

The Genus *Crinum* in Southern Africa

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ABSTRACT

The 21 species of *Crinum* recognized in southern Africa are reviewed and illustrated, mostly in colour. Five of these were described by the author during the last two decades. A key to the species and notes on the history, diagnostic features and distribution in southern Africa are provided.

INTRODUCTION

Linnaeus described four species of *Crinum* in his *Species Plantarum*, 1753, and the following year the genus was defined in the 5th edition of his *Genera Plantarum*. The four species listed were *C. latifolium*, *C. asiaticum*, *C. americanum* and *C. africanum*. Because *C. latifolium* is the first in the list, Uphof (1942) considers it to be the type species. But Hitchcock & Green proposed *C. americanum* as the lectotype, in the *International Rules of Botanical Nomenclature*, p. 140, 1935, and Traub (1963) follows them. Linnaeus described *Crinum americanum* in his *Hortus Cliffortianus* in 1737 and this supports the choice made by Hitchcock and Green.

Of these four species described by Linnaeus, three belong to the genus as defined today, but *C. africanum* is now classified as *Agapanthus*.

For many years after the establishment of *Crinum* we find members of this genus being described among the assortment of Amaryllids under the name *Amaryllis*. In 1837 appeared the interesting and useful publication "Amaryllidaceae" by W. Herbert. He defined the genus *Crinum* satisfactorily and described 46 species and a number of varieties. These included several which had originally been described as species of *Amaryllis*. In addition to his descriptive or taxonomic work, The Honourable and Reverend William Herbert, Dean of Manchester, kinsman of the Earl of Carnarvon, cultivated Amaryllids in his famous garden at Spofforth and experimented with hybridization.

Fifty-one years later, in 1888, Baker's "Handbook of the Amaryllidaceae" appeared. J. G. Baker recognised 79 species and divided them into three subgenera. It is interesting to note that the two Linnaean species which have claim to being the type species, *C. latifolium* and *C. americanum*, fall into different subgenera as defined by Baker: *C. latifolium* in the subgenus *Codonocrinum*, defined as "perianth funnel-shaped, tube permanently curved; stamens and style contiguous, declinate", and *C. americanum* in the subgenus *Platyaster* with "perianth erect hypocrateriform, segments lanceolate; stamens spreading". The third subgenus is *Stenaster* "perianth erect hypocrateriform, segments linear; stamens spreading". If species are grouped according to these divisions, one finds an assortment of forms in each group, that is, while species agree in the diagnostic features, they may differ considerably in other respects. In addition, there are species which do not exactly fit into the definition of any of the three subgenera. For instance *C. campanulatum* and *C. moorei* are both listed by Baker and

subsequent authors in *Codonocrinum* but the one, *C. campanulatum*, has the lobes forming a distinct cup and the stamens not declinate, and *C. moorei* has subspreading lobes and declinate stamens. Because of the occasional odd forms found in this genus it seems advisable not to attempt any subdivisions.

Baker is also responsible for the revision of the genus *Crinum* in the *Flora Capensis* (1896) and *Flora of Tropical Africa* (1898). In South Africa only 8 species were recognised at the time and in tropical Africa 38.

In a most helpful article Uphof (1942) sums up the major and minor works on the genus and lists all the species described to that date, 130 in all, classifying them, where possible, under Baker's subgenera, with 15 unclassified species. Recent contributors to our knowledge of the genus are H. P. Traub and L. S. Hannibal, members of the Amaryllis Society of America. An example of the work of each of them is listed under the references Traub (1963) and Hannibal (1967). In South Africa a cytological study published by Van der Walt, Geerthsen and Robertson (1970), is of particular value because the material worked with was identified at this Institute (Botanical Research Institute). There have been some name changes since the paper was prepared but it is known to which species the names refer. For instance "*C. forbesii*" is the recently described *C. paludosum* and the "new species" has been described as *C. foetidum*.

DIAGNOSTIC FEATURES

The most striking feature about all species of *Crinum*, except *C. moorei*, growing in nature or cultivated in the open in South Africa is that leaves more than one year old have lost their tips by a clean cut. This is because the leaves die back to the base in the winter with the result that in spring the previous seasons leaves grow out again with truncate tips, while only a few leaves in the centre are new and have their apices intact. This is not the case in *C. moorei* where all the leaves in a season are intact and the many leaf-scars on the false stems show no sign of growing out for a second year. In this connection it is illuminating to read Hannibal's observations (1967) which in effect state that the leaves of *Crinum* species from semi-arid areas are slow growing and take three years to reach maturity whereas the leaves of *C. moorei* from "heavier rainfall areas with dry seasons" mature in one year. The leaves of all *Crinums* are rosulate or rarely distichous (but not biflabellate), and definitely sheathing at the base. They vary in colour, width, ciliation and texture. The solid scapes are short or long and naked except for two terminal spathe-valves. The umbels bear from 1 to 40 flowers which may be subsessile

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or pedicellate and the fruit in some species is beaked by the persistent base of the perianth-tube. The length of the tube, the form in which the segments are arranged and whether they are keeled with red or not, are of specific significance and possibly to a lesser extent, the length of the peaked apices of the segments. This peak is formed by the true apex being introrse and forming a peak like a dunce's cap. This false apex or peak may be short and blunt in some species or long and pointed in others. Another interesting feature is the way the flowers fade. In some species they turn brown and in others red. The tunicated bulbs are usually large and they either narrow gradually toward the apex or abruptly into a short or long neck. In some cases the neck, formed by the sheathing bases of the leaves, elongates into a short, up to 60 cm long, leafy stem-like structure, and in one species, *C. moorei*, this structure grows quite tall and the leaf-bases harden and thicken forming a false stem leafy only in the upper portion. This species is also unique in South Africa in having ensiform leaves that do not grow out for a second year and they have an indication of a midrib. In all *Crinum*s the seed-coats of the large, more or less globose seeds are impervious to water and an analyses of the seed by Isaac and McGillivray (1965) has shown that the water content is very high. This accounts for a peculiarity of the genus, namely that the seeds germinate readily without water and in the driest conditions. It also supports the claim (Hannibal, 1967) that the seeds are dispersed by water. The seed coats are usually smooth and only in one species, *C. foetidum*, have they been found to be papillate. A feature observed by Herbert (1837) is that the ovary, which is situated between the pedicel and the perianth tube is "thickest in the middle". In some species new bulbs form prolifically round the mother bulb.

