARY OF THE EFFECTS OF COLOURS ON CROSSING.

1. *The Combination of Colours.*—Reds and yellows form orange, ranging from yellow-orange to scarlet-crimson.



FIG. 34.—R. AUCKLANDII (HYB.).*

* The Society is indebted to the courtesy of Messrs. Veitch & Sons, and the Editors of the *Journal of Horticulture* and of the *Garden* for the use of the engravings inserted in the text of this paper.

2. *The Reduction of Colours.*—White and crimson may produce pink. Pink and crimson may produce pink or rose. Light yellow and golden yellow may produce a primrose-yellow.

3. *The Separation and partial Elimination of one of the Colours.*—White and orange may produce pink or yellow. Pink and orange may produce yellow.

4. *The total Elimination of all Colour.*—White, orange, or yellow, crossed with pink, may produce white.

5. *The Dissociation of Colours.*—A crimson or yellow crossed with orange may produce reddish lobes and a yellow tube, or yellow lobes with roseate throat.

6. *The Prepotency of Colours.*—Crimson or yellow may completely overpower yellows and orange, one or other being alone transmitted.

7. *The Restoration of Colours.*—Reds and yellows can be restored without a fresh infusion, if the tint be "in the blood" from some previous generation, whether in the corolla or in the anthers and filaments only.

ILLUSTRATIONS OF THE EFFECT OF CROSSING ON COLOURS.

1. *The Combination of Colours.*—The whole colours of the present species of Rhododendron are crimson (*R. Lobbii* and *R. multicolor*, var. *Curtisii*), cerise (*R. malayanum*), golden-yellow (*R. Teysmannii*), straw-colour (*R. Brookeanum*, var. *gracile*), lemon-colour (*R. multicolor*), buff-orange (*R. javanicum*), and white (*R. jasminiflorum*).

When red and yellow are united, one, and the more usual, effect is their combination, giving rise to various shades of orange or scarlet, ranging from a golden-orange to scarlet-crimson. When two orange-coloured forms are crossed, the offspring, as might be expected, are mostly characterised by various shades of orange.

As examples of the above combinations are *R. Lobbii* (crimson) × *R. Brookeanum*, var. *gracile* (straw-coloured) = Queen Victoria (yellow-orange) and Prince Leopold (red-orange).

Crown Princess of Germany (pinkish-orange) × *R. javanicum* (orange) = Souvenir de J. H. Mangles (chrome-orange).

R. javanicum (orange) × *R. multicolor*, var. *Curtisii* (crimson) = Nos. 37, 406 (scarlet-crimson).



FIG. 35.—PRINCESS ROYAL.

R. multicolor, var. *Curtisii* (crimson) × Princess Christian (yellow) = No. 394 (scarlet).

R. Lobbii (crimson) × *R. Brookeanum*, var. *gracile* (straw) = Duchess of Edinburgh (scarlet-crimson).

2. *Reduction of Colours*.—As instances of the colour of the offspring being paler than that of the parents, Princess Alexandra (white) × Duchess of Edinburgh (scarlet-crimson) = Pink Perfection and Princess Beatrice (cream and pink).

Princess Royal (pink) × *R. Lobbii* (crimson) = Princess Helena (pink).

Princess Alexandra (white) × *R. Teysmannii* (golden yellow) = No. 464 (primrose).

R. Teysmannii (golden yellow) × *Taylori* (pink) = offspring of different shades of primrose-yellow, as Portia, Juliet, and Purity, in which the pink of the male parent is scarcely perceptible.

3. *Separation, with Elimination of one of the Colours*.—Instances occurred where yellow or red was more or less completely eliminated, especially when white characterised one or other of the parents.

The first hybrid raised was Princess Royal (fig 35), by crossing *R. jasminiflorum* (white) with *R. javanicum* (orange). In the offspring the yellow of the male parent disappears, while the pink or rose-colour of the same parent is left. A sister hybrid, *Jasminiflorum carminatum*, of the same parentage, resembles Princess Royal in form, but approaches a crimson in colour (fig. 36). A very similar result occurred in several of the offspring of Princess Alexandra (white), crossed by *R. javanicum* (orange). Most of them are more or less decidedly pink, such as Queen of Roses, Rose Perfection, &c. In others the yellow is present, but with a tendency to dissociation from the red, as is implied, *e.g.*, in the name "luteo-roseum." In one case, however, Minerva, the corolla is a rich yellow, the red of the orange having in this case disappeared, the anthers alone being crimson. A similar result occurred in crossing Princess Alexandra (white) with the scarlet-crimson Duchess of Edinburgh, the offspring of which, Monarch, is a yellow-orange, while Virgil is a pure yellow; so that the white of Princess Alexandra has nearly eliminated all the crimson from the male parent. It is remarkable, however, that in a sister offspring, Pink Perfection, the opposite and more usual result

occurs, in that now the white has eliminated all trace of yellow (derived from the grandparent *R. Brookeanum*, and at the same time reduced the crimson (derived from *R. Lobbi*) to a pure pink.

Very similar results had been previously noticed to occur in crossing the orange-coloured *Begonia cinnabarina* with the white *B. Dregei*; a pink offspring, *B. Weltoniensis*, was obtained.

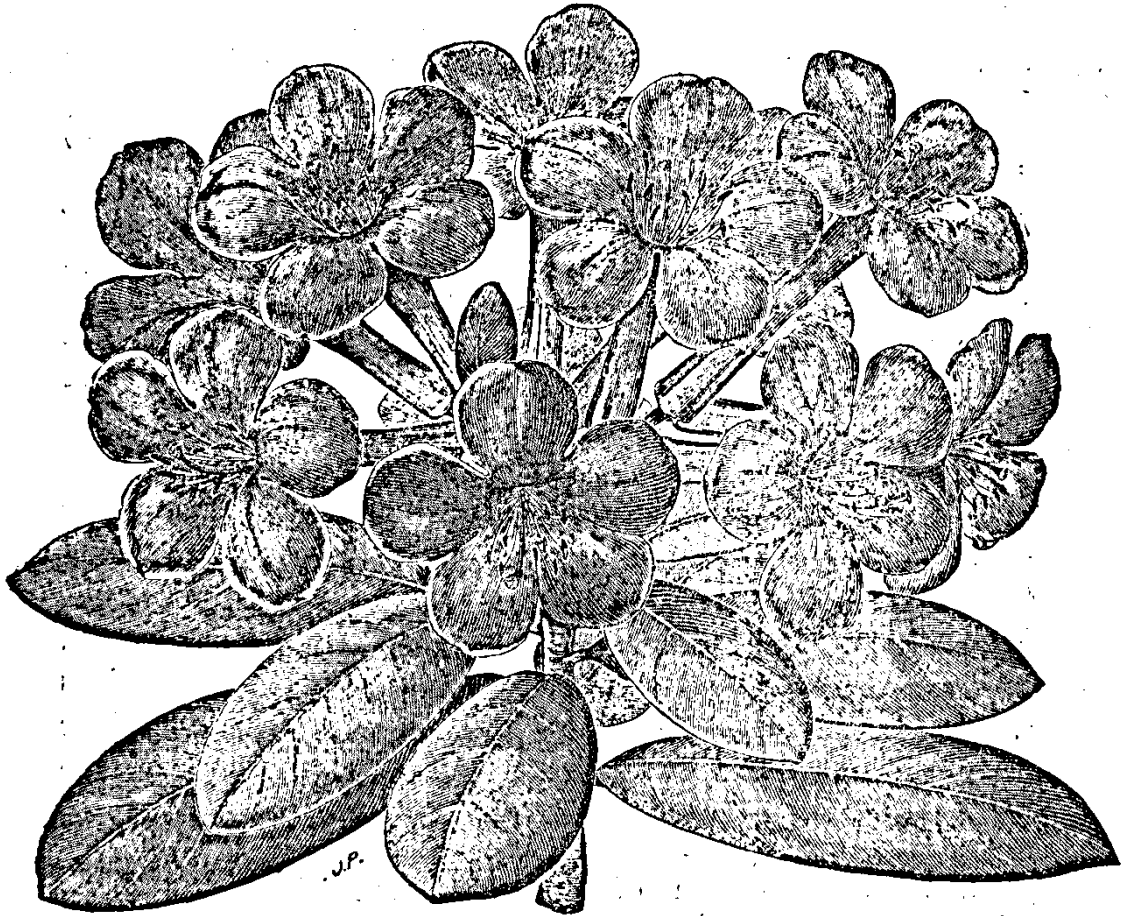


FIG. 36.—RHODODENDRON JASMINIFLORUM CARMINATUM.

Again, no varieties of colours were obtained from the old bronze-red *Abutilon Darwinii* until crossed by the white *Boule de Neige*.

4. *Total Elimination of Colour*.—On recrossing *Princess Royal* (pink) with *R. jasminiflorum* (white), *Princess Alexandra* (white) was obtained (fig. 87).

In some cases red and yellow eliminate each other, though in others, as stated, and perhaps more generally, they combine to produce orange and scarlet. Thus *Purity* (French white) is derived from *R. Teysmannii* (golden yellow) × *Taylori* (pink).

R. multicolor (lemon) × Princess Beatrice (cream and pink) produced white varieties. Princess Royal (pink) × *R. Teysmannii* (golden yellow) = No. 392, which has a pale pink limb and a nearly white tube; the anthers alone are orange, containing, therefore, the union of the two colours. Lastly, Princess Royal (pink) × *R. javanicum* (orange) = Thalia (white).



FIG. 37.—PRINCESS ALEXANDRA.

5. *Dissociation of Colours*.—In other genera of plants this may give rise to a striped, flamed, or blotched appearance, as for example in *Calceolarias* and in varieties of the Snapdragon; but such has not occurred in these Rhododendrons. Sometimes,

however, a flower would have the interior of the tube or throat of a more strongly tinged hue than the lobes, or *vice versa*.

Thus, *R. multicolor* (lemon) × Lord Wolseley (red-orange) = No. 403, which has light crimson lobes and a yellow tube.

R. Teysmannii (golden yellow) × *R. multicolor*, var. *Curtisii* (crimson), as well as the reciprocal hybrid, has a rose-coloured throat with a yellow-orange limb.

R. multicolor (lemon) × Aurora (yellow-orange) = No. 460. This has a yellow tube with red-orange lobe. The reciprocal cross is the same. Princess Frederica (yellow) × *R. multicolor* (lemon) = No. 339, has a pink* throat and a yellow limb.

The stigma and anthers are very often quite different from the corolla, frequently retaining an ancestral colour, which is lost or inconspicuous in the corolla. Thus *e.g.* Princess Frederica has orange anthers, the corolla being yellow; while in Queen of the Yellows the anthers are crimson.

6. *Prepotency of Colours*.—It not infrequently happens that the colour of one parent will be almost or entirely prepotent over that of the other, and be transmitted to the offspring.

Lord Wolseley (red-orange) × *R. Teysmannii* (golden-yellow) = Yellow Perfection. On the other hand, *R. multicolor*, var. *Curtisii* (crimson) × *R. Teysmannii* (yellow-golden) = No. 474 (crimson). The former species very frequently transmits its crimson colour unaffected by the other parent.

