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STUDIES IN THE GESNERIACEAE OF THE OLD WORLD

XV: THE GENUS SAINTPAULIA

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The African Violet, *Saintpaulia*, has attained amazing horticultural popularity in recent years, especially in the United States of America. It follows that the botanist who ventures to write about the genus is wise to define his objectives with some precision. Those of the present paper can be simply stated. My concern is with the limits of the genus and with the recognition and identification of its wild species. This revision is preliminary to an account of the family *Gesneriaceae* for the Flora of Tropical East Africa, now being published from Kew. Many many horticultural forms of *S. ionantha* have been raised (cf. Wilson, H. v. P., 1953), and it seems likely that soon many more of hybrid origin will be grown. It is clear, too, that not a few of the species will be found to exist in the wild in recognizably different strains. This paper, however, is neither a monograph not a horticulturist's guide. I am aware that both these are needed, but they must be supplied by pens other than mine. The only point where I have strayed from my immediate objectives is in the bibliography. Having at hand references to papers not relevant to the limited scope of the text, I have nevertheless included them as an aid to anyone pursuing more detailed studies.

The history of the introduction of *Saintpaulia* in 1892 by Baron St. Paul is now well known (see Hooker, 1895; Burtt, 1947; Roberts, 1952). It remains to add that the earliest specimen of the genus I have seen was collected on the coast " opposite Zanzibar " by Sir John Kirk in 1884 (K), and another was found in 1887 by the Rev. W. E. Taylor (BM) in the Giryama and Shimba Mts., which are in S.E. Kenya between the Teita Hills and the coast. Kirk's plant is in all probability true *S. ionantha*, but I have not seen a *Saintpaulia* from the region whence came Taylor's specimen, and it is too scanty to assign to any species.

The first additions to the genus were the two species, *S. goetzeana* and *S. pusilla*, found by W. Goetze in the Uluguru Mts. and published by Engler in 1900. Then in 1906 C. B. Clarke reported the existence of two species in the material from Usambara, though he unfortunately called the true *S. ionantha S. kewensis* and used *S. ionantha* for another plant.

Clarke also fell into the same mistake as the present writer, thinking he was looking at two species (which I later designated *S. ionantha* and *S. diplotricha*—Burtt, 1947) instead of three (*S. ionantha*, *S. diplotricha* and *S. confusa*—Burtt, 1956).

Engler added *S. grotei* in 1921, and that completed the tally (excluding *S. alba* E. A. Bruce=*Linnaeopsis alba*) until 1947. In the decade 1947–1956 seven new species were described, raising the total of accepted species to eleven. The revision now presented makes a big increase to that number: nineteen species being distinguished in the key. Yet it can only be considered an interim account, for some specimens are still not satisfactorily placed. There are reports of plants being discovered at fresh stations, and some of these are confidently expected to be new.

Of all these species only four, *S. inconspicua*, *S. pusilla*, *S. goetzeana* and *S. teitensis*, have not been studied from living plants cultivated at Kew or at Edinburgh. For this opportunity I am indebted to the labours of many enthusiasts. That none of the new species commemorates their names is not through any lack of gratitude on my part, but merely because it would have been invidious to single out for such commemoration one rather than another.

The labours of Mr. & Mrs. R. E. Moreau were the first to disclose the wealth of unknown forms in this fascinating genus. Amongst the plants they introduced into cultivation at Kew in the late 1930's were the new species *S. tongwensis* and *S. orbicularis*. Dr. P. J. Greenway has never missed an opportunity of sending back seed or valuable herbarium specimens, and others who have greatly helped this work by the collection of plants in East Africa are Mr. P. R. O. Bally, Dr. W. J. Eggeling and Dr. B. Verdcourt. In November 1954 Mrs. R. D. Barker brought over living material of a collection of Saintpaulias assembled by Mr. W. R. Punter of Tanga, and more recently Mr. Punter himself has visited Britain and we have been able to discuss Saintpaulia problems. He has been to endless trouble not only in collecting the plants but in examining them, tabulating characters and criticizing my draft, and I owe him a very great debt. From the United States of America I have had especial help from Mr. Harvey Cox and from Mr. Evan P. Roberts, to whom we may confidently look for continuing studies in the genus. There are many others, some of whom I do not even know by name, who have contributed to the introduction of these plants into cultivation. As a result I have had available for study an unrivalled collection of living material, and I am able to appreciate how impossible it would have been to construct a reasonable classification without this living herbarium at hand.

It has, however, been most instructive to find that several of the recently described species have actually been represented in herbaria for many years. Despite the living material, therefore, herbarium collections have been most valuable, and I am greatly indebted to the authorities of the herbaria at Berlin, the British Museum (Nat. Hist.), Brussels, Kew and Munich for access to or the loan of their material.

Affinities of the genus

No species of Saintpaulia has ever been described under another genus, though Rodigas (1895) wished to unite *Saintpaulia* with *Petrocosmea*. Only one plant, *Linnaeopsis alba* (E. A. Bruce) B. L. Burtt, has been wrongfully

included in *Saintpaulia*. These two facts argue that the genus must be very well marked, but they probably derive more from its having a very characteristic facies than from a clear technical definition.

Saintpaulia is remarkably constant in flower-form: the corolla tube is always short, the limb spreads almost at right angles and the two large yellow anthers are always clearly visible at the mouth of the tube. *Linnaeopsis alba* was excluded from *Saintpaulia* (Burtt, 1947) because its corolla is subcampanulate and does not fit the *Saintpaulia* pattern, and because the anthers are small; furthermore the leaves are more strongly veined and less fleshy than in *Saintpaulia*, two characters that also serve to distinguish the other species of *Linnaeopsis*.

Petrocosmea has a very much wider range of flower-form than has *Saintpaulia*, and it never quite reproduces the shape so characteristic of the African Violet. A better distinguishing character between the two genera resides, however, in the anthers: in *Petrocosmea* the cells are not divergent and the lines of dehiscence are more or less parallel to the filament and to one another: in *Saintpaulia* they diverge widely, so that the lines of dehiscence are almost at right angles to the filament, and being confluent at the tips form a continuous shallow arc.

When flowering material alone is available, there is more danger of confusing *Saintpaulia* with some of the rosulate species of *Boëa*, but this genus has a twisted fruit like that found in *Streptocarpus*. Beautiful flowering material of *Boëa urvillei* C. B. Cl. was collected on the island of Waigeo, off the N.W. tip of New Guinea, in 1954, by Dr. van Royen of Leiden, and he noted the very strong resemblance of its flowers to those of the African Violet.

A monotypic genus with very much the same corolla shape as *Saintpaulia* is the Himalayan *Platystemma*: in this case, however, the constant presence of four fertile stamens and the almost monophyllous habit suggest that the resemblance may be superficial, rather than indicative of any very close affinity. The development of this characteristic pattern of corolla in three areas so widely separated as E. Africa, N. India and New Guinea is of considerable interest.

Geographical distribution

One of the most remarkable features of the genus *Saintpaulia* is its restricted geographical distribution. It is the rule, rather than the exception, in the family as a whole to find that individual species are rather strictly localized, but there is no other comparable genus (even if we set the criterion for comparison at merely 10 species) in the Old World *Gesneriaceae* which is spread over less than five times the area of *Saintpaulia*: probably none occupies less than ten times that territory. Irrespective, then, of any distortion which could be introduced by too narrow setting of the species-limits, the large number of species in a small area is a salient feature: the whole genus of some 20 species in 25,000 square miles (about one-fifth the area of the British Isles). These figures are, of course, very rough, but they are sufficiently remarkable to be emphasised.

Splitting up the area we find the species distributed thus:—

Uluguru Mts.	3 species
Nguru Mts.	1 species
E. Usambara Mts. and outlying areas	10 species
W. Usambara Mts.	4 species
Teita Hills	1 species
Giryama and Tsimba Mts.	1 specimen (unnamed)

The greatest development of the genus is clearly in the E. Usambara Mountains and nearby (*i.e.*, Mt. Tongwe to the south and the Tanga area near the coast), and it is here that the most difficult taxonomic problems are met. The species from the Uluguru and Nguru Mts. are very well marked. The most westerly of those in the Usambara Mts. is *S. shumensis* from World's View, Shume, and this is also an easily distinguished species, as, indeed, are the other species from the W. Usambaras. There is a possibility (discussed under the species) that *S. shumensis* also occurs in the Nguru Mountains, but material is not yet adequate for a certain decision. In the South Pare Mts., whose foothills are less than 20 miles further west of Shume, no *Saintpaulia* has yet been reported. The single species from the Teita Hills is closely related to the general body of species in the Usambara Mts., while the record of the genus in the " Giryama and Tsimba Mts." (probably between Mombasa and the Tanganyika border and not far inland) rests only on the specimen (already mentioned) collected by the Rev. W. E. Taylor in 1887 (BM).