DISTRIBUTION

The genus is found in the tropics of Asia, Africa and America and extends into the temperate regions of both hemispheres: in the south to South Africa and Australia and, in the north, to Japan in the Old World and the southern regions of the U.S.A. in the New World. Over 150 species have been described but this number may be much reduced when the genus is studied as a whole. Over half the number are from Africa. In South Africa plants are found sparsely on mountain- or hill-slopes with a concentration in low lying areas, on river banks and at the coast. Some species flourish in marshes and pans.

AUTHOR'S NOTE

It is regretted that this account deals only with the southern African representatives. Species of *Crinum*, as in many other genera, are difficult to assess from dried specimens or from descriptions, unless the diagnostic features are known. In order to establish such features the living plants in their natural habitat have to be studied. Throughout many years, working at endless identifications in the National Herbarium, I have, from time to time, been faced with the problem of identifying a *Crinum*. Each case required investigation, first to know the plant in nature and something of its distribution and then to search literature, old and new, for its correct name. So that, by final retiring time, it seemed logical to publish the data so far collected in order that future taxonomists may extend the study to the rest of the genus. This may result in name changes as far as specific epithets are concerned, for the

distribution of the species may be much wider than our present records show. In the notes under some species a possible relationship with an extra South African species is mentioned. However it is my hope that a future reviewer will resist the modern tendency to make drastic changes at the generic level. It is conceivable that each reviewer will in turn redefine sections of this genus and possibly include its three related African genera, *Amaryllis*, *Ammocharis* and *Stenolirion* in the rearrangement. It has not been possible to place all our species in the subgeneric divisions that exist because of intermediates and anomalies. It seems wiser therefore to draw attention to the distinctions but not to erect watertight compartments for them.

REFERENCES

- BAKER, J. G., 1888. *Bak. Handb. Amaryll.* London: George Bell & Sons.
 BAKER, J. G., 1896. *Amaryllidaceae. Fl. Cap.* 6: 171-246.
 BAKER, J. G., 1898. *Amaryllidaceae. Fl. Trop. Afr.* 7: 376-413.
 HANNIBAL, L. S., 1967. Evolution of *Crinum*. Paper presented at the Rhodesian Scientific Congress May, 1967. Not yet published?
 HERBERT, W., 1837. *Herb. Amaryll.* London: James Ridgeway & Sons.
 ISAAC & MCGILLIVRAY, 1965. A Note on the Water-storing Seeds of Two Species of *Crinum* and of Some Other S.A. *Amaryllidaceae. Ann. Bot. n.s.* 29:739.
 TRAUB, H. P., 1963. *The Genera of Amaryllidaceae.* California: The American Plant Life Society.
 UPHOF, J. C. T., 1942. A Review of the Species of *Crinum. Herbertia* 9: 63-84.
 VAN DER WALT, E. L., GEERTHSEN, J. M. P. & ROBERTSE, P. J., 1970. 'n Sitogenetiese Studie van die genus *Crinum* Linn. in Suid-Afrika. *Agroplantae* 2: 7-14.

CRINUM

Crinum L., Sp. Pl. 291 (1753); Gen. Pl. ed. 5: 141, No. 366 (1754); Herb., *Amaryll.* 242 (1837); Benth. & Hook.f., Gen. Pl. 3, 2: 726 (1883); Bak., *Handb. Amaryll.* 74 (1888); Fl. Cap. 6: 198 (1896); Fl. Trop. Afr. 7: 373 (1898); Phill., Gen. ed. 2: 203 (1951); Uphof in *Herbertia* 9: 63 (1942); Traub, the *Genera of Amaryllidaceae* 60 (1963). Type species: *C. americanum* L.

Ammocharis sensu Miln-Redhead & Schweick. in *J. Linn. Soc.* 52: 170 (1939), partly, as to *A. baumii*.

Herbaceous plants with large tunicated bulbs which are sometimes produced into a neck or rarely into a false stem made up of the indurated sheathing bases of the old leaves; in some species new bulbs are readily produced laterally. *Leaves* linear, lorate or ensiform, sheathing at the base, rosulate or distichous (but not biflabellately spreading) often dying back in the winter, the previous season's leaves growing out again in spring with a few new leaves in the centre. *Inflorescence* arising laterally, umbellate, 1-many-flowered; peduncle solid; spathe-valves 2; bracteoles at base of each flower narrowly linear. *Flowers* subsessile or pedicelled; perianth-tube long; segments linear to broadly lanceolate, the inner slightly broader than the outer, spreading or connivent into a campanulate or trumpet shape. *Stamens* inserted in the throat of the perianth-tube; filaments arcuate, ascending or declinate; anthers versatile. *Ovary* inferior, obvious as a swelling between the apex of the pedicel and the base of the perianth tube, turbinate. *Fruit* subglobose, bulging with the large seeds, eventually bursting irregularly to release the subglobose seeds, sometimes beaked with the persistent base of the perianth-tube. *Seeds* subglobose.

A genus with over 130 species described. Distributed throughout the tropics and warm temperate regions of the Old and New Worlds. The largest number of

species are found in Africa. There are 21 species in South Africa, occurring in all the provinces but absent from the Peninsula.