R. Lobbia (crimson) × *R. Brookeanum*, var. *gracile* (straw) = Duchess of Edinburgh and Duchess of Connaught (bright scarlet-crimson).

Monarch (yellow-orange) × *R. malayanum* (cerise) = Little Beauty (cerise).

7. *Restoration of Colours*.—In some cases a particular colour is, so to say, in the blood, and, though eliminated more or less entirely in one generation, may reappear in the next without any fresh infusion; or, if there be a trace of it, as *e.g.* in the anthers alone, it appears capable of redevelopment till it becomes pronounced in the next generation. Thus, Monarch (orange) is the offspring of Princess Alexandra (white) × Duchess of Edinburgh (scarlet-crimson); but this latter is a hybrid resulting from crossing *R. Lobbia* (crimson) with *R. Brookeanum*, var. *gracile* (yellow).

* The pink is traceable to the grandparent Princess Royal.

Hence the source of the yellow colour in the orange in Monarch was this last-named grandparent.

Princess Alexandra (white) \times *R. Brookeanum*, var. *gracile* (straw) = *Taylori* (pink); but Princess Alexandra is the offspring of Princess Royal (pink).

Princess Frederica (yellow with orange anthers) \times *R. multicolor* (lemon) = No. 339 (yellow border, but pink throat). The pink here is derived from the grandparent Princess Royal.

R. multicolor (lemon) \times Princess Beatrice (cream and pink tinge) = No. 335 (dark rose). In this case not only has the yellow disappeared, but the red derived from *R. Lobbiai*, through Duchess of Edinburgh (the male parent of Princess Beatrice), has reappeared and become pronounced.

EFFECTS OF FORM IN CROSSING.

Form of the Original Species (large-flowered).—Cor. border large and tube short, lobes reflexed—*R. Teysmannii* (fig. 43, f). Cor. border large and tube short, lobes straight—*R. Brookeanum* (fig. 43, a) and *R. javanicum* (fig. 43, e). Cor. border small and tube long—*R. jasminiflorum* (figs. 38 and 43, c), and *R. Lobbiai* (fig. 43 b).

Small-flowered Species.—Cor. border broad, tube funnel-shaped—*R. multicolor* (fig. 43, d). Cor. border small, tube straight—*R. malayanum* (fig. 43, g).

The long straight tube of *R. jasminiflorum* is traceable through most of the progeny of Princess Royal and Princess Alexandra, when crossed with *R. Brookeanum*, but when crossed with the short-tubed *R. javanicum*, it approximates that of the latter species. A similar result follows when they are crossed with *R. multicolor*. The short-tubed *R. javanicum* similarly reduces the larger one of Princess Frederica, as in Princess Christian.

On the other hand, *R. javanicum* (short-tubed) (fig. 43, e) \times Duchess of Edinburgh (long-tubed) (fig. 44, l) = *Militare* (long-tubed). The long tube is derived from *R. Lobbiai* (fig. 43, b), which is strongly curved and ascending. A slight curvature is retained in the hybrids, but disappears in the second and subsequent generations.

With regard to the form of the small-flowered *R. multicolor*, whenever this species is crossed with any other or a descendant

of them, it universally reduces the size so that the offspring, while being intermediate, are nearer to that of *R. multicolor* than the other. The short funnel-shaped tube is more or less traceable in all its offspring in the *multicolor* section.

THE EFFECTS OF THE LEAF IN CROSSING.

Forms of the Leaves of the Original Species (fig. 42).—Elliptical, apex very obtuse, base truncate, length 2 to 3 inches—*R. jasminiflorum*. Elliptical, apex acute, base truncate, length 5 inches



FIG. 38. — *R. JASMINIFLORUM*.

—*R. Teysmannii*. Lanceolate, apex acute to acuminate, base tapering, length 5 inches—*R. javanicum*. Lanceolate, apex acute to acuminate, base tapering, length 2 to 3 inches (the under surface is covered with russet-brown scales)—*R. malayanum*. Lanceolate, apex acute to acuminate, base tapering, length 2½ inches—*R. Lobpii*. Oblanceolate, apex acute to acuminate, base very tapering, length 8 inches—*R. Brookeanum*. Oblan-

ceolate, apex acute to acuminate, base very tapering, length 2 to 3 inches—*R. multicolor*.

R. jasminiflorum.—The elliptical form with truncated base is traceable in immediate descendants, as in the hybrid *Jasminiflorum carminatum* = *R. jasminiflorum* × *R. javanicum*, but it is soon lost when again crossed with other species or descendants; as when it is crossed with *R. multicolor*, except in Nos. 452 and 453, which retain much of the form of the leaf of *R. jasminiflorum*, or again in Ruby = *R. jasminiflorum* × *R. multicolor*, var. *Curtisii*, this latter species having acute and tapering leaves.

R. Teysmannii.—The broadly elliptical form is lost when this species is crossed with *R. multicolor*, but somewhat retained when crossed with Maiden's Blush = No. 397. Similarly in No. 450 = Lord Wolseley × *Teymannii*, and in Nos. 53a, 458, &c. = Princess Frederica × *R. Teysmannii*, as also in No. 405 = *R. multicolor*, var. *Curtisii* × *R. Teysmannii*. It will be observed that *R. Teysmannii* is prepotent in these cases while being the male parent.

R. javanicum.—The broad lanceolate leaf with tapering ends is retained in Diadem, Militare, and Ne plus ultra = *R. javanicum* × Duchess of Edinburgh. Similarly in Brunette = Princess Frederica × *R. javanicum* and No. 158, in which cases the species is the male parent.

R. Brookeanum, var. *gracile*.—The very remarkable leaf of this species, which is 8 inches long, obovate, and with very attenuated base, is never reproduced; the barest trace only being observable in Crown Princess of Germany = Princess Royal × *R. Brookeanum*.*

R. multicolor.—This small and tapering leaf is readily transmitted, as in No. 426, &c. = Queen of the Yellows × *R. multicolor*, var. *Curtisii*. The general effect of this species, whether used as the male or female parent, is to reduce the size of the leaf of the other parent, and impart its tapering ends, narrowing the blade at the same time.

R. malayanum.—This species was crossed, as the male parent, with Monarch (derived from Princess Alexandra), both parents having tapering leaves, but those of the latter being large. This form is retained in the offspring, Little Beauty and No. 29, which have the same russet-brown scales of the male.

* This well illustrates the fact that a large-sized leaf is by no means always correlated to prepotency. The same feature is true also for the corolla.

EFFECTS OF MULTIFOLD CROSSING.

Mr. Veitch has raised several crosses of the fourth generation, combining four or five species in the results. The following are a selection to illustrate the fact that the species first used frequently retain no visible trace of their existence in the latest offspring, which is much more conformable to the form and colour of the species last introduced into the cross.

Hippolyta (fig. 44, *k*) = Queen of the Yellows \times *R. multicolor*, var. *Curtisii*. This contains *jas.*, 2 *jav.*, *Brook.*, and *mult.*, var. *Curtisii*. The form is nearly identical with that of *R. mult.* (fig. 43, *d*), but larger; the increased size being probably due to the effect of *R. javanicum*. The leaf is an enlarged form of that of *R. multicolor*. This cross also illustrates the strong propotency of this species, for there is no appreciable difference of any importance in form or colour between *Hippolyta* and the second generations, Nos. 32 and 301 = Pr. Royal \times *R. mult.* var. *Curt.*, which contains *jas.*, *jav.*, and *mult.* only.

Yellow Perfection = Lord Wolseley (fig. 44, *m*) \times *R. Teysmannii* (fig. 43, *f*). This contains *jas.*, 2 *jav.*, *Brook.*, and *Teys.* It is intermediate between *R. Brookeanum* and *R. Teysmannii*, with the leaf more nearly that of the latter species.

Primrose and No. 456 = Maiden's Blush \times *R. Teysmannii*. This contains *jas.*, 2 *jav.*, *Brook.*, and *Teys.* In *Primrose*, *R. Teysmannii* overpowers everything; but in No. 456 *R. Brookeanum* is more apparent in colour and form.

Little Beauty and No. 318 (fig. 44, *n*) = Monarch \times *R. malayanum* (fig. 43, *g*). This contains five species, and one of them twice—viz., *jas.*, 2 *jav.*, *Lobb.*, *Brook.*, *malay.*; yet the result is almost purely *R. malayanum*, the leaf only being larger, yet even that has the russet scales of this species.

Artemis = *Ophelia* \times *R. Teysmannii*. This contains *jas.*, 3 *jav.*, and *Teys.* The large lobes may be attributed to *R. javanicum*; but the size and colour are nearer to *R. Teysmannii*.

Aspasia = *R. Teysmannii* \times Maiden's Blush. This contains 2 *jas.*, *jav.*, *Brook.*, and *Teys.* *R. Brookeanum* is seen in the slender tube, *R. Teysmannii* in the general form and colour, as well as in the leaf.

Juliet, *Portia*, *Imogene*, and *Purity* = *R. Teysmannii* \times

Taylori. These contain 2 *jas.*, *jav.*, *Brook.*, and *Teys*. In these *R. Brookeanum* predominates in the slender tube and paleness of the colour.

In not a single instance is the original form *R. jasminiflorum* traceable either in the corolla or the foliage.

PRACTICAL RESULTS.

From the preceding observations a few practical results may be noticed.

1. It has often been observed that when a plant with coloured flowers succeeds in throwing up a seedling with *white* flowers, the second generation from the latter may be remarkable for a great variation of tints. This, however, does not apply in the present instance, as the only white form is a true species (*R. jasminiflorum*). (Fig. 38.)

2. When a flower with a composite colour, as orange, is crossed by white, then the next generation may have the colours separated, shades of red or of yellow being the result. This is true, either when crossed by a true species (*R. jasminiflorum*) or a cross (Princess Alexandra). (Fig. 39.)

3. If rose or pale red, and pale or dark yellow, be united, delicate pinky-cream coloured, as well as primrose-yellow tints, are produced.

4. It is generally preferable to employ the pollen of a true species when a crossed offspring is fertilised.

5. If it be required to enrich a colour, the plant with the richer tint should be used as the male parent.

6. Reciprocal hybrids are practically identical.

7. Pollen from short stamens tends to dwarf the size of the offspring in *Rhododendrons*. This was discovered by Mr. McNab, but is scarcely applicable to the present species, as there is little or no difference in the lengths of the stamens.

8. From the history of the *Balsamæflorum* section (p. 256), one may gather the usefulness of self-fertilisation in *fixing*, but, of course, not in *creating*, double forms. Conversely, the offspring of a semi-double flower crossed by any single one was invariably single, the latter being prepotent over the semi-double form.

THE BALSAMÆFLORUM SECTION OF RHODODENDRON
CROSSES.