In the East Usambara Mountains there is a certain correlation between geographical distribution and leaf form. Thicker purplish leaves are characteristic of plants from near the coast (*S. ionantha* itself, *S. diplotricha* and *S. tongwensis*), while plants from further inland generally have thinner green leaves, though these often seem to be firmer in texture.

Species limits

As already mentioned in discussing geographical distribution, it is in the area of the E. Usambara Mountains and down to the coast that the major problems in species-limits are found. There are two especially difficult groups: one includes the acaulescent species *S. difficilis* and *S. confusa*, the other includes the caulescent species *S. grotei*, *S. amaniensis* and *S. magungensis*. In each group one species, *S. difficilis* and *S. grotei*, is marked off from the others by its more robust growth, which rather emphasises the parallelism between those two groups. As the notes appended to the individual species will show, it is in these two groups that further changes of classification are most likely to occur. It is true to say, however, that none of the species in the E. Usambara area is so well marked off from all other species as are those from the W. Usambaras, the Nguru or the Uluguru Mountains.

It is not unreasonable to expect a taxonomist to make it clear in his revisionary work where he is backing a hunch, and working on narrow concepts, and where the facts seem clear, well marked and beyond the upsetting effect of any change of view that more detailed field studies might make inevitable. I therefore submit the following list with species bracketed together when I feel that their independent recognition could well be jeopardized by further discoveries, though these could as well lead to the

recognition of further entities in the same complex. That I may be shown to have put the brackets in just the wrong places must be accepted as a reasonable hazard. This list will have an additional use in suggesting between which species confusion is most likely to arise.

1. *S. inconspicua.*
2. *S. pusilla.*
3. *S. shumensis*
4. *S. teitensis.*
5. *S. ionantha.*
6. *S. tongwensis.*
7. *S. grandifolia.*
8. *S. pendula.*
9. *S. intermedia.*
10. *S. goetzeana.*
11. *S. velutina.*
12. *S. diplotricha.*
13. *S. nitida.*
14. *S. orbicularis.*
15. *S. difficilis.*
16. *S. confusa.*
17. *S. grotei.*
18. *S. amaniensis.*
19. *S. magungensis.*

Morphology

1. *Habit.*

The two chief habits of growth, commonly designated rosulate and caulescent, depend on four associated characteristics. In rosulate plants the successive pairs of leaves are very close together (that is, the internodes are very short); the stems are predominantly upright, though in old plants the lower part may be prostrate; rooting is from the lower part of the stem below the leaves; below the leaf-crown the stem is thick, somewhat fleshy, irregular on the surface (by reason of the numerous leaf scars) and tapering downwards to the older decaying part that rots slowly. In these rosulate species the main stem may be unbranched, but when it does branch the side shoots are usually produced below the main crown of leaves, and they behave exactly as the main stem.

In caulescent plants the successive pairs of leaves are separated by well marked internodes (although there is inevitably some aggregation towards the tips of the shoots); the stems tend to be prostrate; roots are not only basal on the stem, but are produced at nodes which still bear active leaves; the stems are of a more or less even thickness throughout their length, and the older parts decay fairly quickly after the loss of their leaves, so that one plant soon breaks up into a number of separate portions.

A rosulate species, such as *S. confusa*, will spread to form quite a mat, but this is much tighter than a similar mat formed, for instance, by *S. grotei*; also the thick branched stems of *S. confusa* remain in connexion with one another much longer than do the thinner stems of *S. grotei.*

It may be necessary to wait some time before young plants grown from leaf cuttings show their characteristic habit. *S. intermedia* was notably tardy in this respect: the first flowers had appeared, and it had been incorporated in the key as a rosulate species before further growth disclosed the true habit. Generally, however, it will only be incomplete specimens that are difficult to place in their appropriate group.

Perhaps two species do not fit this general picture of habit in *Saintpaulia. S. pusilla* is a delicate rosetted herb which would appear to be a short-lived plant; *S. inconspicua* is caulescent, but rather diffuse and perhaps more erect than the caulescent species usually are. Both these species are relatively little known and neither has been in cultivation, so that no more can be said about their habit at present.

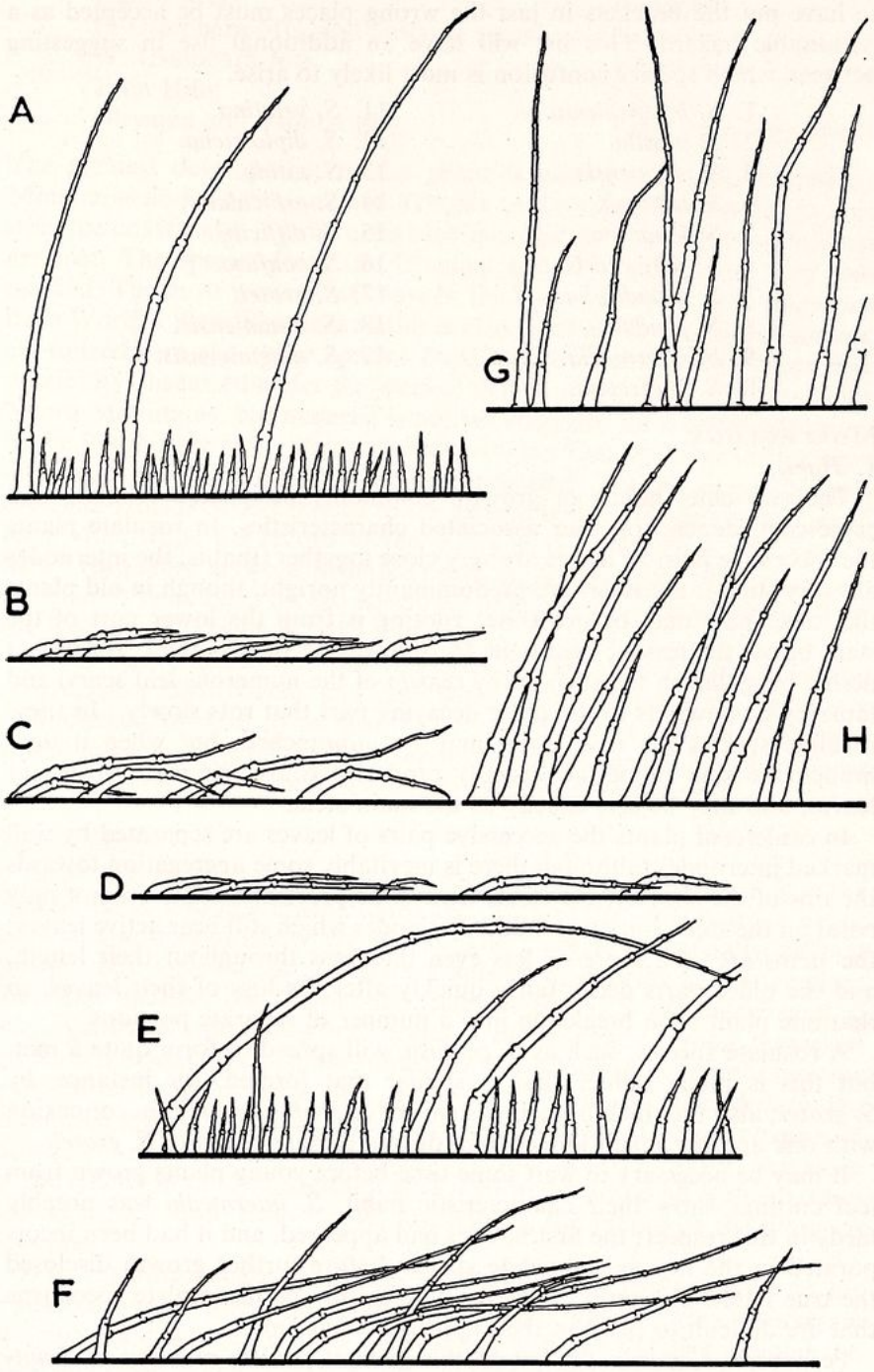

FIG. 1. Indumentum on the upper leaf surface of eight *Saintpaulia* species.