Key to species

- Perianth-tube straight, cylindrical; segments narrow, mostly under 8 mm wide, spreading abruptly and recurving; stamens not declinate:
- Dwarf species; inflorescence under 20 cm high:
- Umbel 1–2-flowered; perianth-tube about 12 cm long.....1. *C. baumii*
 Umbel about 7-flowered; perianth-tube about 2 cm long.....2. *C. nerinoides*
- Inflorescence over 20 cm high; umbels many-flowered; buds cernuous:
- Leaves distichous; plants grow in dry areas.....3. *C. buphanoides*
 Leaves rosulate; plants usually grow in marshy country.....4. *C. crassicaule*
- Perianth-tube usually curved outwards; segments broad, mostly over 1 cm wide, conniving into a cup, funnel or trumpet shape:
- Leaves distichous.....5. *C. euchrophyllum*
 Leaves rosulate:
- Leaves with a longitudinal thickened line suggestive of a midrib:
- Perianth segments subspreading or forming a wide (loose) funnel, white or pink (without a red keel); plants with a stem-like structure, leafy in the upper portion; leaves broad, ensiform....10. *C. moorei*
 Perianth segments closed to form a trumpet shape, nodding, distinctly keeled with red; leaves long acuminate.....11. *C. kirkii*
- Leaves without a midrib:
- Perianth segments shallowly cup-shaped in the lower half, upper half subspreading, suffused with rose; stamens not declinate; plants growing in marshes or pans.....6. *C. campanulatum*
- Perianth segments deeply cup-shaped or funnel- or trumpet-shaped; stamens declinate:
- Open flowers suberect, segments predominantly white; plants growing in marshes or pans:
- Median leaves up to 5 cm broad measured shortly above the base, flaccid, somewhat glaucous green; flowers up to 7 in an umbel.....7. *C. paludosum*
- Median leaves under 2 cm broad above the base:
- Leaves firm, suberect, U-shaped in cross section.....8. *C. rautanenianum*
 Leaves flaccid, spreading, shallowly canaliculate.....9. *C. carolo-schmidtii*
- Open flowers spreading horizontally and then becoming nodding:
- Peduncle short, 4–15 cm long, rarely slightly longer; umbel 1– rarely 2-flowered:
- Leaves stiff, erect, about 10 mm broad, canaliculate, finely toothed on the margin....12. *C. acaule*
 Leaves flaccid, narrow, 3 mm broad, smooth on the margins.....13. *C. minimum*
- Peduncle 15–90 cm long, umbels few to many flowered:
- Perianth-tube short, about 3 cm long, shorter than the segments:
- Leaves grass-green, rather stiff; perianth becoming pink as it fades:
- Leaves up to 2 cm broad; pedicels 0–2, 5 cm long.....14. *C. lineare*
 Leaves up to 5 cm broad; pedicels up to 5 cm long.....15. *C. variabile*
- Leaves glaucous-green, flaccid, usually undulate, spreading at ground level; perianth becoming light brown as it fades.....20. *C. macowanii*
- Perianth-tube long, 7 cm or more long, segments about as long or shorter than the tube:
- Leaves comparatively few, about 11, broad, up to 15 cm broad, spreading along the ground:
- Leaves blue-green (not glaucous), rather thin; perianth predominantly white with long acuminate segments.....16. *C. foetidum*
- Leaves dark or grass green, rather thick; perianth with a distinct purplish-pink keel or suffused with purplish-pink; segments not acuminate:
- Peduncle up to 30 cm long; pedicels short, up to 2 cm long; perianth-tube persisting like a beak on the fruit.....17. *C. graminicola*
- Peduncle up to 60 cm long or more; pedicels up to 7 cm long; perianth-tube dying back to a short crown on the fruit.....18. *C. delagoense*
- Leaves many, rarely few but then not spreading along the ground but suberect with the upper portion arching downwards:
- Leaves narrow, the majority under 3 cm broad at the middle:
- Leaves strongly undulate at first and spreading, the inner suberect and not undulate, margins finely ciliate-dentate; perianth-segments forming a rather wide trumpet shape with revolute apices; old flowers drying brown; fruit beaked....19. *C. lugardiae*
- Leaves never undulate, suberect, margins smooth; perianth-segments spreading at the apex, old flowers drying reddish; fruit not beaked; plants restricted to the eastern Cape coastal region.....14. *C. lineare*
- Leaves broad, the majority over 5 cm broad at the middle:
- Perianth-segments forming a wide trumpet shape; anthers black showing up on the white inside; old flowers drying brown; fruit beaked; new leaves few in the centre.....20. *C. macowanii*
- Perianth-segments forming a narrow trumpet shape; anthers grey or brown; old flowers drying pink or red; fruit not beaked; new leaves many....21. *C. bubispenmum*

1. *Crinum baumii* Harms in Warb., Kunene—Samb. Exped. 199 (1903); Verdoorn in Flow. Pl. Afr. 36: t.1432 (1964); Sölch in Prodr. Fl. S.W.Afr. 150: 6 (1969). Type: Angola, Chirumbu, Baum 273.

Ammocharis baumii (Harms) Milne-Redhead & Schweick. in J. Linn. Soc. Bot. 52: 187 (1939).

Bulb 2–5 cm long, abruptly narrowed into a neck 1–5 cm long, covered entirely with chartaceous tunics produced at the apex to surround the new leaves at the base. *Leaves* rosulate, about 6, erect, canaliculate, 9 cm long, or longer, 2 mm broad. *Peduncle* terete, green, erect, 3–6 cm long. *Spathe-valves* 3–5 cm long, about 5 mm broad at the base. *Umbel* 1–2-flowered; pedicels 0–5 mm long. *Perianth* white turning pink; tube slender, erect, about 12 cm long; segments white with a deep rose keel, abruptly spreading, revolute, linear, 5 cm long, 5 mm broad. *Stamens* arcuate, ascending; filaments white turning rose, about 4 cm long; anthers about 7 mm long. *Ovary* green, about 5 mm long, 4 mm broad. *Fruit* subglobose, tinged with red, about 15 mm diam, with an apical crown (not beaked). PLATE 1.