The group of semi-double and double forms of Rhododendrons called *Balsamæflorum* (figs. 39 and 40), from their resemblance to the double flowers of some Balsams, is a curious result of self-fertilisation. Mr. Heal, Mr. Veitch's assistant, who has raised all these hybrids and crosses, observed a *single* flower in a certain truss on a plant of the second generation to have *one* anther only, slightly petaloid. He impregnated the pistil of the flower with

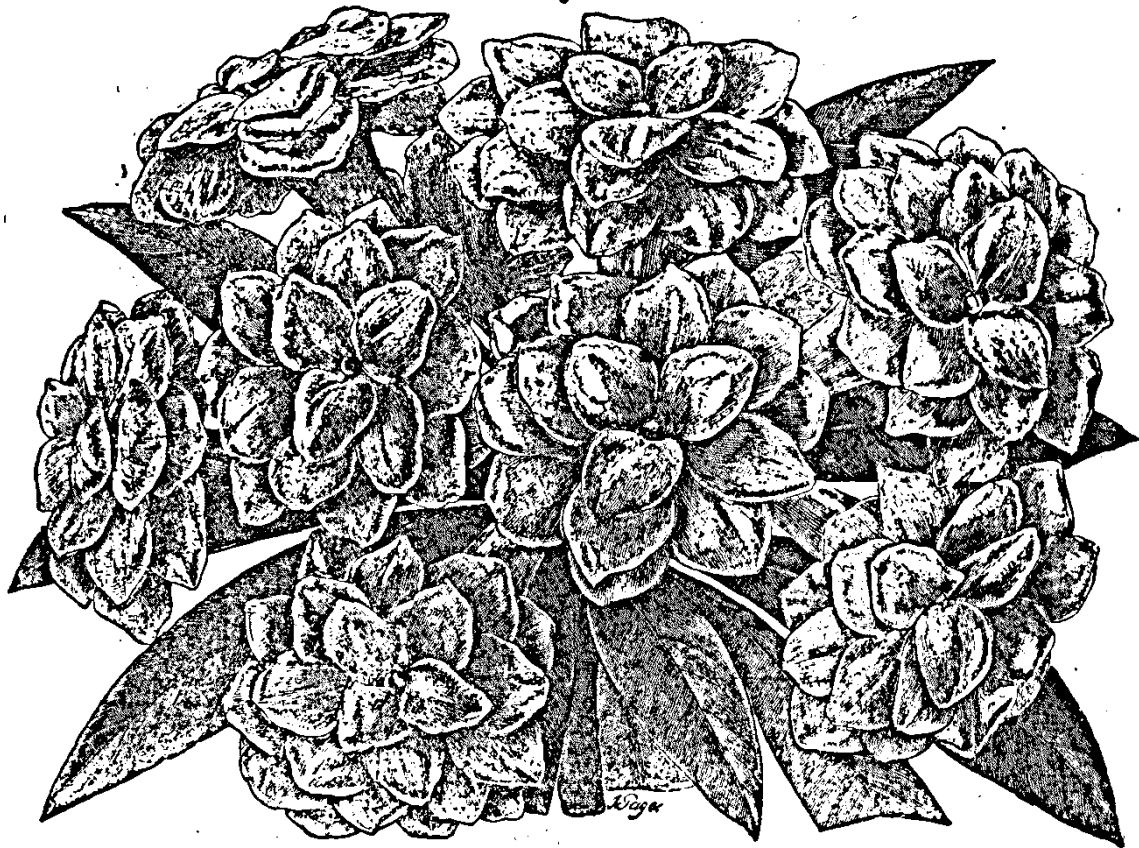


FIG. 39.—RHODODENDRON BALSAMÆFLORUM CARNEUM.

pollen from the other anthers of the same flower; this process being thus strict self-fertilisation. About twenty seedlings were raised, which now constitute the *Balsamæflorum* section.

It would, I think, be incorrect to say that self-fertilisation in this case was a *cause* of doubling, but that it enabled and encouraged the tendency to petalody to be intensified. For, on the contrary, whenever a member of this group has been crossed with a true species, or one of the crosses raised from the seven species, the results were always normal (*e.g.* Nos. 207 and 423),

thereby showing that this tendency to petalody was destroyed or overcome by the natural vigour of the true species or cross with which it was united.

With reference to petalody, differences range from a very slight condition in the filaments to a completely double state. In one seedling raised the stem was forked, each branch terminating in a truss; and while the flowers on one truss had all their stamens more or less petaloid, those in the other had but some only.



FIG. 40.—RHODODENDRON BALSAMÆFLORUM ALBUM.

With regard to the form of the corollas, some have elongated tubes with a comparatively small limb, and consequently partaking much of the shape of Princess Royal. Others have a short tube, and broader limb, thereby approximating the form of *R. javanicum*.

With regard to colours the offspring show great variety. They range from white and pink to dark red or crimson, as well as pure yellow, to various shades of orange.

The name of the original plant is not known, but this dis-

sociation of form and colour reveals the parentages, in that Princess Royal and *R. javanicum* and *R. jasminiflorum* are clearly present. As pure yellow forms occur, such would probably point to *R. Brookeanum*, var. *gracile*. Consequently, as it was known to be a second generation, it was most probably one of the three following, Princess Frederica, Crown Princess of Germany, or Duchess of Teck.

The foliage is very variable, with a frequent want of symmetry in the two halves of the blade.

BIGENER, INDICO-JAVANICUM (FIG. 41).

This is a bigeneric cross between *Rhododendron* Lord Wolseley (fig. 44, *m*) and *Azalea indica stella*.

The female parent is of the third generation, the descent being as follows:—*R. jasminiflorum* (white) × *R. javanicum* (orange) = Princess Royal (pink); Princess Royal × *R. Brookeanum*, var. *gracile* (yellow) = Duchess of Teck (reddish orange); Duchess of Teck × *R. javanicum* (orange) = Lord Wolseley (red-orange).

The male parent has a dark rose-coloured corolla, with crimson spots over the upper petals.

The corolla of the cross is smaller than that of either parent, having a broadish, nearly straight tube, slightly bulging above; the lobes of the limb are much shorter than is the case with either parent.

The colour is a rather redder orange than that of the female parent; the anthers are crimson, as well as in both parents.

With regard to the foliage of the cross, though smaller in size the leaf agrees both in form and anatomical details with that of the *Rhododendron* or female parent in every detail of importance. The leaf of *Azalea* is markedly different, being obovate instead of lanceolate; toothed, and not entire; covered with fibrous hairs instead of being glabrous above, with minute peltate scales below; the cell-walls of the epidermis being sinuate instead of straight; and the proportion of stomata being less than in the *Rhododendron* as well as the cross. The hairs of the *Azalea* are very peculiar in structure. They grow on the branches, petioles, midrib, and veins below, and are generally scattered over the upper surface of the leaf. They are composed of numerous fibres resembling short liber-fibres, graduated in length, so that

the longest form the point of the hair, like a fine camel's-hair brush.

With regard to a dwarf sister-plant,* the anatomical details exhibited a very considerable amount of arrest of structure, the number of cells being nearly twice that of the *Rhododendron* in the same area, in consequence of their minute size, with fewer stomata. It also agreed in most other respects both with the

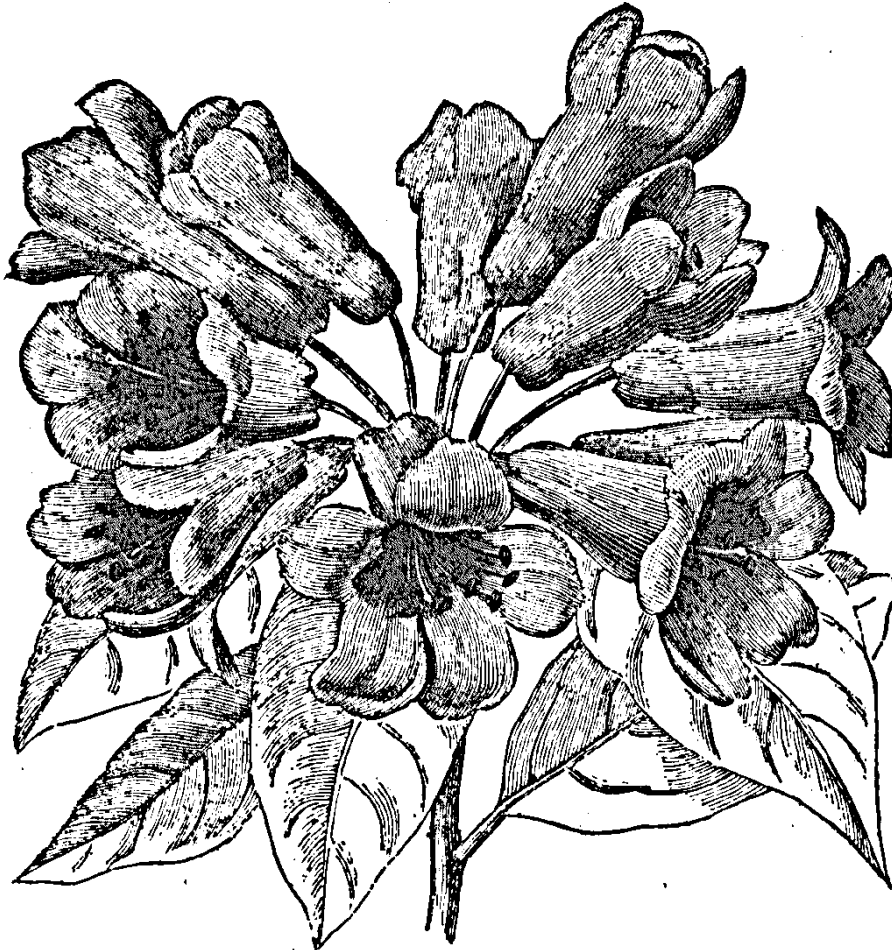


FIG. 41.—*R. INDICO-JAVANICUM*.

sister-cross as well as with the *Rhododendron*, except that the shape was more elliptical, and possessed glandular hairs instead of peltate scales.

It is observable that this case followed the supposed rule in so far as that the female parent imparted its likeness to the foliage. Of the numerous hybrids and crosses raised by Mr.

* This plant is now seven years old, but does not exceed five inches in height. It has never flowered.

Veitch amongst these seven East Indian species, the above rule was found to fail very generally, in that each parent would impart certain peculiarities either to the flowers or leaves, according to its own prepotency, but the cause of such power is unknown.

DISCUSSION.