A, *S. diplotricha*. B, *S. nitida*. C, *S. grotei*. D, *S. orbicularis*. E, *S. velutina*. F, *S. intermedia*. G, *S. grandifolia*. H, *S. ionantha*. (A, C, D, E, F, G, and H × 25 approx. B × 50 approx.)

2. *Leaves and leaf-indumentum*

In all species of *Saintpaulia* both leaf surfaces bear scattered short-stalked or subsessile glands. These are a regular feature and, being without taxonomic value within the genus, can be disregarded for present purposes. It is the nature, posture and distribution of the eglandular hairs of the upper leaf surface that have been very largely used in constructing the key to the species. Such characters have the advantage of being relatively simple to express in words: the disadvantage of requiring careful examination. Faced with the need to examine a large number of plants, I adopted the following procedure: a thin slice (not a microscopist's section, which leaves only the stumps of hairs to be seen) was cut across the leaf in the direction in which the hairs were lying: this was placed on edge on the stage of a binocular dissecting microscope. I then found myself able to make all observations quickly and rapidly. I am greatly indebted to Mr. P. J. B. Woods for repeating such an examination and for making numerous drawings from which the figures in this paper have been prepared (Fig. 1).

Such an elaborate procedure is not, of course, necessary; but it is desirable to examine the cut edge of a leaf rather than to rely on a surface view, for short colourless erect hairs may be almost invisible when seen from above. Appressed hairs, of course, show up well in surface view, but neither is there any danger of their being missed when seen edge-on.

If the various types of hair are designated as follows:—

LE—long erect hairs
LA—long appressed hairs
SE—short erect hairs
SA—short appressed hairs

then the possible indumentum types, and the species in which they are found, are:—

LE —*S. ionantha*, *S. tongwensis*, *S. shumensis*, *S. goetzeana*, *S. pusilla*, *S. pendula*, *S. teitensis* (?), *S. grandifolia*.
LESE—*S. velutina*, *S. diplotricha*.
LESA—*S. difficilis* (?).
LA —*S. intermedia*.
LASE—Not yet known.
LASA—*S. amaniensis*, *S. magungensis*, *S. grotei*, *S. confusa*, *S. difficilis* (?), *S. orbicularis*.
SE —Not yet known.
SA —*S. nitida*.
O (hairs absent on upper surface, except at margin)—*S. inconspicua*.

Such a classification of hair types is too rigid: there are intermediate states between erect hairs and appressed hairs. In particular it is difficult to decide whether *S. difficilis* is best placed as LESA or LASA; whether, that is, its long hairs are best placed in the erect or appressed class. Nevertheless such a synopsis of species according to the indumentum of their leaves gives a useful picture of the genus.

All leaf-characters must be taken from mature leaves. On young leaves the hairs, especially long ones, will be appressed whatever their condition later on. It is also to be noted that young leaves may show marginal teeth much more strongly developed than they appear in the mature leaf.

The indumentum of the petiole generally tends to be similar to that of the leaf surface and its characters have not been used independently.

Variation in the texture of the lamina and its correlation with geographical distribution has already been mentioned, and there is no doubt that a thorough investigation of the leaf anatomy needs to be made. In the descriptions I have tried to give a qualitative idea of texture: in the key it has scarcely been necessary to mention it except as a subsidiary feature. Nevertheless there is here a feature of potential taxonomic value.

3. *Floral characters*

The flowers of *Saintpaulia* provide very few reliable specific characters. In handling living plants from wild sources, colour is the most obvious of these. But colour cannot be used in the herbarium with any certainty and the wide range of cultivated colour forms within *S. ionantha* is a warning against paying too much attention to the flower colour of individual clones.

The self-coloured species appear to show that feature consistently, though the shade of colour may vary: it seems certain, for instance, that both light and dark forms of *S. ionantha* occur in the wild. The species with bicoloured flowers, pale margins and deeper eye, also seem consistent in this patterning; as far as is presently known flowers so coloured are found only in *S. inconspicua*, *S. orbicularis*, *S. pusilla*, *S. shumensis* and *S. velutina*. *S. goetzeana* is said to have the two upper lobes white, the three lower marked with pinkish violet.

The flowers of *S. ionantha* are larger than those of *S. shumensis*: that is a real specific difference. But flower size is too easily affected by growing conditions to afford a classificatory character of any practical value. Old and pot-bound plants may produce numerous flowers below the size thought to be normal for the species: young vigorous plants may produce unusually large blossoms. Even in the wild it is not to be expected that conditions will always be appropriate for a "normal sized" flower. Nevertheless the horticulturist may well become familiar with valid differences in flower size among the species he grows under uniform conditions.

The normal flower of *Saintpaulia* has an irregular limb with 2 upper lobes and 3 lower ones, and an androecium of 2 fertile stamens and 2–3 small staminodes. Abnormally, regular flowers may occur (Dümmer, 1912) and these have five equal corolla lobes and five fertile stamens. Variations in the androecium are known to occur even without such peloria of the corolla. For instance the lateral staminodes have been found bearing small, but apparently fertile, anthers in *S. magungensis* (Greenway 298/48, No. 1): Miss E. R. Saunders recorded variation in the degree of development of the staminodes in *S. ionantha* (Saunders, 1934, p. 153) and noted that sometimes the staminode receives a vascular trace, at others the trace is diverted into the corolla-lobe.

With these known variations, which are based on no exhaustive study though confirmed by my own observations, the use of characters of staminodal development to distinguish species is unwise. That Roberts (1952) was able to do so, may have been because much of the cultivated material of the different species really represents just a single clone.

It is yet too early to say much about the range of fruit-characters. Between the short fat blunt capsule of *S. ionantha* and the long slender one of *S. nitida* there is a wide gulf, but in many species the fruits are not yet properly known. Whether shape depends on full fertilization remains to be discovered; there can certainly be quite a range on a single plant. Further study will almost certainly permit more profitable use of the characters of fruit.

Subdivision of the Genus

When only 3 species of *Saintpaulia* were known, *S. ionantha*, *S. pusilla* and *S. goetzeana*, K. Fritsch divided the genus into two sections. *Eusaintpaulia* included the two rosulate species; the caulescent *S. goetzeana* was segregated as a separate section *Archisaintpaulia*. I doubt if this division on habit really represents the natural affinities of the species and I see no reason why any subdivision of the genus is needed. I therefore abandon these sections.

Saintpaulia H. Wendland in Gartenflora, xlii, 321, t. 1391 & fig. 66 (1893); K. Fritsch in Engl. & Prantl, Nat. Pflanzenfam. iv, 3b, 185 (1895) et Nachtr. iii to iv, 3b, 318 (1908); Baker & Clarke in Oliver, Fl. Trop. Afr. iv (2), 500 (1906); B. L. Burtt in Gard. Chron. 3 ser. cxxii, 22 (1947); E. P. Roberts in African Violet Mag. vi (2), 24 (1952).

Perennial herbs, stems either rather short and thick and elongating slowly, with a dense terminal crown of leaves, or procumbent, rooting at the nodes, with distinct internodes. *Leaves* opposite, petiolate, often more or less fleshy, the blade suborbicular to elliptic, its indumentum often characteristic of the species. *Peduncles* axillary, 1-several-flowered, the flowers borne cymosely with 2 flowers opening serially at each dichotomy of the inflorescence. *Bracts* small, usually linear. *Calyx* divided almost to the base into 5 linear or lanceolate segments; these are irregularly arranged, the uppermost is median, the upper laterals lie just within the outer margin of the upper corolla-lobes (not in line with the sinus) and, similarly, the lower laterals lie just within the lower margins of the lateral corolla-lobes. *Corolla* with a short cylindric tube and a characteristic 5-lobed limb spreading at right angles to it; the limb with bilobed upper lip and a lower lip of three more or less spreading lobes, glabrous on the face but hairy on the back and ciliate (usually glandular-ciliate) on the margins. *Fertile stamens* two only in normal flowers, the anticous pair; filaments inserted just within the corolla tube, stout, somewhat flattened and twisted; anthers large robust bright yellow, carried just outside the mouth of the corolla tube, cohering face to face, reniform, dehiscing by arcuate confluent slits. *Staminodes* 2–3, usually small; abnormally 2 or all fertile. *Ovary* short, conical, villous, tapering abruptly into the style which is about 3 times its length, glabrous except at the base, exserted stiffly to left or right of the centre of the corolla; stigma small, terminal, papillose, often with central depression. *Fruit* capsular, varying from ovoid to linear-cylindric, tardily dehiscent.