Grows in the flood plains of rivers. Recorded from South West Africa and Angola.

S.W.A.—1719 (Rundu): about 5 km S. of Rundu (–DD), *De Winter* 3774.

This charming *Crinum* was collected by Dr. B. de Winter in the flood plains of the Okavango near Rundu. It was locally common and grew in deep white sand. Besides the type collection which is from near Chirumbu, Angola, “in damp soil” along the Kubango, only one other record exists, recorded by Milne-Redhead & Schweickerdt (1939) but has not been seen by me. It is from Huilla which lies in the drainage basin of the Kunene River, and was collected at the Gambos Mission Station by F. Newton, the Portuguese naturalist, who collected in Angola and on St. Thomas Island.

When Milne-Redhead and Schweickerdt transferred this species to *Ammocharis* they expressed some uncertainty because they did not know whether the ar-

range of the leaves was bilabellate or not (bilabellate arrangement is one of the diagnostic features of *Ammocharis*). In our growing plants it was obvious that the leaves were rosulate. Whether this alone is sufficient to separate *Crinum* from *Ammocharis* has not yet been determined. As long as one has the species well defined it seems of little real consequence. Here the original classification is followed.

2. *Crinum nerinoides* Bak. in Bull. Herb. Boiss. ser. II, 3: 666 (1903); Milne-Redhead & Schweick. in J. Linn. Soc. 52: 189 (1939), as a doubtful species of *Ammocharis*; Sölch in Prodr. Fl. S.W. Afr. 150: 3 (1969) as a doubtful species of *Ammocharis*. Type: Herero-land, Dove s.n. (Z).

Bulb 2,5 cm long, produced into a short or long neck, 2–3,5 cm broad, tunics produced at the apex to cover the base of the leaves and peduncle. *Leaves* about 5, narrowly linear, 5–15 cm long, about 0,2 cm broad, apex of outer leaves truncate (leaves having grown out after dying back). *Peduncle* 4–10 cm long, slender. *Spathe-valves* 3–4 cm long. *Umbel* 3–7-flowered; pedicels 1–2 cm long. *Perianth* “pink”, “deep rose”; tube slender, straight, 1–2,5 cm long; segments eventually spreading and revolute in the upper quarter, about 3,5–4,5 cm long, 0,4–0,6 cm broad. *Stamens* arcuate erect, filaments about 3–3,5 cm long. *Ovary* about 5 mm long, 3 mm diam. *Fruit* not seen. FIG. 1.

Grows in “loamy soil on the edge of a pan” in “flooded limestone”. Recorded from the Grootfontein and Gobabis district of South West Africa.

S.W.A.—Hereroland, without precise locality, Dove s.n. (Z). 1917(Tsumeb): Farm Heidelberg (–BB), W. & E. Walter 331, sub. WIND 382. 2218 (Gobabis): Witvlei (–AD), Mason & Boshoff 2516.

This species, like *C. baumii*, is known in herbaria from very few gatherings. In addition to the type, only three specimens have been collected and all within the last two decades. From the notes on these specimens one gathers that the plants are restricted to groups around limestone pans.



FIG. 1.—*Crinum nerinoides*, a pressed specimen in the Windhoek Herbarium, Walters 331 from near Tsumeb, South-West Africa.



PLATE 1.—*Crinum baumii* Harms. From Flowering Plants of Africa, Vol. 36, Pl. 1432 (1964).

3. *Crinum buphanoides* Welw. ex Bak. in J. Bot. Lond. 16: 195 (1878); Bak., Handb. Amaryllid. 80 (1888); Fl. Trop. Afr. 7: 398 (1898); Verdoorn in Flow. Pl. S.Afr. 23: t.887 (1943); Sölch in Prodr. Fl. S.W. Afr. 150: 6 (1969). Type: Angola. Pungo Andongo, Welwitsch 4016.

C. leucophyllum Bak. in Bot. Mag. t.6783 (1884). Type: Damaraland, without precise locality, Een s.n., cult. Kew.

Bulb large, about 15 cm diam., produced into a neck of varying lengths. Leaves light green, distichous, sheathing at the base, forming a leafy false stem up to about 30 cm high, the lowest the broadest, up to 15 cm broad, each successive leaf above narrower, the uppermost (the youngest), about 1 cm broad, margins ciliate with minute cartilaginous teeth. Peduncle lateral stout more or less 45 cm long, 2,5 cm broad and 1,5 cm thick. Spathe-valves about 10 cm long, 3,5 cm wide at the base, reflexed; bracteoles white, narrowly linear,

about 5 cm long. Umbel 13–40-flowered. Pedicels 1,5–4,5 cm long. Perianth with a long slender tube, 7–10 cm long; segments white to pink, usually with a deep red keel, narrow and spreading abruptly, recurved, about 6,5 cm long, usually under 1 cm wide, lower portion with infolded margins covering the basal portion of the filaments, peaked apex usually under 5 mm long, reflexed apex bearded. Stamens arcuate erect, filaments rose in the upper portion. Style deep rose in the upper part. Fruit not seen. FIG. 2, 3, 4.

Grows in deep sand or loam in dry areas. Recorded from the northern regions of South West Africa, and the northwestern, northern central and eastern Transvaal. Also occurs in Ngamiland and Angola.

S.W.A.—1715 (Ondangwa): 19 km E. of Ondangwa (—BC), De Winter & Giess 6927. 1821 (Andara): Island opposite Shitangadimbo Camp, De Winter & Marais 4801. 2115 (Karibib): Omaruru (—BD), Barnard 59. 2215 (Trekopje): Onanis (—DD), Hardy & De Winter 1402.