Sir JOHN LLEWELYN said it was not more than twenty years when nothing but *R. ponticum*, *catawbiense*, and *maximum* were cultivated in this country, and these possessed but a poor variety of colour, the prevailing tints being a dull or rosy purple. By crossing these with the scarlet *arboreum* from Nepal, a strain was obtained having scarlet flowers, but retaining the tender habit of their Indian parent. This progeny was again crossed with hardy kinds, and so up to the present day when our collections present us with every intermediate shade of colour between intense scarlet, rich purple, and down to a pure white produced in plants in every respect hardy. Amongst the many names of those who have been successful raisers of hybrid Rhododendrons are Mr. Burn, of Tottenham Park, Wilts, and Mr. Carton, late of Highclere, Hants. Mr. Carton was warmly supported by Mr. J. R. Gowen, Messrs. John and Hosea Waterer, of Bagshot and Knap Hill; Messrs. Lee, of Hammersmith; Messrs. Standish & Noble, Bagshot; Mr. Baker, and many others. Several hybrid Azaleas and Rhododendrons had been raised at Highclere, the seat of the Earl of Carnarvon, but it was not until 1831 that a very remarkable and lovely hybrid was obtained. It was duly figured in the *Botanical Register*, table 1414, under the name of *Rhododendron Alta-clerense*,* and is described in the words of Dr. Lindley as having flowers of a "clear transparent crimson colour, rendered still more bright by a few distinct spots of a darker hue." This hybrid was raised by Mr. J. R. Gowen, who gave the following particulars concerning it in the *Botanical Register*:—"They (the flowers) are intermediate between *R. arboreum* of Nepal and a seedling Rhododendron from *R. catawbiense*, which had been fertilised with pollen from *R. ponticum*. From the period of the introduction of *R. arboreum* into the Highclere garden by my friend Dr. Wallich, and more

* Alta-Clera is the name of Highclere in Domesday Book, and in ancient writings.

particularly since its inability to withstand the rigour of this climate had been ascertained, Lord Carnarvon became desirous of producing a cross breed between it and the hardy species. The pollen from *R. arboreum* was used early in the spring of 1826 in fertilising the flowers of this hardy species, which by previous concert had been brought into contemporaneous bloom. The result was the production of a number of capsules containing good seed, from which were raised above 1,800 plants, which have been extensively distributed to nurseries and private gardens both in England and Scotland. The plants retained by Lord Carnarvon showed flower-buds in small quantity late last autumn. Some of the most perfect were removed into pots early in the present season from the shrubberies, and, being placed under glass in a cool conservatory, have flowered. The plants are quite hardy, having never been damaged in the slightest degree by the winters of this climate; but they are very excitable, shoot very early, and will therefore in early springs be liable to be injured by late frosts. They make extremely vigorous growth, and, judging from the analogy which I have observed to prevail in hybrid production, I am inclined to believe they will attain to the height of 20 feet and upwards. Their foliage is very ornamental." It was probably about 1854 to 1864 the species of Himalayan Rhododendron were attracting attention, for in those days Hooker, in the *Botanical Magazine*, figures some forty species.

EAST INDIAN SPECIES OF RHODODENDRON.

The following species, of which the majority have been introduced by Messrs. Veitch & Sons, are the origins of the hybrids and crosses described in this paper.

1. *R. Brookeanum** (Low) var. *gracile*.—A lax shrub, epiphytal, or growing on mossy limestone. Leaves, form oblanceolate, 8 inches long; apex acute; base very tapering. Corolla large; tube somewhat funnel-shaped, about $1\frac{1}{4}$ inches long; limb $2\frac{1}{2}$ inches diameter; lobes revolute; colour straw. There are two principal varieties, yellow and a rich red, said to resemble *Azalea indica lateritia*, but richer. It is not used in

* *Journ. Hort. Soc.* iii. p. 83, 1848.

these crossings. The present variety of the yellow form has been unfortunately lost to cultivation. Being somewhat more slender than the typical specific form it received the cognomen *gracile*. Mr. Veitch's variety was introduced by Lobb from Borneo in 1855. (Figs. 42 and 43, *a*.)

2. *R. jasminiflorum** (Hook.).—A small shrub, about 1½ feet high, of compact habit. Leaves, form obovato-oblong or elliptical, 2 to 2½ inches long, 1 to 1½ inches broad; apex very obtuse; base truncate. Corolla large; tube 2 inches long, straight; limb small, 1 inch diam.; lobes small, obovate; colour white. Anthers pink. A native of Mount Ophir, Malacca, 5,000 feet. Introduced by Mr. Veitch, sen., 1849. (Fig 38; from *Journ. of Hort.*, Vol. II., New Ser., p. 131. Figs. 42 and 43, *c*.)

3. *R. javanicum*† (Blume?).—A shrub of lax habit, with long internodes, sometimes epiphytal. Leaves, form lanceolate, 3 to 4½ inches long, 1½ inches broad; apex acute to acuminate; base tapering. Corolla large; tube about ¾ inch long; limb 2½ inches diameter. Colour yellow orange. Anthers crimson. Several varieties in colour occur wild, *e.g.*, a citron and a red-orange or Rolleson's variety. A native of Java, 4,000–8,000 feet, on a volcanic range. Introduced by Mr. Rolleson. (Figs. 42 and 43, *e*.)

4. *R. Lobbi*‡ (Veitch), *R. longiflorum* (Lindl.).—A shrub 8 feet high, with lax branches. Leaves, form lanceolate, with revolute margins, about 3 inches long and 1 inch broad; apex and base tapering. Corolla large; tube curved and ascending, 2½ to 3½ inches long; limb 1 inch diameter. Colour bright glossy crimson. A native of Sarawak jungles, Borneo. Introduced by Mr. Veitch. (Figs. 42 and 43, *b*.)

5. *R. malayanum* (Veitch).—A small shrub with a compact habit. Leaves small, 1½ to 2½ inches long, ½ inch to 1 inch broad; form oblanceolate; apex acute to acuminate, base very tapering; covered with russet-brown peltate scales on the under-side. Corolla very small; tube straight, about ½ inch long; limb 1 inch diameter. Colour cerise-crimson. A native of Sumatra. Introduced by Mr. Veitch. (Figs. 42 and 43, *g*.)

* *Bot. Mag.* 76 t. 4,524; *Lem. Jard. Fl.* 41.

† *Bot. Mag.* 73 t. 4,336; *Fl. de Ser.* 3, 293; var. *aurantiaca*, *Fl. de Ser.* 6, 576; Rolleson's var., Beck's *Fl.* 1852, p. 65.

‡ *Florist and Pomologist*, 1870, p. 233.

6. *R. multicolor* (Oliver).—A small shrub with a compact habit. Leaves small, form suboblanceolate, $1\frac{1}{2}$ to 2 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch broad; apex acute; base very tapering. Corolla small; tube funnel-shaped, $\frac{1}{2}$ inch long; limb $1\frac{1}{4}$ inches. Colour lemon. Var. *Curtisii*: this only differs in having a rich crimson corolla. Natives of Sumatra. Introduced by Mr. Veitch. (Figs. 42 and 43, *d*.)

7. *R. Teysmannii* (?).—A lax shrub. Leaves large; form elliptical, $4\frac{1}{2}$ inches long, 2 inches broad; apex acute; base abruptly tapering. Corolla large; tube $\frac{3}{4}$ inch long; limb $2\frac{1}{2}$ inches diameter; lobes reflexed. Colour golden yellow. Anthers yellow. A native of Sumatra. Introduced by Mr. Veitch. (Figs. 42 and 43, *f*.)

GENEALOGIES.

FIRST GENERATIONS.—TRUE HYBRIDS.

I. *Rhododendron Brookeanum*, var. *gracile*. (No hybrids raised.)

II. i. *R. jasminiflorum** \times *R. javanicum* = Princess Royal and Jasminiflorum carminatum.

ii. *R. jasminiflorum* \times *R. multicolor*, var. *Curtisii* = Nos. 35, 329 (Pl. III., fig. *i*), 452, 453.

III. *R. javanicum* \times *R. multicolor*, var. *Curtisii* = Nos. 37, 406, 455, 506.

IV. *R. Lobbii* \times *R. Brookeanum*, var. *gracile* = Duchess of Edinburgh (Pl. III., fig. *l*), Duchess of Connaught, Prince Leopold, Queen Victoria.

V. *R. malayanum*. (No hybrids raised.)

VI. *R. multicolor*. (No hybrids raised.)

VII. *R. multicolor*, var. *Curtisii* \times *R. Teysmannii*† = Nos. 405, 444, 474.

VIII. i. *R. Teysmannii* \times *R. multicolor*, var. *Curtisii*† = Nos. 31a, 31B, 300, 457.

ii. *R. Teysmannii* \times *R. javanicum* = No. 518.

* The first named is always the female parent.

† Reciprocal hybrids.

SECOND GENERATIONS.—TRUE HYBRIDS CROSSED BY A
TRUE SPECIES.

II. *Through Princess Royal (R. jas. × R. jav.).*

i. Pr. Royal × *R. Brookeanum*, var. *gracile* = Princess Frederica, Crown Princess of Germany, Duchess of Teck.

ii. Pr. Royal × *R. jasminiflorum* = Princess Alexandra (fig. 37; from *Journ. of Hort.*, Vol. III., New Ser., p. 477).

iii. Pr. Royal × *R. javanicum* = Baroness Schroeder, Excelsior, Thalia, No. 170.

iv. Pr. Royal × *R. Lobbii* = Princess Helena.

v. Pr. Royal × *R. multicolor*, var. *Curtisii* = Nos. 32a, 32b, 32B, 301.

vi. Pr. Royal × *R. Teysmannii* = Czarina, Duchess of Fife, Nos. 55, 392, 508.

vii. Pr. Royal × *R. Aucklandii* (fig. 34)* = Pearl.

Through Jasminiflorum carminatum (R. jas. × R. jav.).

Jas. carm. × *R. multicolor*, var. *Curtisii* = Ruby, Nos. 33, 413, 425.

IV. *Through Duchess of Edinburgh (R. Lob. × R. Brook.).*

Duch. Edinburgh × *R. javanicum* = Brilliant, Scarlet Crown, Triumphans.†

Through Duchess of Connaught (R. Lob. × R. Brook.).

i. Duch. Con. × *R. javanicum* = Conqueror, No. 63.

ii. Duch. Con. × *R. multicolor*, var. *Curtisii* = Nos. 317, 442.

TRUE SPECIES CROSSED BY A TRUE HYBRID.

R. javanicum × Duchess of Edinburgh = Cardinale, Diadem, Militare, Ne plus ultra.†

R. multicolor × Duchess of Connaught = No. 473.

TRUE HYBRID CROSSED BY A TRUE HYBRID.

IV. *Through Duchess of Edinburgh (R. Lob. × R. Brook.).*

Duch. Edinburgh × *Jasminiflorum carminatum (R. jas. × R. jav.)* = No. 505.

* *R. Aucklandii* is the only species which is not E. Indian, and not used on any other occasion. It is a native of Sikkim-Himalaya. (See fig. 34; from *Journ. of Hort.*, Vol. VIII., New Ser., p. 229).

† Reciprocal crosses.

THIRD GENERATIONS.—SECOND GENERATIONS CROSSED WITH
A TRUE SPECIES.

Through Princess Frederica (Pr. Roy. × R. Brook.).

- i. Pr. Frederica × *R. javanicum* = Queen of the Yellows, Princess Christian, Thetis, Brunette, No. 158.
- ii. Pr. Frederica × *R. multicolor* = Nos. 839, 419, 428.
- iii. Pr. Frederica × *R. multicolor*, var. *Curtisii* = Nos. 418, 507 (?).
- iv. Pr. Frederica × *R. Teysmannii* = Nos. 53a, 53B, 449, 458, 459.

Through Crown Princess of Germany (Pr. Roy. × R. Brook.).

Cr. Pr. Germany × *R. javanicum* = Star of India, Aurora, Apollo, Empress, President, Gloria Mundi, Indian Yellow, Souvenir de J. H. Mangles, Dante, Ajax.

Through Duchess of Teck (Pr. Roy. × R. Brook.).

Duch. Teck × *R. javanicum* = Lord Wolseley (fig. 44, m), No. 56.

Through Princess Alexandra (Pr. Roy. × R. jas.).