Key to the species of Saintpaulia

1a. Leaves glabrous in centre of upper surface,* hairy on margins and on nerves below; fls. small (c. 1·25 cm. diam.), white with blue centre. Uluguru Mts. . . . . 1. *inconspicua*

1b. Leaves always hairy on upper surface 2

2a. Indumentum of upper leaf surface either of long hairs only, which are usually ± erect or curved over in their upper part, or of these densely interspersed with short erect hairs 3

2b. Indumentum of upper leaf surface always including numerous short appressed hairs; long hairs, if present, usually ± appressed also, occasionally ± spreading (*S. difficilis*) 13

3a. All the hairs long (though often somewhat unequal) and well-spaced 4

3b. Spaces between the long hairs densely beset with much more numerous short erect hairs 12

4a. Rosette plants,† stem only developing below close-packed terminal clusters of leaves 5

4b. Caulescent plants† with distinct internodes 10

5a. Flowers pale with deeper eye, only c. 2 cm. diam. . . 6

5b. Flowers self-coloured, normally c. 2·5 cm. or more in diam. . 7

6a. Leaves elliptic; delicate rosetted herb with slender axis. Uluguru Mts. . . . . 2. *pusilla*

6b. Leaves orbicular; dwarf but robust herb, axis c. 5 mm. diam. W. Usambara Mts. . . . . 3. *shumensis*

7a. Leaf blade subpeltate; inflorescences shorter than the leaves; fruit 2·5 cm. long. Teita Hills . . . . . 4. *teitensis*

7b. Leaf blade cordate at base; fruit less than 2 cm. long . . 8

8a. Leaves dark purplish, thick, up to 8 cm. long and 6 cm. wide. E. Usambara Mts. to coast 9

8b. Leaves light green, thinner, up to 10 cm. long and 8 cm. wide. W. Usambara Mts. . . . . 7. *grandifolia*

9a. Leaves suborbicular; flowers deep violet, if pale mauve ± translucent 5. *ionantha*

9b. Leaves elliptic; flowers pale mauve but opaque . 6. *tongwensis*

10a. Leaf-blade about 1·5 cm. long, margins almost entire; flowers white with rosy lilac marking on two lower lobes. Uluguru Mts. 10. *goetzeana*

10b. Leaf-blade about 4–5 cm. long, margins crenate-serrate (at least when young); flowers deep violet 11

11a. Leaves light green, concolorous; peduncles usually 1–2-flowered. E. Usambara Mts. . . . . 8. *pendula*

11b. Leaves purplish or reddish below, dull purplish-green above; peduncles several-flowered. E. Usambara Mts. . 9. *intermedia*

12a. Flowers small, c. 2 cm. diam., deep violet except towards the tips of the lobes, which are white; leaf thinnish, margin (? always) upturned, deep green above, reddish purple below. W. Usambara Mts. 11. *velutina*

* Apart from scattered short-stalked glands, which are found in all species.

† See notes on habit, p. 551.

12b. Flowers larger, c. 2·5 cm. diam., very pale violet; leaf margins slightly recurved; leaves purplish above, reddish purple below. E. Usambara Mts. . . . . 12. *diplotricha*
13a. Rosette plants,* stems only developing below close-packed terminal clusters of leaves 14
13b. Caulescent plants* with distinct internodes . . . 17
14a. Hairs on upper surface of leaf all short, scattered, inconspicuous; leaf shining, dark green; flowers deep violet blue; fruit slender, c. 1·5 cm. long and 1 mm. diam. Nguru Mts. . 13. *nitida*
14b. Hairs on upper surface of leaf of mixed lengths, fairly dense and leaf obviously hairy; fruits c. 2 mm. diam. 15
15a. Flowers pale with blue centre, numerous, c. 2 cm. diam.; leaves orbicular, green, thin, all the hairs appressed. W. Usambara Mts. 14. *orbicularis*
15b. Flowers deep blue or purple, c. 2·5 cm. diam. E. Usambara Mts. 16
16a. Long hairs ± erect or spreading; leaves usually distinctly longer than broad, pale green below; fruit hairs ± spreading 15. *difficilis*
16b. Long hairs lying flat; leaves more or less suborbicular, almost white below, glistening; fruit hairs ± appressed . . . 16. *confusa*
17a. Petiole c. 7–10 cm. long; leaves thin, distinctly crenate, with rather conspicuous veins; flowers pale mauve . . . 17. *grotei*
17b. Petiole not exceeding c. 5 cm.; leaves thicker, obscurely crenate; flowers purple 18
18a. Marginal hairs of corolla lobes glandular . . 18. *amaniensis*
18b. Marginal hairs of corolla lobes largely eglandular 19. *magungensis*

1. **Saintpaulia inconspicua** B. L. Burtt, **species nova** ex affinitate *S. pusillae* Engl., a qua habitu caulescente, foliis superne (marginibus exceptis) pilis destitutis inferne in nervis tantum pilosis, floribus minoribus recedit.

Herba caulescens, debilis, caulibus breviter et appresse pilosis. *Folia* petiolis variabilibus plerumque 2–3·5 cm. longis etiam pilosis; lamina plus minusve elliptica, c. 4–5 cm. longa et 2–3 cm. lata, apice rotundata vel obtusa, basi plus minusve (et saepe inaequilateraliter) rotundata, supra pilis parcis ad margines exceptis glabra, infra parce piloso-pubescens pallidior, venis lateralibus utrinque 5 subtus conspicuis praedita. *Inflorescentiae* axillares 1–6-florae, pedunculis foliis brevioribus vel vix longioribus parce pilosis. *Bracteae* lineares, pilosae, ad 3 mm. longae. *Pedicelli* 5–7 mm. (sub fructu 10 mm.) longi. *Calyx* in segmenta 5 linearia, 3 mm. longa, apice aliquantulum recurva subappresse pubescentia divisus. *Corolla* tubo 2 mm. longo; labium superius 5·5 mm. longum, obtuse bilobum; inferius 6 mm. longum, obtuse trilobum. *Filamenta* 2·5 mm. longa; antherae 1 mm. longae et latae. *Ovarium* 2·5 mm. longum, hirsutum, in stylum 2·5 mm. longum basi hirsutum superne glabrum productum. *Fructus* (immaturus) c. 1 cm. longus, saepe paulo curvatus.

TANGANYIKA: Uluguru Mts. Morogoro, Kisaki Rd., 1370 m., 6 inch herb, white flowers with blue spot, occasional on moist soil in forest, 18 Dec. 1934, *E. M. Bruce* 328 (holo. K). Nordwestseite, 1400 m., Urwald, Kraut vereinzelt, Bl. weiss, blaulich, 10 Dec. 1932, *Schlieben* 3068 (B).

* See notes on habit, p. 551.

An untidy plant with small flowers not immediately recalling an African Violet and originally marked as *Didymocarpus* in the herbarium. However, its resemblance to the African plants of that genus is superficial; the corolla-shape, which in the *Didymocarpi* is shortly and broadly tubular rather in the manner of *Streptocarpus umtaliensis*, provides a clear-cut distinction. This plant is a true *Saintpaulia*. The African species referred to *Didymocarpus*, albeit their reference to that genus is debatable, are not congeneric with *Saintpaulia inconspicua*. Schlieben's collection includes some tiny plants each with only two or three leaves and a single flower. They seem, however, to be no more than very small specimens but they do not, of course, show the caulescent habit at all obviously.

2. **Saintpaulia pusilla** Engl. in Bot. Jahrb. xxviii, 481, tab. 7 (1900); Baker & Clarke in Oliver, Fl. Trop. Afr. iv (2), 501 (1906); H. E. Moore, African Violets &c., 153 (1957).
TANGANYIKA: Uluguru Mts. Im Gebirgsurwald an der Südseite des Lukwangule-Plateaus von 12–1800 m., an Felsblöcken zwischen Moos, Nov. 1898, *Goetze* 205 (holo.—n.v.). N-W-seite, Bondua, Nebelwald, 1650 m., Kraut vereinzelt an feuchten Felsen zwischen Moosen und Farnen, Blüte weisse, lila Flecken, 24 Nov. 1933, *Schlieben* 3010 (BM, BR, M). Bondwa peak, above Morningside, 1680 m., on rock surfaces with filmy ferns under rock overhang, no direct rain, flowers white, except for the two smallest petals which are mauve, capsule elongate, leaves purplish below, Jan. 1953, *W. J. Eggeling* 6443 (K); *ibidem*, Nov. 1953, *W. J. Eggeling* 6712 (K). Forest, 1680 m., 25 Nov. 1932, *G. B. Wallace* 492B (K—mixed with *S. goetzeana*).