FIG. 2.—*Crinum buphanoides*, showing the distichous leaves, grown in Pretoria, originally from Elmeston, N.W. Transvaal (Codd 2124).

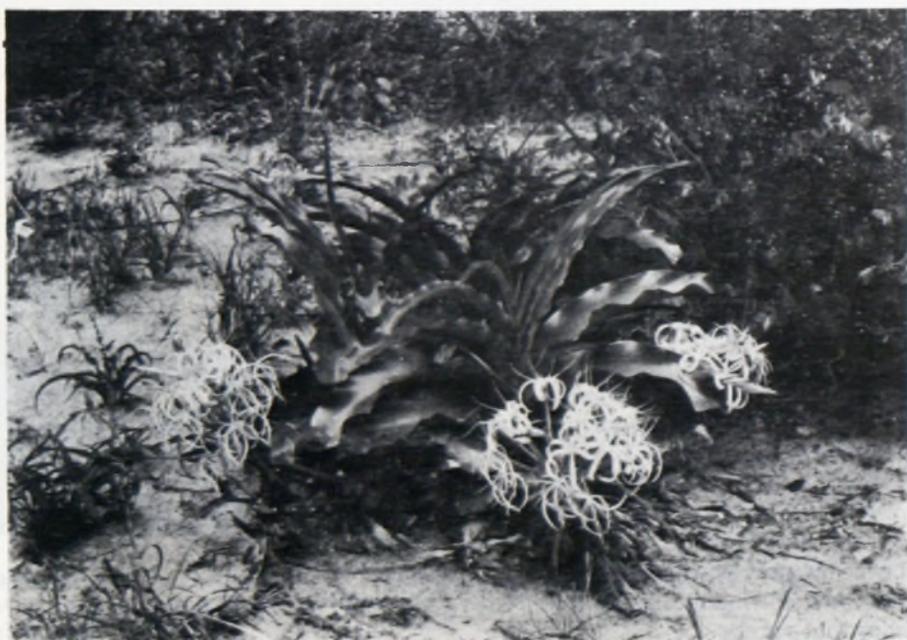


FIG. 3.—*Crinum buphanoides*, near Francistown. Photo by Herbert Lang.

TRANSVAAL.—2229 (Waterpoort): Eyem, north of Blaauwberg (-CC), *Obermeyer, Schweickerdt & Verdoorn* 86. 2230 (Messina): Messina, *Pole Evans sub PRE 13121A*. 2231 (Pafuri): Punda Milia (-CC), *Lang sub TRV 32276*. 2327 (Ellisras): Elmeston (-DC), *Codd & Erens 2124*. 2328 (Baltimore): 32 km N. of Potgietersrust (-DD), *Galpin 11580*. 2330 (Tzaneen): Baiandbai (-BB), *Lang sub TRV 32255*; 24 km from Duiwelskloof on the Louis Moore Mine road, (-CA), *Thompson s.n.* 2427 (Thabazimbi): 32 km N.W. of P.O. Rooiberg on road to Krantzberg (-DA), *Codd & Erens 2071*. 2428 (Nylstroom): banks of the Palala River near Naboomspruit (-DA), *Galpin 14665*; 24 km N.E. of Naboomspruit on road to Potgietersrust (-BD), *Reynolds 4049*. 2431 (Acornhoek): Tshokwane (-DD), *Van der Schijff 1422*; Sabie River, Skukuza (-CD), *Stevenson-Hamilton s.n.* 2528 (Pretoria): Rust de Winter (-BA), *Codd 6229*. 2531 (Komatipoort): 9 km N. of Malelane (-BC), *Codd 5509*; 15 km W. of Skukuza (-AA), *Codd 5700*; Lower Sabie (-BB), *Lang in TRV 30409*; Barberton (-CC), *Williams in TRV 6227*; *Thorncroft in TRV 13428*; *Ellers s.n.*; Klokwane (-AD), *Van der Schijff*; between Klokwane and Mhamban (-AD), *Van der Schijff 3252*; 3946; Gomondwane (-BD) *Van der Schijff 4029*.



FIG. 4.—Bulb of *Crinum buphanoides* from near Krantzberg, Transvaal.

The clearly distichous arrangement of the leaves is unusual in South African species of *Crinum*. This feature is not obvious from most herbarium specimens, that is if there are no photographs of the growing plant attached or if the collector has not made a note about the leaf arrangement. In the original description there is no mention of distichous leaves and our concept of the species is based on a specimen named at Kew in 1935 (*Obermeyer, Schweickert & Verdoorn* 1937). From the Botanical Magazine Plate, No. 6783, and from the origin of the specimen figured, Damaraland, there can be little doubt that *C. leucophyllum* is synonymous. For the features by which to distinguish *C. buphanoides* from the following species, *C. crassicaule*, see the notes under that species.

4. *Crinum crassicaule* Bak., *Handb. Amaryll.* 85 (1888); N. E. Brown in *Kew Bull.* 1909: 142 (1909) partly, excluding the description and *Lugard* 45; Verdoorn in *Bothalia* 10: 57 (1969), in notes under *C. foetidum* n. sp. Type: Ngamiland, Koobie, *Chapman s.n.*, painted by Baines (K, holo.: PRE, photo.).