- i. Pr. Alexandra × *R. Brookeanum*, var. *gracile* = Maiden's Blush, Taylari.
- ii. Pr. Alexandra × *R. javanicum* = Rose Perfection, Queen of Roses, Ambient, Ophelia, Favourite, Luteo-roseum, Aphrodite, Amabile, Minerva.
- iii. Pr. Alexandra × *R. multicolor*, var. *Curtisii* = Nos. 42a, 42B, 828, 858, 898.
- iv. Pr. Alexandra × *R. Teysmannii* = No. 464.

SECOND GENERATIONS CROSSED WITH A TRUE HYBRID.

Pr. Alexandra × Duchess of Edinburgh (*R. Lobbii* × *R. Brook.*) = Acis, Monarch (fig. 44, h), Princess Beatrice, Pink Perfection, Virgil.

FOURTH GENERATIONS.—THIRD GENERATIONS CROSSED BY A
TRUE SPECIES.

Through Queen of the Yellows (Pr. Fred. × R. jav.).

Qn. of Yellows × *R. multicolor*, var. *Curtisii* = Hippolyta (fig. 44, k), Nos. 881, 426, 487, 490.

- *Through Princess Christian* (*Pr. Fred.* × *R. jav.*).
Pr. Christian × *R. multicolor*, var. *Curtisii** = No. 39, 443, 489.
Through Star of India (*Cr. Pr. Germ.* × *R. jav.*).
 i. *Star of India* × *R. multicolor*, var. *Curtisii* = Nos. 34, 322, 417.
 ii. *Star of India* × *Jasminiflorum carminatum* = No. 511.
Through Aurora (*Cr. Pr. Germ.* × *R. jav.*).
Aurora × *R. multicolor* = Nos. 387, 402, 451.
Through Lord Wolseley (*Duch. Teck* × *R. jav.*).
 i. *Lord Wolseley* × *R. multicolor*, var. *Curtisii* = No. 395.
 ii. *Lord Wolseley* × *R. Teysmannii* = Yellow Perfection, Boule d'Or, No. 450, 519.
 iii. *Lord Wolseley* × *Azalea indica stella* = Indico-javanicum (fig. 41, and p. 258; from *Journ. of Hort.*, Vol. XIX., New Ser., p. 373).†
Through Acis (*Pr. Alex.* × *Duch. Edin.*).
Acis × *R. Brook.* = No. 503.
Through Amabile (*Pr. Alex.* × *R. jav.*).
Amabile × *R. Teysmannii* = Acidalia, The Queen, No. 79.
Through Ophelia (*Pr. Alex.* × *R. jav.*).
Ophelia × *R. Teysmannii* = Artemis, Nos. 484, 510.
Through Maiden's Blush (*Pr. Alex.* × *R. Brook.*).
 i. *Maiden's Blush* × *R. multicolor*, var. *Curtisii* = Nos. 331, 346.
 ii. *Maiden's Blush* × *R. Teysmannii** = Primrose, Nos. 320, 327, 456.
Through Monarch (*Pr. Alex.* × *Duch. Edin.*).
Monarch × *R. malayanum* = Little Beauty, Nos. 29, 318 (fig. 44, n).
Through Princess Beatrice (*Pr. Alex.* × *Duch. Edin.*).
Pr. Beatrice × *R. multicolor* = No. 50.

..... TRUE SPECIES CROSSED BY A THIRD GENERATION.

- i. *R. multicolor* × *Aurora** (*Cr. Pr. Germ.* × *R. jav.*) = Nos. 388, 441, 460.

* Reciprocal crosses raised with these.

† This "bigener" did not flower until it was six years old. A sister cross is now seven years old, and only about 5 inches in height. It has never flowered.

ii. *R. multicolor* × Pr. Beatrice (Pr. Alex. × Duch. Edin.)= Nos. 335, 386.

iii. *R. multicolor* × Lord Wolseley (Duch. Teck × *R. jav.*)= Nos. 403, 466.

i. *R. multicolor*, var. *Curtisii* × Pr. Christian* (Pr. Fred. × *R. jav.*)=Nos. 394, 424, 429, 488.

ii. *R. multicolor*, var. *Curtisii* × semi-double "Balsamæ-florum"=No. 423.

i. *R. Teysmannii* × Maiden's Blush* (Pr. Alex. × *R. Brook.*)=Aspasia, No. 397.

ii. *R. Teysmannii* × Taylori (Pr. Alex. × *R. Brook.*)= Juliet, Portia, Imogene, Purity.

THIRD GENERATION CROSSED BY A TRUE HYBRID.

Through Star of India (Cr. Pr. of Germ. × R. jav.).
Star of India × *Jasminiflorum carminatum*=No. 511.

Through Ld. Wolseley (Duch. Teck. × R. jav.).

Lord Wolseley × *Jasminiflorum carminatum* (*R. jas. × R. jav.*)=Nos. 78, 509.

TRUE HYBRID CROSSED BY A THIRD GENERATION.

Through Pr. Leopold (R. Lobb. × R. Brook.).

Prince Leopold × Maiden's Blush (Pr. Alex. × *R. Brook.*)= *Incarnatum floribundum*.

EFFECTS OF PARENTAGE.—FIRST GENERATIONS.—TRUE HYBRIDS.

II. i. *R. jasminiflorum* (white) × *R. javanicum* (orange)= Princess Royal (pink), *Jasminiflorum carminatum* (crimson).

Male.—Cor., colour pink or crimson; form, broad limb. Leaf larger, † acute apex, tapering base.

Female.—Cor., colour (eliminates yellow from orange of the male); form, long tube.

* Reciprocal crosses raised with these.

† Comparative terms always refer to the same feature in the opposite sex.

II. ii. *R. jasminiflorum* (white) × *R. multicolor*, var. *Curtisii* (crimson)=Nos. 35, 329, 452, 453 (crimson).

Male.—Cor., colour crimson; form, broad limb. Leaf lanceolate, acute (No. 35).

Female.—Cor., form, slightly longer tube. Leaf nearly elliptical, obtuse (Nos. 452, 453).

III. *R. javanicum* (orange) × *R. multicolor*, var. *Curtisii* (crimson)=Nos. 37, 406, 455, 506 (crimson-scarlet).

Male.—Cor., colour crimson-scarlet. Leaf, reduced in size.

Female.—Cor., form same, reduced in size. Leaf, lanceolate, acute.

IV. *R. Lobbia* (crimson) × *R. Brookeanum*, var. *gracile* (straw)=Duchess of Edinburgh, Duchess of Connaught, Prince Leopold, Queen Victoria.

Male.—Cor., colour, yellow in combination, producing scarlet-crimson (Duch. Edinburgh, Duch. Connaught), red-orange (Prince Leopold), primrose-yellow to pale salmon (Queen Victoria).

Female.—Cor., colour red in combination; form, curved tube. Leaf, form and size.

VII. *R. multicolor*, var. *Curtisii* (dark crimson) × *R. Teysmannii* (golden yellow) = No. 405 (yellow orange), 444 (red orange), 474 (crimson).*

Male.—Cor., colour, yellow has entered most in No. 405 (yellow orange); less in No. 444 (red-orange), and is wanting in No. 474 (crimson). Form, lobes reflexed in No. 444.

Female.—Cor., colour three shades of red. Form, size, and shape, but enlarged.

Leaf, form, lanceolate as in female, but much larger, especially in No. 474 (4 inches), No. 405 (5½ inches) in length.

VIII. i. *R. Teysmannii* (golden yellow) × *R. multicolor*, var. *Curtisii* (crimson) = Nos. 81a, 81B, 300, 457.*

N.B. These hybrids being reciprocal with VII. are practically identical with No. 405, slight variations occurring in the depths of the tints and in the size of the leaves.

ii. *R. Teysmannii* × *R. javanicum* (orange)=No. 518 (golden yellow).

Male.—Cor., broader tube; anthers pink.

Female.—Cor., reflexed lobes. Leaf, form.

* Reciprocal hybrids.

SECOND GENERATIONS.—TRUE HYBRIDS CROSSED BY A TRUE SPECIES.

II.—Through *Princess Royal* (*R. jas.* × *R. jav.*).

i. Pr. Royal (pink) × *R. Brookeanum*, var. *gracile* (straw) = *Princess Frederica*, Crown Princess of Germany, Duchess of Teck (all yellow).

Male.—Cor., colour yellow.

Female.—Cor., colour, occasional pink tinge; anthers, orange; form same, with slight differences in size; leaf much the same.

ii. Pr. Royal (pink) × *R. jasminiflorum* (white) = *Princess Alexandra* (white).

Male.—Cor., colour white; form, long tube.

Female.—Cor., colour, occasional pink tinge; form nearly same; anthers orange; leaf, form and size.

iii. Pr. Royal (pink) × *R. javanicum* (orange) = *Baroness Schroeder*, *Excelsior*, *Thalia*, No. 170.

Male.—Cor., colour yellowish white (*Thalia*); French white (*Bar. Schr.*); form, broader limb but shorter tube; leaf same (*Thalia*).

Female.—Cor., colour rose (No. 170); leaf elliptical, with truncate base of *R. jasminiflorum* (*Bar. Schr.*).

iv. Pr. Royal (pink) × *R. Lobbii* (crimson) = *Princess Helena* (pink).

Male.—Cor., form, long curved tube and small limb; anthers crimson.

Female.—Cor., colour pink; leaf, form nearly same.

v. Pr. Royal (pink) × *R. multicolor*, var. *Curtisii* (crimson) = Nos. 32a, 32b, 32B, 301 (shades of crimson).

Male.—Cor., colour crimson, form same enlarged; leaf same, but larger.

Female.—Cor., form, large limb.

vi. Pr. Royal (pink) × *R. Teysmannii* (golden yellow) = *Czarina*, Duchess of Fife, Nos. 55, 392, 508 (pale pinky-yellow to orange).

Male.—Cor., colour, imparted shades of yellow; form, broad limb, shorter tube (Nos. 55, 508); leaf, large size and breadth.

Female.—Cor., colour, pink tinge, e.g. No. 508 (in which the colours are dissociated), red in orange (No. 55); form, slightly longer tube (No. 392, *Czarina*); anthers orange.

vii. Pr. Royal (pink) (fig. 85) \times *R. Aucklandii* (white) (fig. 84) = Pearl (white).

Male.—Cor., colour white.

Female.—Cor., form same; leaf, 2 inches long, obovate, obtuse apex, tapering at base, unlike parentage.

Through Jasminiflorum carminatum.

Jas. carm. (crimson) \times *R. multicolor*, var. *Curtisii* (crimson) = Ruby, Nos. 33, 413, 425.

Male.—Cor., colour crimson; form, enlarged, with a more funnel-shaped, shorter tube.

Female.—Cor., form, larger limb; leaf same; sometimes elliptical as in *R. jas.*

IV. *Through Duchess of Edinburgh* (*R. Lobb.* \times *R. Brook.*).

Duch. Edinburgh (scarlet-crimson) \times *R. javanicum* (orange) = Brilliant, Scarlet Crown, Triumphans (all scarlet-crimson).

Male.—Cor., colour, yellow in crimson and scarlet or orange; leaf same, varying in size.

Female.—Cor., form same (with curved tube of *R. Lobbii*); leaf same, varying in size.