At one time there was some confusion between this species and *S. goetzeana*, partly due no doubt to their growing together and to their both having bicoloured flowers: white with the two upper petals mauve. They were carefully studied in the field by Dr. W. J. Eggeling and his observations left him quite convinced that the species are distinct. This is confirmed by examination of herbarium material. The stouter, definitely creeping habit of *S. goetzeana*, its thicker, rounder leaves, which are usually purple below, and shorter fatter fruit are good distinguishing features.

3. **Saintpaulia shumensis** B. L. Burtt in Notes Roy. Bot. Gard. Edinb. xxi, 238 (1955); H. E. Moore, African Violets &c., 153 (1957).
TANGANYIKA: W. Usambara Mts. Shume, World's View, 1900–1950 m., 8 March 1947, *Greenway* 7934 (EA, K), cult. from this number (holo. K, E); *W. M. Moreau*, Amani herb. No. 9840 (EA); 4 June 1953, *Drummond & Hemsley* 2852A (K, E). Manolo to Magamba, 1750 m., 31 May 1914, *Peter* O I 126 (B). Mlalo, immergrüner Regenwald, 1400–1600 m., 7 Oct. 1902, *Engler* 1397 (B).

A specimen closely resembling *S. shumensis* was collected by Schlieben in the Nguru Mountains (Kinbola, c. 1600 m., Nebelwald, Bl. lila, 11 Jul. 1933, *Schlieben* 4112—B). If it truly belongs to this species it will provide a most interesting, and unexpected, extension of range. The collector's failure to note that the flower was bicoloured militates against the identity,

for Schlieben was careful and accurate in such matters; further, the hairs on the leaf are rather more erratic in length than in true *S. shumensis*. However, there is certainly a close and interesting affinity and further material must be sought.

4. **Saintpaulia teitensis** B. L. Burtt, **species nova** ex affinitate *S. ionanthae* H. Wendl., foliis longius petiolatis et laminis subpeltatis, inflorescentiis foliis brevioribus et fructibus majoribus distinguitur.
Herba rosulata, caule (in speciminibus siccis) ad 10 cm. longo haud ramoso cicatricibus foliorum crebre praedito. *Folia* petiolis ad 15 cm. usque longis dense et plus minusve appresse pilosis; lamina late elliptica, late ovata vel suborbicularia, 5·5–7·5 cm. longa et 4·5–5·5 cm. lata, apice rotundata vel raro obtuse acutata, basi subpeltata, marginibus obscure crenato-dentata, utrinque pilis c. 1·5–2 mm. longis parce (infra ad nervos densius) praedita. *Inflorescentiae* foliis breviores, dense pilosae; pedunculi ad 5 cm. longi; bracteae 3–8 mm. longae, lineares; pedicelli c. 1·5 cm. longi. *Calyx* ad basin in segmenta 5 linearia 7 mm. longa pilosa divisus. *Corolla* tubo 2 mm. longo; labium superius 1·3 cm. longum, fere ad basin bilobum; labium inferius 1·5 cm. longum et 2 cm. latum profunde trilobatum. *Filamenta* 4 mm. longa; antherae 2·5 mm. longa, 3·5 mm. lata. *Ovarium* 3 mm. longum, dense pilosum, in stylum 9 mm. longum basi pilosum superne glabrum attenuatum. *Fructus* cylindricus, ad apicem attenuatus, 2·5 cm. longus, 3 mm. diametro, parce pilosus.
KENYA. Teita Hills, Mbololo Hill, in forest near water, Sept.–Oct. 1938, *Boy Joanna* (Coryndon Mus. No. 8982—EA, K).

This species is only known to me from dried material, but its characters are sufficiently distinct to warrant describing it. Inevitably the hairs of the leaf are appressed in herbarium specimens, but I think they will prove to be more or less erect in the living plant. Some leaves seem to be reddish purple on the lower surface, others lack anthocyanin and are light green. The long unbranched stalk is a very conspicuous feature of these specimens, but how far it is a specific character remains to be seen. It must be hoped that the species will be successfully introduced: one attempt was made on our behalf some years ago by Dr. Van Someren, but the plants unfortunately failed to survive the air journey.

Geographically *S. teitensis* is the northernmost species yet known and in this genus of local distributions its status as a distinct species is not unexpected. Its apparent affinity with the coastal species from Tanga, rather than with any form of the West Usambaras is, however, worth noticing.

5. **Saintpaulia ionantha** H. Wendland in Gartenflora, xlii, 321, t. 1391 & fig. 66 (1893); Baillon in Bull. Soc. Linn. Paris, ii, 1148 (1893); Bull. Soc. Tosc. Ort. 1894, 13, fig. 1; Rev. Hort. 1894, 109; Neub. Garten-Mag. 1894, 362, fig. 97; Hook. f. in Curtis, Bot. Mag. t. 7408 (1895); H. E. Moore, African Violets &c., 151 (1957).

Syn.: *Petrocosmea ionantha* (H. Wendl.) Rodigas in Ill. Hortic. xlii, 108 (1895).
Saintpaulia kewensis C. B. Cl. in Oliver, Fl. Trop. Afr. iv (2), 501 (1906).

TANGANYIKA: Feuchte Felsen a. d. Siga-höhlen, Blüte blau, 21 Aug. 1910, *Winkler* 4276 (Wroclaw). Sigi Caves, cliffs (A), top ledges (B), amongst boulders (C), comm. *W. R. Punter*, fl. 1956 in hort. bot. reg. Edin. ref. C.1688(A), C.1687(B) and C.1576(C); *ibidem*, coll. *P. R. O. Bally*, cult. Bailey Hortorium, Cornell, 1955, *H. E. Moore* 6999 bis.

This species is the basis of the African Violet mania which has swept the United States of America. The number of named variants that have been raised from seed is a remarkable witness to the hidden potential of a species which is not unusually variable in the wild. It is, however, clear that pale and dark flowers do occur naturally and they were known in cultivation and named by R. H. Beddome (1908, p. 97); he distinguished pale lilac (type), very dark blue (*violacea*), white violet-tinted (*albescens*), reddish with longer leaves (*purpureus*). Much of the history of origin of these variants has been lost and the story is now scarcely susceptible of botanical study. It would be of great interest to see if a new line, re-introduced from wild seed and carefully segregated in cultivation, gave rise to comparable progeny.

6. **Saintpaulia tongwensis** B. L. Burtt in Gard. Chron. 3 ser. cxxii, 23 (1947) et in Curtis, Bot. Mag. N. S. tab. 11 (1948); Cox & Roberts in African Violet Magazine, iii (4), 5 (1950); H. E. Moore, African Violets &c., 153 (1957).
TANGANYIKA: E. Usambaras. Tongwe Mt., coll. *Mrs. R. E. Moreau*, cult. in hort. bot. reg. Kew (holo. K); *ibidem*, 600 m., a perennial herb sometimes with a thick semi-woody basal stem and leaves in a rosette, leaves dark and light green above, often flushed crimson below, flowers several together in a cyme, lavender-coloured, very rare growing on gneiss rocks with Encephalartos in Isoberlinia, Mystroxylon, Flacourtia, Chrysophyllum, Allophylus, Tricalysia, Memecylon forest patch on a rocky mountain peak, 22 Sept. 1940, *Greenway* 6024 (EA). Cult. in hort. bot. reg. Edin.; stem becoming as thick as one's thumb with age, June 1954, ref. C.1559 (E); comm. *W. R. Punter*, ref. C.1574 (E).

Dr. Greenway's detailed notes are put on record here as it is said that forest clearing and collecting may have combined to exterminate *S. tongwensis*. The pale flowers have more body, less translucence, than pale forms of *S. ionantha*, as though a deeper pigment were diluted with white in *S. tongwensis*, rather than with water.