Bulb large, more or less 24 cm long, 14 cm diam., narrowing at the apex into a rather thick neck about 7 cm diam. and varying in length. *Leaves* rosulate, the lower spreading from near the base, arching downwards, the new entire leaves in the centre few, suberect, tapering towards the apex, median leaves about 7 cm broad; margins with a thin cartilaginous border and small, fairly widely spaced, cartilaginous hairs. *Peduncle* lateral about 50 cm long, 2–3 cm broad, 1,3 cm thick, often tinged purplish brown. *Spathe-valves* fading soon and reflexed, about 7 cm long 2 cm broad at the base; bracteoles narrowly linear, white, about 4 cm long. *Umbel* 8–16-flowered. *Pedicels* 1,3–4 cm long. *Perianth* with a long slender tube 9–15 cm long, usually tinged brownish purple, buds erect at first, then cernuous and as the flower opens erect again; segments spreading abruptly and reflexed from the base; white or pale pink on the surface with a dorsal purplish or brownish red band down the centre, 5,5–8 cm long, 1–1,3 cm broad in the upper two thirds with the peaked apex usually over 5 mm long and green. *Stamens* arcuate erect (not declinate); filaments a brilliant maroon red in upper two thirds. *Style* brilliant red. *Fruit* not seen. PLATE 2; Fig. 5.

Found in or near river swamps. Recorded from the Caprivi Strip. Also from the Okavango swamps in Ngamiland and along the Mashi River in Barotseland.

S.W.A.—1724 (Katima Molilo): Mpola, 24 km from Katima Molilo on road to Ngoma, *Killick and Leistner 3296*. 1821 (Andara): on the Okavango River N. of Mohembo, *Renew s.n., cult. PRE, G.N. 22574; 22575*.



FIG. 5.—*Crinum crassicaule*, showing leaves not distichous and fading flowers with segments hanging down. Originally from the Caprivi Strip (*Renew* G.N. 22575).



PLATE 2.—*Crinum crassicaule* Bak. From the Caprivi Strip, grown in Pretoria (Killick & Leistner 3296).



PLATE 3.—*Crinum euchrophyllum* Verdoorn. From Flowering Plants of Africa, Vol. 42, Pl. 1642 (1972).



FIG. 6.—Bulbs of *Crinum crassicaule* from Nangweshi, Barotseland. Photo by Dr. L. E. Codd.

The interesting features observed on the growing plants, among which were specimens collected by L. E. Codd in Barotseland, are not obvious on herbarium specimens. The young buds are stiffly erect. One inflorescence observed commenced with 4 such buds and seemed to bear out Baines's remarks: "the pedicels are arranged not in a circle but four lozengewise in the centre then a row of four on each side etc.". The second stage finds the much elongated tubes and larger buds (but still closed) cernuous. Next, as the flowers open they become erect again and the segments spread and rapidly become reflexed from the base, not arcuate recurved as in *C. buphanoides*. In the meantime, the following series in the same umbel were going through the same three stages. The segments of the flowers are slightly broader than those of *C. buphanoides* and the peaked apices somewhat longer.

Besides the differences in degree mentioned above and the rosulate arrangement of the leaves this species differs from *C. buphanoides* in distribution and habitat. *C. buphanoides* grows in the dry areas of the Transvaal, Botswana, S.W. Africa and Angola whereas our species grows in swamps. It has been recorded from the drainage basin of the Okavango and the Zambesi. A future reviewer of the genus should investigate *C. subcernuum* Bak. from the Zambesi delta. This could be our species and since it was described in 1881 would be the correct name for it.

5. *Crinum euchrophyllum* Verdoorn in Flow. Pl. Afr. 42: t. 1642 (1972). Type: South West Africa, eastern Caprivi, McFerren sub PRE 31940 (PRE, holo.).

Bulb subglobose, about 7 cm long, 6 cm diam., narrowed into a neck. Leaves distichous, about 12, glaucous, flaccid, arcuate, canaliculate, the median about 70 cm long, 2.5 cm broad near the base, width increasing in the lower leaves to about 4 cm broad at the base, narrowing towards the apex, margin with fairly sparse, minute cartilaginous teeth. Peduncle erect, about 30 cm long, slightly laterally compressed, 1.5 cm broad. Spathe-valves erect, about 8 cm long, 2 cm broad at base, narrowing towards the apex. Umbel 1–2-flowers opening one at a time, buds at first erect then spreading, open flower suberect, white, as it matures it becomes spreading to cernuous and turns a deep rose colour. Pedicels 0–5 mm long. Perianth with a tube about 11 cm long; lobes with a faint rosy

keel, conniving to form a rather wide funnel shape, 10 cm long, the outer about 2 cm wide in the centre, inner about 3 cm wide. Capsule not beaked. Seeds subreniform, pale green, smooth. PLATE 3, FIG. 7, 8, 9.

Found in areas subject to annual flooding. Recorded from the eastern Caprivi.



FIG. 7.—*Crinum euchrophyllum* showing the distichous leaves and 1-flowered umbel.

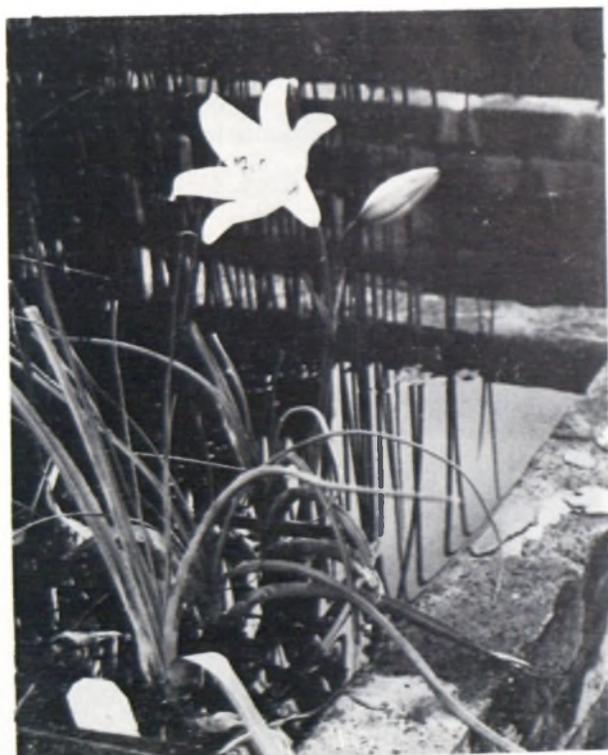


FIG. 8.—*Crinum euchrophyllum* with a 2-flowered umbel



FIG. 9.—Bulb of *Crinum euchrophyllum*, grown in a pot.