IV. *Through Duchess of Connaught* (*R. Lobb.* \times *R. Brook.*).

i. Duch. Connaught (crimson) \times *R. javanicum* (orange) = Conqueror (scarlet), No. 63 (scarlet-crimson).

Male.—Cor., colour scarlet; form, enlarged limb and shorter tube; leaf broader.

Female.—Cor., colour, introduction of yellow forming scarlet or scarlet-crimson.

ii. Duch. Connaught (crimson) \times *R. multicolor*, var. *Curtisii* (crimson) = Nos. 317, 442 (crimson).

Male.—Cor., form same, but larger. Leaf same, but larger.

Female.—Cor., form, longer tube.

TRUE SPECIES CROSSED BY A TRUE HYBRID.

R. javanicum (orange) \times Duch. Edinburgh (scarlet-crimson) = Cardinale, Diadem, Militare, Ne plus ultra (scarlet-crimson).

N.B. These being reciprocal hybrids with Brilliant, Scarlet Crown, and Triumphans, there is no difference of importance between them, beyond slight shades of colour.

R. multicolor (lemon) × Duch. Connaught (scarlet-crimson) = No. 473 (scarlet-crimson).

Male.—Cor., colour crimson (yellow of male eliminated). Leaf broader and longer.

Female.—Cor., form nearly same, slightly larger. Leaf enlarged.

TRUE HYBRID CROSSED BY TRUE HYBRID.

Through Duchess of Edinburgh (*R. Lobb* × *R. Brook*).

Duch. Edinb. (scarlet-crimson) × *Jasminiflorum carminatum* (dark crimson) = No. 505 (dark crimson).

Male.—Cor., colour deep crimson, eliminated yellow from the scarlet tint. Leaf, same size.

Female.—Cor., form, slight curvature of tube and large limb. Leaf, acute apex.

THIRD GENERATIONS.—SECOND GENERATIONS CROSSED WITH A TRUE SPECIES.

Through Princess Frederica (*Pr. Roy* × *R. Brook*).

i. *Pr. Frederica* (pinky-yellow) × *R. javanicum* (orange) = Queen of the Yellows, Princess Christian, Thetis, Brunette, No. 158 (yellow to yellow-orange).

Male.—Cor., colour slightly intensifies the orange tint in No. 158 and Brunette. Anthers crimson. N.B. Six lobes appear to be constant in these two. Form, sometimes broadens the tube.

Female.—Cor., colour same in first three. Form same. Leaf same.

ii. *Pr. Frederica* (pinky-yellow) × *R. multicolor* (lemon) = Nos. 339 (yellow limb, rose throat), 419 (pinky-lemon), 428 (lemon).

Male.—Cor., colour prevails in No. 419 (pinky-lemon) and 428 (fine lemon-yellow). Form same, but slightly larger. Anthers yellow-orange. Leaf intermediate.

Female.—Cor., colour, No. 339 (lobes salmon, throat rose). Anthers red-orange. N.B. This form is scarcely distinguishable from Nos. 457 = *R. Teysmannii* × *R. multicolor*, var. *Curtisii*.

iii. *Pr. Frederica* (pinky-yellow) × *R. multicolor*, var. *Curtisii* (crimson) = No. 418, 507 (?)

Male.—Cor., colour crimson. Form, same size. Leaf intermediate.

Female.—Cor., form, straight and longer tube.

iv. Pr. Frederica (pinky-yellow) × *R. Teysmannii* (golden yellow)=Nos. 53*a*, 53*B*, 449, 458, 459 (primrose-yellow to golden yellow).

Male.—Cor., colour, when yellow is intensified. Form, slightly shorter tube. Leaf, broadening, with truncate base.

Female.—Cor., colour, when paler yellow. Form same, when slender tube.

Through Crown Princess of Germany (Pr. Roy. × R. Brook.)

Cr. Pr. Germany (yellow) × *R. javanicum* (orange)=Star of India, Aurora, Apollo, Empress, President, Gloria Mundi, Indian Yellow, Souvenir de J. H. Mangles, Dante, Ajax (yellow to red-orange).

Male.—Cor., colour, imparted orange tint, even intensified, in last two. Form, enlarged limb and shorter tube. Leaf, same when tapering at base, and more acuminate.

Female.—Cor., colour, when yellow prevails. Leaf, when not attenuated at base; it is a reversion to *R. jasminiflorum*, for the female parent is attenuated.

Through Duchess of Teck (Pr. Roy. × R. Brook.)

Duch. Teck (yellow) × *R. javanicum* (orange)=Lord Wolseley (red-orange), No. 56 (yellow-orange).

N.B. These, being of same parentage as the last, are not distinguishable except in shades of colour.

Through Princess Alexandra (Pr. Roy. × R. jas.)

i. Pr. Alexandra (white) × *R. Brookeanum*, var. *gracile* (straw)=Maiden's Blush (pinky-yellow), Taylori (pink).

Male.—Cor., colour, imparted yellow. Form, enlarged size.

Female.—Cor., colour, imparted pink, intensified in Taylori, from the grandparent Pr. Royal. Form, long tube. Anthers orange. Leaf, form and size.

ii. Pr. Alexandra (white) × *R. javanicum* (orange)=Amabile, Rose Perfection, Queen of Roses, Ambient, Ophelia, Favourite, Aphrodite, Luteo-roseum, Minerva, Light Pink, Rose, through pinky-yellow salmon to golden yellow (Minerva).

Male.—Cor., colour, shades of pink, derived from orange by

elimination of yellow. Form, larger size. Leaf, size, and when tapering and acuminate.

Female.—Cor., colour, dissociation or elimination of yellow from orange in some, and red from orange in Minerva; form, longer tube; leaf, when truncate, due to *R. jasminiflorum*.

iii. Pr. Alexandra (white) \times *R. multicolor*, var. *Curtisii* (crimson)=Nos. 42a, 42B, 328, 353, 398 (crimson).

Male.—Cor., colour crimson; form, reduced size; leaf, form.

Female.—Form, longer tube; leaf longer and larger.

iv. Pr. Alexandra (white) \times *R. Teysmannii* (golden yellow)=No. 464 (primrose).

Male.—Cor., colour yellow.

Female.—Cor., colour paler tint; form nearly same; leaf intermediate.

SECOND GENERATION CROSSED WITH A TRUE HYBRID.

Through Princess Alexandra (Pr. Roy \times R. jas.).

Pr. Alexandra (white) \times Duchess of Edinburgh (scarlet-crimson)=Virgil (primrose), Acis (salmon), Monarch (yellow-orange), Princess Beatrice (cream), Pink Perfection (pink).

Male.—Cor., colour various; form greatly enlarged; anthers deep crimson.

Female.—Cor., colour. The effect of the white female parent is to dissociate the yellow from the red in the scarlet-crimson of the male parent. This is completely effected in Virgil (primrose), which has pink anthers. The yellow is a restoration from the grandparent, *R. Brookeanum*. On the other hand the yellow is totally eliminated in Pink Perfection.

FOURTH GENERATIONS.—THIRD GENERATIONS CROSSED BY A TRUE SPECIES.

Through Queen of the Yellows (Pr. Fred. \times R. jav.).

Queen of the Yellows (slightly orange-yellow) \times *R. multicolor*, var. *Curtisii* (crimson)=Hippolyta (fig. 44, k), Nos. 381, 426, 487, 490 (scarlets).

Male.—Cor., colour scarlet by combination of crimson; form same, but enlarged; leaf tapering and narrower.

Female.—Cor., colour scarlet by combination of yellow; form, larger limb; leaf, size.

Through Princess Christian (Pr. Fred. × R. jav.).

Pr. Christian (yellow) × *R. multicolor*, var. *Curtisii* (crimson) = Nos. 39, 443 (crimson), 489 (pinky-scarlet).*

Male.—Cor., colour crimson; form same, but larger; leaf tapering and narrower.

Female.—Cor., form, large border; leaf larger.

Through Star of India (Cr. Pr. of Germ. × R. jav.).

Star of India (pinky-orange) × *R. multicolor*, var. *Curtisii* (crimson) = Nos. 34, 417, 322 (crimson to scarlet).

Male.—Cor., colour, imparted crimson; form same, but reduced; leaf tapering at both ends.

Female.—Cor., colour, slight infusion of yellow; form same, but reduced; leaf same length, but narrower.

Through Aurora (Cr. Pr. of Germ. × R. jav.).

Aurora (pinky-orange) × *R. multicolor* (lemon) = Nos. 387* (orange), 402 (pinky-salmon), 451 (rose-crimson).*

Male.—Cor., colour, imparted crimson tint; leaf tapering at both ends in No. 387.

Female.—Cor., form same, but much reduced; leaf, same in No. 451 but reduced, broader in No. 387.

N.B. Nos. 387 and 451 are practically similar to Nos. 34, 417, and 352 described above, of similar parentage.

Through Lord Wolseley (Duch. Teck × R. jav.).

i. Lord Wolseley (red-orange) × *R. multicolor*, var. *Curtisii* (crimson) = No. 395 (light crimson).

Male.—Cor., colour, imparted crimson; form, slightly increased.

Female.—Cor., colour, reduced crimson; form, same tube, but smaller; leaf identical.

ii. Lord Wolseley (red-orange) × *R. Teysmannii* (golden yellow) = Yellow Perfection, Boule d'Or, No. 450, 519.

Male.—Cor., colour golden yellow, red eliminated from orange; leaf larger, broader, more truncate.

Female.—Cor., form same, but larger; lobes not reflexed as in male; anthers orange.

* For reciprocal crosses to these, see below, pp. 276, 277.

iii. Lord Wolseley (red-orange) \times *Azalea indica stella* (red-orange)=Indico-javanicum. (For description and figure, see p. 259, fig. 41.)

Through Acis (Pr. Alex. \times Duch. Edin.).

Acis (salmon) \times *R. Brookeanum*, var. *gracile* (yellow)= No. 503 (pale pinky-salmon).

Male.—Cor., colour more yellow and less orange; anthers salmon (instead of crimson); leaf enlarged.

Female.—Cor., colour, retained pink from salmon.

Through Amabile (Pr. Alex. \times R. jav.).

Amabile (pale pink) \times *R. Teysmannii* (golden yellow)=Acidalia (very pale primrose), Queen (ditto), No. 79 (ditto).

Male.—Cor., colour, imparted yellow, but reduced in tint; eliminated pink; form, reflexed lobes; leaf, form and size of first two.

Female.—Anthers pink; leaf of No. 79.

Through Ophelia (Pr. Alex. \times R. jav.).

Ophelia (rose) \times *R. Teysmannii* (golden yellow)=Artemis (primrose-yellow), Nos. 484 and 510 (ditto).

Male.—Cor., colour, imparted yellow, but reduced in tint; form, reflexed lobes; leaf, form and size.

Female.—Anthers pink.

Through Maiden's Blush (Pr. Alex. \times R. Brook.).

i. Maiden's Blush (pinky-yellow) \times *R. multicolor*, var. *Curtisii* (crimson)=Nos. 331, 346 (light scarlet-crimson).

Male.—Cor., colour, crimson hue; form nearly same, but larger.