7. **Saintpaulia grandifolia** B. L. Burtt, **species nova** inter omnes foliis grandis late ovato-ellipticis apice rotundatis basi cordatis distincta. Pili in pagina foliorum superiore omnes subaequales et erecti sunt, quamobrem species haec juxta *S. ionantham*, *S. tongwensem*, *S. teitensem* ponenda est, sed a tribus omnibus characteribus supra notatis et foliis tenuioribus laete viridibus recedit.
Herba rosulata. *Petiolus* ad 10 cm. longus, pilis aliis longis aliis numerosioribus brevioribus recte patentibus densius vestitus. *Lamina* late ovato-elliptica, 10 cm. usque lata et fere 8 cm. lata, apice rotundata, basi cordata, marginibus leviter crenato-serrata, venis utrinsecus c. 5 ascendentibus supra leviter impressis subtus prominulis; pagina superior pilis erectis

densiuscule vestita, viridis; pagina inferior uti superior breviter pilosa, albo-viridis. *Pedunculi* c. 7 cm. longi, pilosi; bracteae lineares, 6 mm. longae, pilosae; pedicelli c. 1·5 cm. longi, pilosi. *Calyx* in segmenta 5 linearia 6 mm. longa pilosa partitus. *Corolla* tubo 2·5 mm. longo, ore 3 mm. diametro; limbus 2·5 cm.×2·5 cm.; lobi superiores 9 mm. longi et 6 mm. lati, laterales 1 cm. longi et 9 mm. lati, medianus 1·2 cm. longus et 9 mm. latus, omnes marginibus glanduloso-ciliati. *Stamina* fertilia filamentis 4 mm. longis, antheris 2·5 mm. longis et 3 mm. latis; staminodia duo parva, tertium minimum. *Ovarium* 3 mm. longum, dense pilosum, in stylum 5 mm. longum attenuatum.
TANGANYIKA. W. Usambara Mts., Lutindi, in steep valley on clay, comm. *W. R. Punter*, ref. S., cult. in hort. bot. reg. Edin. C.1575 (holo. E).

A particularly fine species whose deep violet flowers contrast well with the clear green leaves. It is, apparently, the nearest relative in the W. Usambaras of *S. ionantha* and allied species nearer the coast. However, in a genus where all the species are so closely interrelated, it would be unwise to attach too much importance to the fact that the most useful key characters bring these plants into close proximity: genetic relationship may lie elsewhere.

8. **Saintpaulia pendula** B. L. Burtt, **species nova** *S. intermediae*, ut videtur, affinis. Ab hac caulibus longioribus minus dense foliatis, foliis viridibus, pilis in pagina superiore suberectis, pedunculis plerumque unifloris facile distinguitur.
Herba prostrata; caules patenter pilosi, repentes, radicantes, internodiis 2 cm. usque longis. *Petioli* 3·5 cm. usque longi, longe et dense patenter pilosi. *Lamina* late ovata vel suborbicularis, 3·5–4·5 cm. longa, 3–3·5 cm. lata, apice obtusa, basi subcordata, marginibus crenato-serrata, superne pilis longis erectis praedita, inferne brevius pilosa, nervis lateralibus utrinsecus 4–5 arcuatis. *Pedunculi* c. 5 cm. longi, pilosi, plerumque uniflori, supra medium bracteis binis linearibus 2 mm. longis praediti. *Calyx* ad basin in segmenta 5 lanceolata, 3 mm. longa, breviter pilosa partitus. *Corolla* tubo 2 mm. longo, limbo 2·5 cm.×2·5 cm.; lobi superiores 7 mm. longi et 5 mm. lati, laterales 8 mm. longi et 9 mm. lati, medius 8 mm. longus et 1 cm. latus, glanduloso-ciliati. *Filamenta* 4 mm. longa, glabra. *Antherae* 2·5 mm. longae et 3·5 mm. latae. *Ovarium* conicum 2 mm. longum dense villosum; stylus 7 mm. longus, glaber, purpureus.
TANGANYIKA. E. Usambara Mts., Mt. Mtai, on rock, comm. *W. R. Punter*, ref. U, cult. in hort. bot. reg. Edin., C.1686 (holo. E).

Dried specimens of *S. pendula* look very like those of *S. intermedia*, but I do not think there can be any real doubt that the species are distinct: living specimens are very easily separated, *S. pendula* having a more diffuse habit, green leaves and almost erect hairs. The specific epithet *pendula* was suggested to me by Mr. W. R. Punter; it is not one he would ever have thought of applying to *S. intermedia* which is, as it were, reluctantly caulescent, while *S. pendula* is almost exuberantly so. The fact that the peduncles of *S. pendula* are normally one-flowered also appears to be a good distinguishing feature.

9. **Saintpaulia intermedia** B. L. Burtt, **species nova** *S. pendulae* affinis et characteribus supra notatis distinguenda. Species haec primum *S. ionanthae* ipsam revocat, sed habitu caulescente et pilis foliorum antrorsum curvatis longe distat.

Herba prostrata; caules repentes, radicantes, congeste foliati internodiis raro 1 cm. usque longis. *Petioli* 8–9 cm. longi, patule pilosi. *Lamina* ovata vel ovato-orbicularis, 4–5 cm. longa et 3–4 cm. lata, apice rotundata, basi rotundata vel subcordata, marginibus crenato-serrata, supra atro-viridis pilis longis superne antrorsum curvatis itaque argenteis praedita, infra rubro-purpurea brevius pilosa, nervis lateralibus utrinsecus 4–5. *Pedunculi* 4–6 cm. longi, pluriflori; pedicelli 2–2·5 cm. longi; bracteae lineares 3 mm. longae; omnia pilosa. *Calyx* ad basin in segmenta lanceolata 4 mm. longa et 1·25 mm. lata pilosa divisus. *Corolla* tubo 2·5 mm. longo, limbo 2·5 cm. × 2·5 cm.; lobi superiores 6 mm. longi et 5 mm. lati, laterales 7 mm. longi et 9 mm. lati, medius 9 mm. longus et 1 cm. latus, glanduloso-ciliati. *Filamenta* 4 mm. longa, glabra; antherae 2·5 mm. longa et 3·5 mm. lata. *Ovarium* conicum, 3 mm. longum, villosum; stylus 7 mm. longus, glaber, purpureus. *Fructus* immaturus 8 mm. longus, villosus.

TANGANYIKA. E. Usambara Mts., Kigongoi, on rock, comm. *W. R. Punter*, ref. V, cult. in hort. bot. reg. Edin., C.2007 (holo. E); *ibidem*, ref. W, C.1580 (E).

In a genus where the species are so closely allied as they are in *Saintpaulia*, the epithet *intermedia* may seem a trifle inappropriate for any particular one of them. This species does, however, especially merit such a description. The habit is definitely caulescent, but this character was very slow to develop in plants grown from leaf-cuttings. The internodes are shorter than those of, for instance, *S. grotei*, and *S. intermedia* may be considered rather closer to the rosulate forms than are the other caulescent species.

The long hairs on the leaf surface are bent over in the upper half so that they are really intermediate between the erect and the adpressed condition. This is therefore an additional reason for the specific epithet.

10. **Saintpaulia goetzeana** Engl. in Bot. Jahrb. xxviii, 481, taf. 6 (1900); Baker & Clarke in Oliver, Fl. Trop. Afr. iv (2), 501 (1906); Cox & Roberts in Afr. Violet Mag. iv (3), 16 (1951); H. E. Moore, Afr. Violets &c., 150 (1957).

TANGANYIKA: Uluguru Mts. Im Gebirgswald an der Südseite des Lukwangule-Plateaus zwischen 1300 und 2000 m. an Felsblöcken zwischen Moos, Nov. 1898, *Goetze* 245 (B). Lupanga, 1800–1950 m., creeping herb on mossy rock surfaces in rain forest, fls. blue and white, absent above this point, 23 Dec. 1933, *Michelmore* 861 (K). Lupanga, 1950 m., rocks in forest, fleshy decorative leaves, red underneath, occasional, 7 Apr. 1935, *E. M. Bruce* (K). Edge of Lukwangule plateau, 2000 m., on rocks in deep shade, hillside forest in upland rain forest, creeping and rooting at nodes, corolla white with small rosy lilac markings on two lower lobes, 17 March 1953, *Drummond & Hemsley* 1656 (K, E). Nordwestseite, Paratapass, 1910 m., Kraut auf Baum, einzeln, Blüte weiss und lilablau, 18 Oct. 1932, *Schlieben* 2829 (BR).

S. inconspicua, *S. pusilla* and *S. goetzeana* are the three species of Saintpaulia found in the Uluguru Mountains, and all are endemic there. *S. goetzeana* is the one most closely allied to the main group of species in the Usambara Mountains to the north. Its nearest ally there is *S. intermedia*, but it is easily distinguished by its much smaller leaf-blades with almost entire margins and by its bicoloured flowers.