S.W.A.—1723 (Singalamwe): eastern Caprivi, *McFerren*, cult. *PRE*, *G.N.* 22582; *McFerren* sub *PRE* 31940.

The most striking feature of this species is the distichous, gracefully arching leaves which are covered with a very fine bloom giving them a pleasing silvery gray colour. The flowers, opening one at a time, are short-lived and strikingly beautiful. When open the single flower is suberect and a glistening white. As it closes it becomes spreading and turns a deep rose colour or, under some conditions, only faintly pink.

6. *Crinum campanulatum* *Herb.* in *Bot. Mag.* sub. t.2121 (1820); *Amaryll.* 270 (1837); *Bak.*, *Handbook.* *Amaryll.* 92 (1888); *Fl. Cap.* 6: 200 (1896); *Uphof* in *Herbertia* 9: 81 (1942); *Verdoorn* in *Flow. Pl. Afr.* 37:

t.1455 (1965). Type: Bathurst district, between Kafir-drift and Blaaukrantz, *Burchell* 3785.

C. aquaticum *Burch. ms.*; *Herb.* in *Bot. Mag.* t.2352 (1822), nom. illeg.

Bulb fairly small, about 7 cm long, 4 cm diam., narrowing into a neck 5 cm or more long, producing new bulbs laterally. *Leaves* linear, from 50 cm to over 1 m long, 14–25 mm wide near the base, canaliculate above, margins with a narrow cartilaginous edge and sparsely ciliate with cartilaginous hairs. *Peduncle* lateral, 30 cm or more long, about 1 cm broad near the base, 7 mm thick. *Spathe-valves* up to 6 cm long, overlapping in the lower half to appear united and encasing the bases of the flowers, (not early reflexing); bracteoles narrowly linear. *Umbel* few-flowered, 4–7-flowered; pedicels 1–4, 5 cm long. *Perianth* with a cylindrical, crenuous tube, crateriform at the apex, and about 5 cm long; segments 4–5 cm long, 1,5–2 cm broad in the middle conniving to form a shallow cup in the lower half with only the apices spreading to somewhat recurved, white, mottled or suffused with shades of rose, becoming deep rose as they mature, usually with a green eye in the centre within. *Stamens* equally disposed, subarcuate erect, faintly suffused with rose. *Style* eventually overtopping the stamens, stigma capitate. *Fruit* subglobose, about 2,5 cm diam., not beaked. PLATE 4; FIG. 10.

Found in periodic marshes, vleis or pans in the eastern Cape. Recorded from the Alexandria, Albany, Bathurst, and East London districts.

CAPE.—3227 (Stutterheim): near Fort Jackson (–DC), *Dodd* in *Herb. Galpin* 7957. 3326 (Grahamstown): Bathurst district, *Sidey* 3337; Albany district, *Story s.n.*; *Prior*; *s.n.* Grahamstown Flats, *Galpin* 7958; Waiheuwel turn off on Salem-Alexandria road (–CB) *Archibald* 5370; 9 km S.E. of Salem (–DA), *Acocks* 23289; Jagersdrift (–DA), *Zeyher s.n.*; 5 km from Shaw Park on Fish River road (–DB), *Wells & Dyer* 2888; Bathurst (–DB), *Comins* 2850.

This species which, in some respects, is unique among the South African *Crinums* and, as far as can be judged, among the tropical species as well, is restricted in its distribution to the eastern Cape. It is found in fairly permanent marshes near the coast from Alexandria to East London and further inland, for



FIG. 10.—*Crinum campanulatum*, in a vlei in the Bathurst District, eastern Cape Province. Photo by Dr. R. A. Dyer.



PLATE 4.—*Crinum campanulatum* Herb. From Flowering Plants of Africa, Vol. 37, Pl. 1455 (1965).



PLATE 5.—*Crinum rautanenianum* Schinz. From Flowering Plants of Africa, Vol. 42, Pl. 1643, (1972).

instance north of Grahamstown, in vleis or pans which are flooded for short periods only. The bulbs survive the long dry season in hard-baked soil.

The features in which this species is unique are the equally disposed stamens, that is they are not declinate, combined with broad perianth-segments that form a cup not a funnel. This combination would exclude it from the three subgenera described but, probably on account of the curved perianth-tube, Baker, the author of the subgenus places it in *Codonocrinum* where together with the curved tube the stamens are declinate and the perianth funnel-shaped.

7. *Crinum paludosum* Verdoorn in Flow. Pl. Afr. 39, t.1523 (1968). Type: Natal, Ingwavuma, Opon-dwini stream, Codd & Verdoorn 10297 (PRE, holo.).

C. forbesii sensu Van der Walt in Agroplantae 2, 1: 8 etc. (1970).

Bulb subglobose, 5–20 cm diam., narrowing more or less gradually into a long neck. *Leaves* lorate, light green with a slight metallic sheen, flexuous, arcuate, somewhat undulate, the median 3–5 cm broad, new leaves in the centre few, margin with a very narrow cartilaginous border and obscurely to clearly ciliate with short cartilaginous hairs. *Peduncle* usually 20–55 cm long, 1–2 cm diam. *Spathe-valves* 6–8 cm long, 2–2.5 cm broad at the base, soon withering and reflexing. *Umbel* 5–11-flowered. *Pedicels* 0–10 mm sometimes longer in fruiting specimen. *Perianth* with the cylindrical tube 9–12 cm long; segments from pure white to delicate pink, drying to a deeper pink, sometimes keeled or striped with pale, to deep pink, in open flower suberect, slightly spreading, apical portion not recurved or only slightly so, 8–10 cm long, 1.3–3 cm broad in the middle, apical peak short, about 3 mm long. *Stamens* declinate, white turning pink in the upper half. *Style* crimson in the upper half, stigma 3-lobed, about 2 mm diam. *Fruit* not beaked, about 3.5 cm diam; seeds reticulate. PLATE 5; FIG. 11, 12.