Female.—Col., colour, scarlet tinge due to yellow; form, straighter tube; leaf same, variable in size.

ii. Maiden's Blush (pinky-yellow) \times *R. Teysmannii* (golden yellow)=Primrose, Nos. 320, 327, 369, and 456.

Male.—Cor., colour more golden in Primrose, eliminated pink in all; form, short tube in Primrose; anthers golden; leaf, ends tapering, truncate in Nos. 369 and 456.

Female.—Cor., colour paler yellow, and orange anthers in 456; leaf elliptical.

Through Monarch (Pr. Alex. × Duch. Edin.).

Monarch (yellow-orange) × *R. malayanum* (cerise-crimson)
= Little Beauty, Nos. 29 and 318 (scarlet-crimson) (fig. 44, n).

Male.—Cor., colour same; form same, but slightly larger in size; leaf, imparted russet scales.

Female.—Leaf, size. N.B. Both parents have a tapering base, but it is more truncate in the offspring, traceable to *R. jasminiflorum*. It has the russet scales of the male parent. In No. 318 the base is very tapering.

Through Princess Beatrice (Pr. Alex. × Duch. Edin.).

Pr. Beatrice (cream, pink throat) × *R. multicolor* (lemon)=
No. 50, 486.

Male.—Cor., colour, pale primrose tube; form nearly same, but enlarged.

Female.—Cor., colour, pink tinge in border and crimson anthers.

TRUE SPECIES CROSSED BY A THIRD GENERATION,

Through R. multicolor.

i. *R. multicolor* (lemon) × Aurora (yellow-orange)=Nos.
388, 441, 460.

N.B. These being reciprocal crosses with Aurora × *R. multicolor* (p. 274), the offspring are identical, only varying in tints; No. 441 closely agrees with No. 451; No. 388 with No. 387. In No. 460, the red and yellow tend to be more dissociated, the former on the edge, the latter in the throat.

ii. *R. multicolor* (lemon) × Princess Beatrice (cream, pink throat)=Nos. 335 (dark rose), 386 (light orange to white).

Male.—Cor., colour, presence of pink; form, large border, truncate tube. Leaf, larger size.

Female.—Cor., colour pale yellow to white, by mutual elimination; form approximates, but is larger; anthers yellow.

N.B.—This cross contains five different species, *R. jasminiflorum* (no trace), *R. Lobbia* (no trace), *R. Brookeanum* (no trace), *R. javanicum* (orange tint and large border, and truncated tube), *R. multicolor* (relatively small size). Leaf, form of *R. javanicum*, but reduced size.

iii. *R. multicolor* (lemon) × Lord Wolseley (red-orange), (through Duch. Teck)=Nos. 403 (rose), 466 (orange).

Male.—Cor., colour, reddish tints. Leaf, breadth and size.

Female.—Cor., yellows mutually eliminated; form nearly same, but larger.

Through R. multicolor var. Curtisii.

i. *R. multicolor*, var. *Curtisii* (crimson) × Pr. Christian (yellow-orange) (through Pr. Fred.)=Nos. 394, 424, 429 (red-orange), 488 (light scarlet).

Male.—Cor., colour, introduced yellow; form, straight tube. Leaf, large in No. 394.

Female.—Cor., colour, red in the orange; form, nearly same size. Leaf, attenuated both ends.

ii. *R. multicolor*, var. *Curtisii* (crimson) × semi-double form of "Balsamæflorum" section (pinky-yellow)=Nos. 70, 423 (crimson).

Male.—Cor., form, broad limb, straight tube; size larger than either parent.

Through R. Teysmannii.

i. *R. Teysmannii* (golden yellow) × Maiden's Blush (pinky-yellow) (through Pr. Alex.)=Aspasia (golden yellow), No. 397 (lemon).

Male.—Cor., colour same or paler yellow; form, somewhat longer tube (397), lobes not reflexed. Aspasia resembles reciprocal form, "Primrose."

Female.—Cor., colour, absence of red tinge. Leaf, form and large size.

ii. *R. Teysmannii* (golden yellow) × Taylora (pink) (through Pr. Alex.)=Portia and Juliet (deeper yellow), Purity and Imogene (paler yellow).

Male.—Cor., form same. Leaf attenuated at base and apex.

Female.—Shades of yellow (pink of male eliminated). Leaf, large size and broad.

THIRD GENERATION CROSSED BY A TRUE HYBRID.

Through Star of India (Cr. Pr. of Germ. × R. jav.).

Star of India (pinky-orange) × Jasmin. carminatum (light crimson)=No. 511 (deep rose).

Male.—Cor., colour, eliminated yellow; form, same border, but reduced. Leaf, same form.

Female.—Cor., form and length of tube.

Through Lord Wolseley (Duch. Teck × R. jav.).

Ld. Wolseley (orange) × Jas. carm. (crimson) = Nos. 73, 509 (light scarlet).

Male.—Cor., form, same enlarged. Leaf, form of *R. jas.*, but much enlarged.

Female.—Cor., lobes larger; scarlet, by infusion of yellow.

TRUE HYBRID CROSSED BY A THIRD GENERATION.

Through Prince Leopold (R. Lob. × R. Brook.).

Pr. Leopold (red-orange) × Maiden's Blush (pinky-yellow) = *Incarnatum floribundum* (rosy salmon).

Male.—Cor., form nearly same.

Female.—Cor., colour deeper red; nearly same. Leaf same.

DESCRIPTION OF PLATES.

Fig. 42.

Leaves of the Seven Species.

The four uppermost represent the general form and size of the leaves (from left to right) of *R. Brookeanum*, *R. multicolor*, *R. malayanum*, and *R. javanicum*, respectively. The three lower forms are those of *R. Teysmannii*, *R. jasminiflorum*, and of *R. Lobbii*.

The figure of *R. Brookeanum* is one-half, and that of *R. Teysmannii* about two-thirds of the real length. The remainder represent the average size and form.

Fig. 43.

Flowers of the Seven Species.

a, *R. Brookeanum* (straw-coloured). *b*, *R. Lobbii* (crimson). *c*, *R. jasminiflorum* (white). *d*, *R. multicolor* (lemon) and *R. mult.*, var. *Curtisii* (crimson). *e*, *R. javanicum* (orange). *f*, *R. Teysmannii* (golden yellow). *g*, *R. malayanum* (cerise).

In no species is there any calyx, thus emphasizing the rule that when flowers grow in corymbs, heads, umbels, &c., there is a great tendency in many cases to arrest the calyx, as may be illustrated by Caprifoliaceæ, Umbelliferæ, Rubiaceæ, Compositæ, &c.

The corolla is quite, or much more regular than in Rhododendrons of other countries, and the stamens are symmetrically arranged, and not declinate.

Fig. 44.

Corollas of Hybrids and Crosses.

h, Monarch. *Genealogy*.—*R. jas.* × *R. jav.* = Princess Royal; Pr. Royal × *R. jas.* = Princess Alexandra; Pr. Alex. × Duchess of Edinburgh (= *R. Lobbii* × *R. Brook.*) = Monarch.

This cross, therefore, contains *R. Brook.*, *R. Lobbii*, *R. jas.* (twice), and *R. jav.* (fig. 43, *a*, *b*, *c*, and *e*).

The form of the corolla closely approximates that of the last species introduced (Duch. of Edin., fig. 43, *l*), but the tube is slightly shorter and quite straight, the curvature of the former (due to *R. Lobbii*) being lost by the effect of the female parent (Pr. Alex.).

The colour is a yellow-orange, the white of the female parent having reduced the red of the scarlet male parent. The anthers have now become a deep crimson.

i, No. 329.—This hybrid, which is the result of crossing *R. jasminiflorum* (fig. 43, *c*) with *R. multicolor*, var. *Curtisii* (fig., 43 *d*), shows how the flower (especially the tube) is intermediate in size, while the male parent has imparted its crimson colour to the flower. This is one of the *multicolor* section.

k, Hippolyta. *Genealogy*.—*R. jas.* × *R. jav.* = Princess Royal; Pr. Royal × *R. Brook.* = Princess Frederica; Pr. Fred. × *R. jav.* = Queen of the Yellows; Qn. of Yell. × *R. mult.*, var. *Curt.* = Hippolyta.

This cross therefore contains four species, and one of them twice.

The form is identically the same as that of the last male parent, or *R. mult.*, only larger. The colour is rather more scarlet than crimson in consequence of the infusion of yellow by the female parent.

Hence both Monarch and Hippolyta show the preponderating influence of the last species introduced in multifold crossings.

l, Duchess of Edinburgh. This hybrid is the offspring of *R. Lobbi* (crimson), (fig. 43, *b*) and *R. Brookeanum* (straw-coloured), (fig. 43, *a*). Comparing the figures, it will be seen how the latter form has greatly overpowered that of *R. Lobbi*, the slight curvature of the tube alone being indicative of the male parentage. The bright scarlet-crimson is due to the infusion of yellow by the the female parent into the bright crimson of that of the male (*R. Lobbi*).

m, Lord Wolseley. *Genealogy*.—*R. jas.* × *R. jav.* = Pr. Royal; Pr. Royal × *R. Brook.* = Duchess of Teck; Duch. Teck × *R. jav.* = Lord Wolseley.

This cross therefore contains three species, and one of them twice.