11. **Saintpaulia velutina** B. L. Burtt, **species nova** *S. diplotrichae* affinis. Species haec foliis pulchre bicoloribus, supra fusco-viridibus subtus roseo-purpureis, supra molliter velutinis, floribus violaceis minoribus, lobis ad apices plerumque albis distinguitur.
Herba rosulata, caule crasso abbreviato. *Petioli* ad 9 cm. usque longi, pilosi. *Lamina* suborbicularis, 2–4 cm. longa et lata, apice rotundata, basi cordata, marginibus (semper?) subincurva inconspicue crenato-serrata, supra pilis longis aliis brevioribus erectis multo numerosioribus interspersis praedita, nervis lateralibus utrinsecus 4. *Pedunculi* 5 cm. longi; bracteae lineares, 2 mm. longae; pedicelli 1·7 cm. longi; omnia pilosa. *Calyx* ad basin in segmenta lanceolata 3 mm. longa divisus. *Corolla* tubo 2 mm. longo; lobi superiores 4 mm. longi et 5 mm. lati, laterales et medius 8 mm. longi et 9 mm. lati, glanduloso-ciliati. *Filamenta* 3 mm. longa; antherae 2·5 mm. longae et 3 mm. latae. *Ovarium* 2·5 mm. longum, villosum; stylus 6·5 mm. longus, fere ad medium pubescens, superne glaber. TANGANYIKA: W. Usambara Mts. Urwald über Balangai, 1280 m., blass-lilablau, 10 Mar. 1916, *Peter* O IV 29 (B). Balangai, 5 miles from Sakarre, comm. *W. R. Punter*, ref. D, cult. in hort. bot. reg. Edin., C. 1579 (holo. E). Balangai, 900 m., on damp rocky banks in shady forest, small tufted plants with pale mauve flowers, undersides of leaves dark pink to maroon, 23 Jan. 1953, *Mrs. Faulkner* 1126 (K).

It was most interesting to find that this distinctive species had been collected in the type area by A. Peter as long ago as 1916. Among the Saintpaulias of the West Usambaras it is the only one showing a strong development of anthocyanin in the leaves. The upper surfaces have a dull velvety appearance, which explains the specific epithet, but the underside is richly coloured. The flowers are rather small, with white tips to the lobes as though the colouring of the corolla has been left unfinished. The cultivated stock has a tendency to produce abnormal flowers, with four fertile stamens and a doubling of the upper lip so that there are two collateral bilobed segments of the corolla on the upperside.

In the herbarium small specimens might be casually confused with *S. shumensis*, but once the leaf-indumentum is carefully examined it is seen that, between the long hairs, there is a dense array of short hairs; these are quite lacking in *S. shumensis*.

12. **Saintpaulia diplotricha** B. L. Burtt in Gard. Chron. 3 ser. cxxii, 23 (1947)—excl. pl. culta.—et in Baileya, iv, 164 (1956); H. E. Moore, African Violets &c., 150 (1957).
TANGANYIKA. Usambara, 1000 m., 26 Nov. 1895, *Buchwald* 149 (holo. K, iso. BM, BR). Maweni, Tanga, on rock, comm. *W. R. Punter* ref. T, cult. in hort. bot. reg. Edin. C.1571 (E). Mkulumuzi Valley, comm. *W. R. Punter* ref. O, cult. in hort. bot. reg. Edin. C.1573 (E); *ibidem*, ref. P,

C.1572 (E). Kange, comm. *W. R. Punter*, cult. in hort. bot. reg. Edin., C.1577 (E). Kange limestone gorge, on rock ledges in deep shade of dry evergreen forest, leaves deep green above, paler below, flowers very pale lilac, 13 Nov. 1956, *Milne-Redhead & Taylor* 7287 (K).

One noteworthy feature of *S. diplotricha*, as exemplified by the Kange stock, is that the limb of the corolla is not almost flat as in most other species but has the lower lip forming an angle of about 135° with the erect upper lip: that is to say, it is about half-way between the horizontal and the vertical.

The confusion which has surrounded this plant has been elucidated in the article in Baileya quoted above. *Buchwald* 149 is the plant which C. B. Clarke accepted in the herbarium as the true *S. ionantha*.

13. **Saintpaulia nitida** B. L. Burtt, **species nova** et foliis supra nitidis pilis brevibus appressis tantum praeditis et fructu tenui distinguenda.

Herba rosulata simplex vel inferne compacte ramosa. *Petioli* 9 cm. usque longi, breviter piloso-pubescentes. *Lamina* late ovata vel suborbicularis, 5–5·5 cm. long, 4–5 cm. lata, apice rotundata, basi paulo cordata, marginibus leviter crenatis, supra fusco-viridia inferne pallidiora, utrinque pilis brevibus inconspicuis appressis densiuscule praedita, venis primariis utrinsecus 5. *Pedunculi* petiolos paulo praestantes, pilis brevibus appresse pubescentes; bracteae lineares, 4–5 mm. longi; pedicelli c.2·5 cm. longi, pubescentes. *Calyx* ad basin in segmenta lineari-lanceolata pubescentia 6 mm. longa divisus. *Corolla* intense caeruleo-purpurea, tubo 2 mm. longo; lobi superiores 7 mm. longi et 8 mm. lati, laterales 8 mm. longi et 9 mm. lati, medius 1 cm. longus et latus. *Filamenta* 4 mm. longa; antherae 1·5 mm. longae et 2 mm. latae. *Ovarium* 2 mm. longum, breviter villosum; stylus 5 mm. longus, imo basi excepto glaber. *Fructus* cylindricus, 1·5 cm. longus, 1 mm. diametro, dense pubescens, purpureus.

TANGANYIKA: Nguru Mts. Mkobwe, northwest side, near Turiani, c.1000 m., on rocks in shade by forest stream, 29 March 1953, *Drummond & Hemsley* 1862 (K, E). Koluhamba, Turiani, Nov. 1953, *S.R. Semsei* 1463 (EA, K); *ibidem* Dec. 1953, *Semsei* for *Eggeling* (E.6776—K). Cult. in hort. bot. reg. Edin., plant rec'd through *Harvey Cox*, ref. A (C.1557—holo. E).

This is one of the easiest species to recognize on account of its inconspicuous indumentum and narrow fruit. The shining leaves and deep violet flowers also make it one of the most handsome. Only one other Saintpaulia has been found as yet in the Nguru Mountains, that mentioned above as being very close to *S. shumensis*. *S. nitida*, by contrast, seems to have no very close affinity, and its position in the sequence of species could easily be altered by invoking its unique indumentum as a key character at an earlier stage.

14. **Saintpaulia orbicularis** B. L. Burtt in Gard. Chron. 3 ser. cxxii, 23 (1947); H. E. Moore in African Violets &c., 153 (1957).

TANGANYIKA: W. Usambara Mts. Bungu to Ambangulu, 1060 m., 29 Feb. 1916, *Peter* O IV 16 (B). Sakarre, Ambangulu, 1200 m., 4 Aug.

1938, *Mrs. R. E. Moreau* 2 (holo. K); cult. in hort. bot. reg. Kew from this number (K). Cult. in hort. bot. reg. Edin. from *Mr. W. R. Punter* (C.1689—E) and *Harvey Cox* (C.1561—E).

The rather numerous pale flowers and the almost orbicular leaves with very tightly appressed hairs are characteristic of this species. A. Peter first found it in 1916, over twenty years before its rediscovery and introduction to cultivation by Mrs. Moreau.