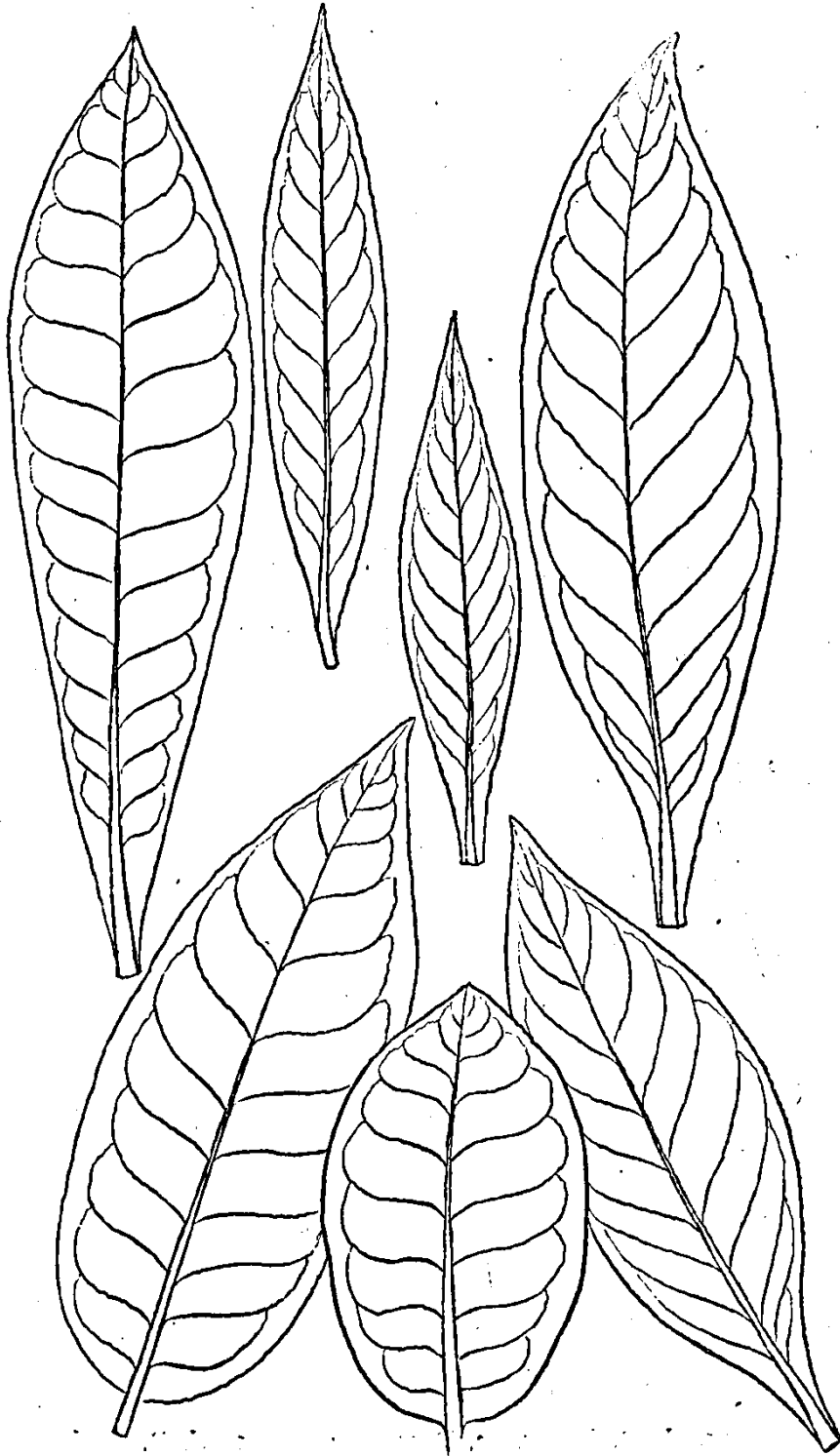
The female parent, Duchess of Teck, has much the same form as Princess Royal, but is a little smaller. The effect of the large-flowered *R. jav.* (fig. 43, *e*), last introduced, is to greatly enlarge the flower.

The colour of Duchess of Teck is almost a primrose with a faint pink tinge, the anthers being orange. In Lord Wolseley the corolla is a bright orange, and the anthers crimson.

n, No. 318. *Genealogy*.—*R. jas.* × *R. jav.* = Pr. Royal; Pr. Royal × *R. jas.* = Princess Alexandra; Pr. Alexandra × Duchess of Edinburgh (= *R. Lobbi* × *R. Brook.*) = Monarch; Mon. × *R. malayanum* = No. 318.

This cross therefore contains five species, and one of them (*R. jas.*) twice, (fig. 43, *a*, *b*, *c*, *e*, and *g*). The last introduced (*R. mal.*), though the smallest-flowered species, has practically overpowered the other four, this and allied crosses being slightly "improved" forms of *R. malayanum*.

R. BROOKEANUM ($\frac{1}{2}$). R. MULTICOLOR. R. MALAYANUM. R. JAVANICUM.

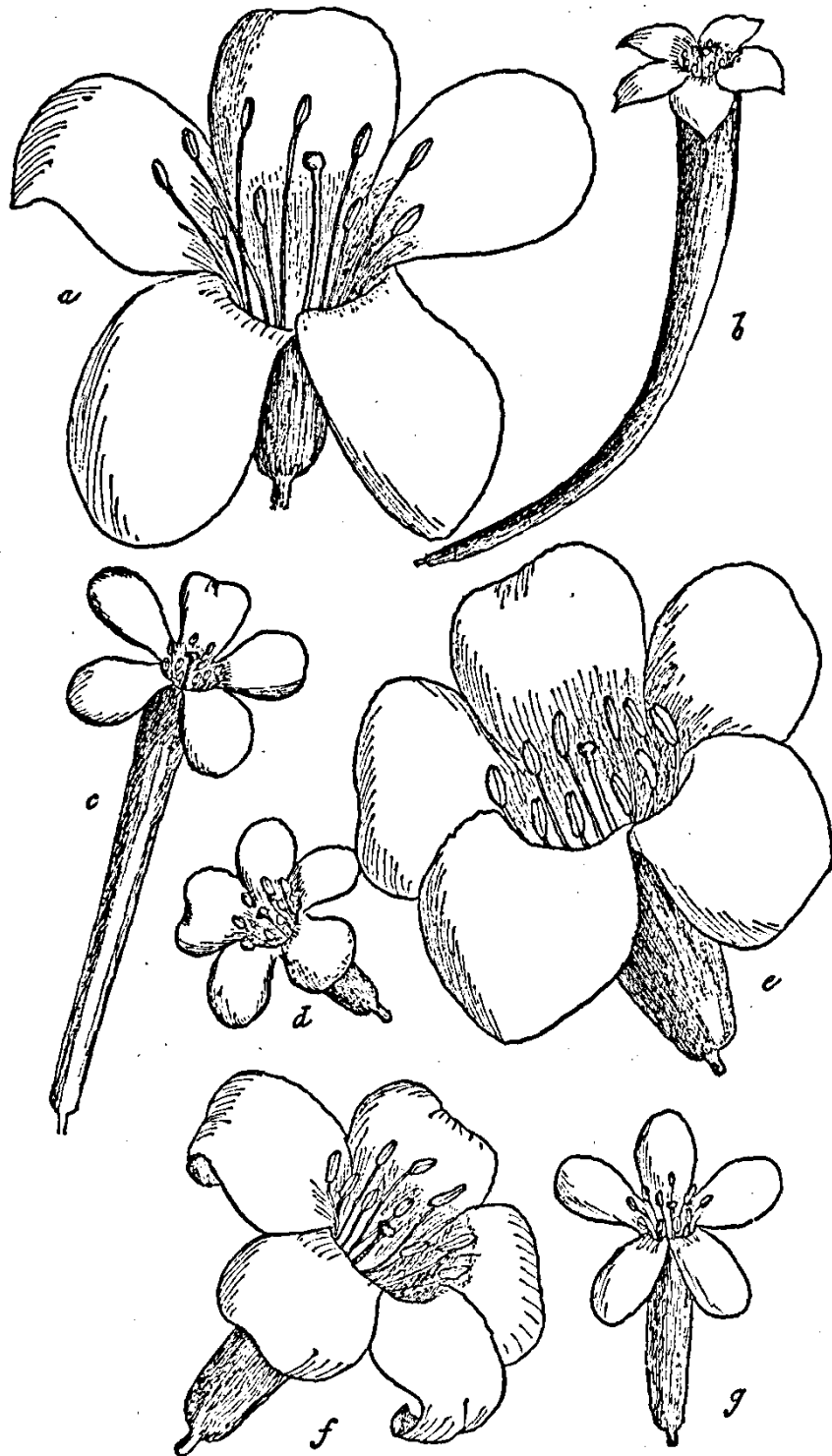


R. TEYSMANNII ($\frac{2}{3}$).

R. JASMINIFLORUM.

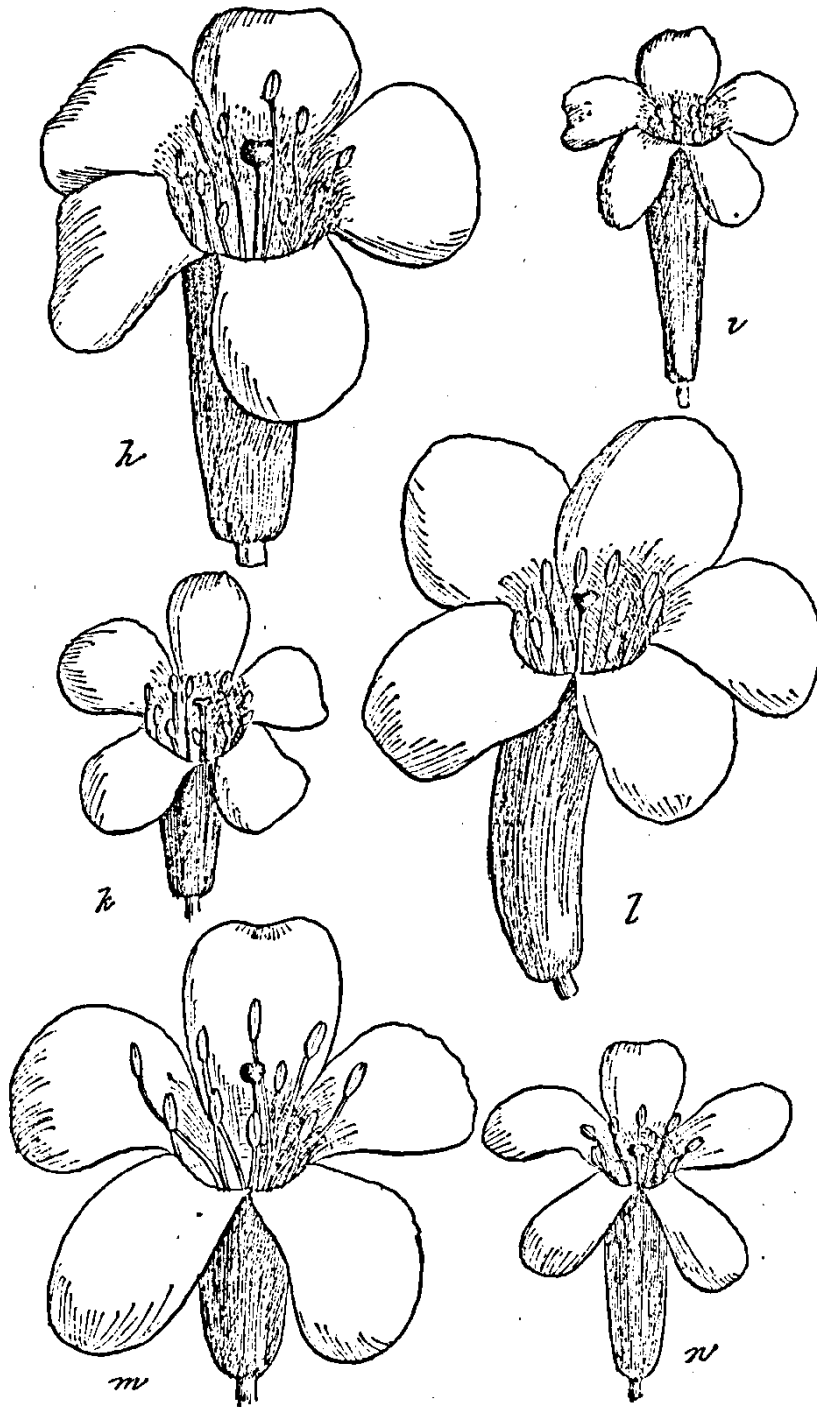
R. LOBBII.

FIG. 42.



R. BROOKEANUM. b, R. LOBBII. c, R. JASMINIFLORUM d, R. MULTICOLOR
e, R. JAVANICUM. f, R. TEYSMANNII. g, R. MALAYANUM.

FIG. 43.



h, MONARCH. *i*, No. 329. *k*, HIPPOLYTA. *l*, DUCHESS OF EDINBURGH.
m, LORD WOLSELEY. *n*, No. 318.

FIG. 44.