15. **Saintpaulia difficilis** B. L. Burtt, **species nova** ex affinitate *S. confusae* B. L. Burtt, a qua habitu robustiore, petiolis longioribus, laminis ellipticis pilis longis in pagina superiore semi-patentibus distinguenda.
Herba foliis apice caulis crassi brevis rosulatis. *Petioli* 12 cm. usque longi pilis aliis longis aliis brevibus intermixtis vestiti. *Lamina* ovata ad ovato-elliptica, 5–7·5 (–8·5) cm. longa, 3–4·5(–5·5) cm. lata, apice obtusa vel raro subacuta, basi abrupte angustata vel rotundata vel subcordata, marginibus crenato-serrata, supra pilis longis parcis semipatentibus aliis brevioribus appressis densius interspersis, infra pubescens, nervis lateralibus utrinsecus 4–5. *Pedunculi* 5–7 cm. longi, uti petioli pilis longis et brevibus pilosi, pluriflori; bracteae lineares, 7 mm. usque longae; pedicelli c. 2 cm. longi. *Calyx* in segmenta anguste lanceolata 3 mm. longa pilosa divisus. *Corolla* violaceo-purpurea, tubo 2 mm. longo, limbo 2·5 cm. × 2·5 cm.; lobi superiores 8 mm. longi et 5 mm. lati, laterales et medius c. 1 cm. longi et 8 mm. lati. *Filamenta* 4 mm. longa; antherae 1·75 mm. longae et 2·5 mm. latae. *Ovarium* conicum, 2 mm. longum, villosum; stylus 8 mm. longus basi pubescente excepto glaber, purpureus. *Fructus* 1 cm. longus et 2 mm. latus, plus minusve appresse villosus.
TANGANYIKA: E. Usambaras. Sigi head waters above Monga, comm. *W. R. Punter*. ref. Q, cult. in hort. bot. reg. Edin., C.1578 (holo. E). Monga, on rock in rain forest, 900 m., coll. *P. J. Greenway* 1939, comm. *Mrs. R. E. Moreau* 7 (K). Head waters of Sigi River, Ubiri to Mgambo, 1050 m., very locally dominant on rocks by streamside in evergreen Parinari, Piptadenia, Cynometra dry valley forest, 22 July 1940, *Greenway* 5974 (EA, K). Head waters of Sigi River, 1050 m., very locally dominant on damp rocks in a stream bed in Piptadenia, Parinari, Allanblackia evergreen rain forest on steep mountain slope, 24 Oct. 1945, *Greenway* 7551 (EA, K). Head waters of Sigi River, Ubiri-Monga, very locally dominant on gneiss rock faces and in leaf-mould on the tops of rocks in Parinari, Piptadenia, Zahna, Isoberlinia rain forest, 24 May 1950, *Greenway & Verdcourt* 8454 (EA, K). Comm. *W. R. Punter*, ref. L., cult. in hort. bot. reg. Edin. (C.1945—E). Cult. in hort. bot. reg. Edin., comm. *Harvey Cox*, 1954, ref. C (C.1570—E).

Of the specimens quoted above it is necessary to enter caveats in respect of the last two. Mr. Punter remarked in a letter " my plants L and Q are very different in general appearance, plant L being of vigorous and Q of feeble growth. The hairs on the upper surface of the leaf of plant L feel stiffer being more erect and the leaf feels hairy. There are more long hairs and fewer short ones on plant L than on plant Q, also they appear to be of mixed lengths on plant L, but on Q the short hairs are of uniform length. The leaf of plant L is thicker than that of plant Q. True, they are

found only a few miles apart, but the scarp edge separates them". Differences there may be, but I cannot believe they are specific. Similarly I refer a plant received from America from Mr. Harvey Cox to this same species; it was thought to have come from near the Kenya border, but no exact locality was available. In cultivation its leaves have a marked yellowish-green colour and the veins are rather impressed above. I think we have, in Punter L & Q and Cox C, three recognizable stocks of the same species.

16. **Saintpaulia confusa** B. L. Burtt in Baileya, iv, 164 (1956); H. E. Moore, African Violets &c., 148 (1957).
TANGANYIKA: E. Usambaras. Cult. in hort. bot. reg. Kew, 1947 (holo. K). Ngua, Potwe track, near Amani, 900 m., 1938, comm. *Mrs. R. E. Moreau*, no. 1 (K) et cult. in hort. bot. reg. Kew, 1947 (K, E). Kwamkoro-Potwe, 1050 m., very locally common on damp gneiss rocks in stream bed in Cephalosphaera, Piptadenia, Ocotea, Polyalthia oliveri evergreen rain-forest, 3 Nov. 1940, *Greenway* 6050 (EA, K).

I do not feel that there is now much room for doubt in equating the wild material cited above with the species so long cultivated as *S. kewensis*. The wild plant, or Mrs. Moreau's introduction, differs from the old garden stock in having longer petioled more erect leaves and somewhat deeper flowers. There is, however, no specific difference, nor any that the taxonomist can appropriately recognize, although, as in other species, it may eventually prove desirable to give horticultural recognition to different strains.

17. **Saintpaulia grotei** Engl. in Bot. Jahrb. lvii, 202 (1921); H. Cox & E. Roberts in African Violet Mag. iii (3), 5 (1950); H. E. Moore, African Violets &c., 151 (1957).
TANGANYIKA: E. Usambaras. Near Amani, *Grote* 3708 (B—destroyed). Amani, on a rock near waterfall and cult. 2 Feb. 1939, *Mrs. Moreau* 6 (K). Mt. Mlinga, 1080 m., perennial creeping herb with purplish flushed leaves and pale mauve flowers, Aug. 1950, *P. J. Greenway* AH 10022 (EA—probably this species).

I received the type specimen of *S. grotei* on loan at Kew in 1939, and satisfied myself that the plant introduced by Mrs. Moreau was the same. Mr. Punter has also sent back *S. grotei*, his plants, obtained from the Amani Plant House, being presumably of the same stock as Mrs. Moreau's. Other plants in Mr. Punter's collection are more doubtfully referable to *S. grotei*, but they are all of Amani origin. I originally identified *Greenway* 4797 from between Kwamkoro and Kihuhwi as this species, but at the time of writing I have not a specimen to hand for confirmation. *Greenway* 7042, distributed as *S. grotei*, is referable to *S. pendula*.

Plants of *S. grotei* grown on the ground in the Nepenthes house at Edinburgh reacted to weak illumination by producing petioles up to 22 cm. long and peduncles in proportion.

18. **Saintpaulia amaniensis** E. Roberts in African Violet Mag. iv (2), 7 (1950); H. E. Moore, African Violets &c., 148 (1957).

TANGANYIKA: E. Usambaras. Near Amani, cult. Michigan State Coll., *E. P. Roberts* 2 (holo., Michigan, not seen); cult. in hort. bot. reg. Edin., comm. *E. P. Roberts*, C.1568 (E).

Evan Roberts distinguishes this species from *S. magungensis* by its having " crenate-dentate and ovate to ovate-elliptical instead of crenate orbicular leaves, two staminodes instead of three and glandular hair on the corolla margin ". The plants we have grown at Edinburgh from Roberts' material do not look to me like different species, and I retain *S. amaniensis* temporarily with considerable doubt. Variability in the development of staminodes has been discussed in the introduction. I do not find any flowers of *S. magungensis* without an occasional glandular hair on the margin of the corolla, nor any of *S. amaniensis* in which eglandular hairs are wholly absent. The two stocks are separable when grown as clones, but I doubt their separate entitlement to specific rank.

19. **Saintpaulia magungensis** E. Roberts in African Violet Mag. iii (4), 6 (1950); H. E. Moore, African Violets &c., 152 (1957).
TANGANYIKA: E. Usambaras. Magunga, cult. Michigan State Coll., *E. P. Roberts* 1 (holo., Michigan, not seen); cult. in hort. bot. reg. Edin., comm. *E. P. Roberts*, C.1569 (E). Mt. Mlinga, a perennial herb with creeping stems and green leaves, flowers dark blue, growing with AH 10022, 17 Aug. 1950, *P. J. Greenway* AH 10023 (EA); *ibidem*, cult. hort. bot. reg. Kew, comm. *P. J. Greenway*, fl. June 1950, ref. 298:48, No. 1. Kwamkuyu River, cult. hort. bot. reg. Kew, comm. *P. J. Greenway*, fl. June 1950, ref. 298:48, No. 2.

The difficulty of distinguishing *S. magungensis* from *S. amaniensis* has been mentioned under that species. It will be noticed that Dr. Greenway collected two Saintpaulias on Mt. Mlinga, one with green leaves and dark flowers (AH 10023) here determined as *S. magungensis*. The other, described as having purplish leaves and pale flowers (AH 10022), is possibly *S. grotei* but that determination requires to be confirmed by examination of fresh material. A thorough investigation in the field might yield useful evidence of the distinctness of these two species; or they might be deemed to be variants of one species. At present it seems that different species do not normally occur in the same station, but the actual degree of separation has not been precisely investigated and some may occur together. Field studies on these lines would be a great help to the taxonomist.

SPECIES EXCLUDENDA

Saintpaulia alba E. A. Bruce in Kew Bull. 1933, 475=**Linnaeopsis alba** (E. A. Bruce) B. L. Burtt, in Gard. Chron. 3 ser. cxxii, 23 (1947).

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