Grows in pans, vleis or periodic streams. Recorded from South West Africa eastwards through Botswana

to the western and central Transvaal and Zululand. (Possibly in Swaziland too but not yet confirmed, see Compton 2974).

S.W.A.—2417 (Mariental): Sandhof (–CA), Giess 9109.

TRANSVAAL.—2427 (Thabazimbi): Vaalpenskraal, about 65 km N.W. of Thabazimbi (–AC), Verdoorn 2494; 2496. 2428 (Nylstroom): almost 5 km N.E. of Naboomspruit (–BD), Verdoorn 2469; Dyer 5853; 5854; about 9 km S.E. of Naboomspruit (–DB), Codd & Verdoorn 10380; between Crecy and Naboomspruit (–DB), Meeuse 9445. 2528 (Pretoria): 14 km W. of Pienaarsriver Station on road to Makapanstad (–CA), Tölken 1275.

NATAL.—2632 (Bella Vista): Ingwavuma-Ndumu Road (–CC), Strey 3766; Vaze Swamp (–DC), De Winter & Vahr-meyer 8595. 2731 (Louwsburg): E. of Pongola (–BC), McNeil 100; 101; 4.5 km E. of Pongola Poort (–BC), Dyer & Verdoorn 5840.

This species, which makes a striking show in pans, marshes and along watercourses, was recently investigated in Zululand. When the diagnostic features were established it was found to have a much wider distribution than at first thought, occurring at intervals across the Continent from east to west, following the main rivers. It proved to be conspecific with specimens collected in Botswana over 40 years ago (see photo) which I had named from description as “probably *C. rautanenianum* Schinz”. An examination of the type of the latter species showed it to be distinct. For the features by which to distinguish it see under that species. It seemed possible, too, that because the flowers are often of a “delicate pink colour”, and because it is recorded by Exell in *Kirkia* 1: 333 (1941) that Forbes dug up “*Amaryllidaceae*” bulbs along a branch of the Tembe river which runs parallel with the Pongola, that it could have been the plant which Lindley described (see *Trans. Hort. Soc.* 6, 1: 87, 1825) and called *Amaryllis forbesii*, but other considerations ruled this out and the species was finally described as new.

C. paludosum is characterised by the gracefully arching leaves, described by a collector as “like young mealies”, the suberect, predominantly white flowers which are suffused to a greater or lesser degree by pale pink, and the conspicuous crimson stigma.



FIG. 11.—*Crinum paludosum*, in a pan near Lake Makariki, Botswana. Photo by Herbert Lang.



FIG. 12.—Bulbs of *Crinum paludosum* from Mosdene, near Naboomspruit.

Mention is made of this species in an article by J. Freidberg in *Landbouweekblad*, 4th May, 1971. Here the value of the species as a cattle feed, in the dry S.W. African country, is reported. The leaves are said to be browsed for several months after flowering.

8. *Crinum rautanenianum* Schinz in Bull. Herb. Boiss. 4, App. III: 48 (1896); Bak. in Fl. Trop. Afr. 7: 402 (1898); Sölch in Prodr. Fl. S.W. Afr. 150: 8 (1969);

Verdoorn in Flow. Pl. Afr. 42: t.1643 (1972). Type: Olukonda, Schinz 822 (Z, holo.; PRE, photo.).

C. rautanenianum Schinz in Dur. & Schinz, Consp. Fl. Afr. 5: 250 (1895), nomen nudum; Uphof in Herbertia 9: 82 (1943).

Bulb about 7 cm long, 6 cm diam., narrowed into a neck at the apex. *Leaves* suberect to erect, rather firm, 1,5–3 cm broad at the base, narrowed gradually but perceptibly towards the apex, about 1,5 mm broad at the middle, and becoming deeply channelled from just above the base, the upper portion appearing terete, strongly many nerved, margin rough with small, distant, hard teeth. *Peduncle* erect, fairly stout, 40–65 cm long. *Spathe valves* about 6 cm long, 1,8 cm broad at base, closely enveloping the base of the flowers, soon becoming papery; bracteoles narrow linear. *Umbel* 1–5-flowered. *Pedicels* 0 or very short. *Perianth* white, faintly pink keeled, buds erect becoming distinctly nodding, open flower suberect; tube 10–13 cm long; segments about 8–10 cm long, the inner about 3 cm broad and the outer slightly narrower, conniving in a broad funnel with only the apices reflexed; peak obtuse on the inner segments up to 3 mm long on the outer. *Stamens* declinate. *Fruit* crowned but not beaked. PLATE 6; FIG. 13, 14.

Growing in open pans and shallow water, on open sandy flats among large trees. Recorded from areas around Ondangwa and Olukonda which are subject to annual flooding.

S.W.A.—1715 (Ondangwa): near Ondangwa (–DD), De Winter & Giess 6857; J. N. du Plessis per P. J. le Roux s. n. cult. in Bot. Gards. No. 22591.4.70. 1716 (Enana): Olukonda (–CC), Schinz 822 (Z).

Although this species is so common locally very few specimens have been preserved in South African herbaria. Besides the type material in Zurich there are two specimens in the Windhoek Herbarium collected by Prof. Walter Nos. 508 & 2713, and one in the herbarium of the Botanical Research Institute collected by De Winter and Giess and cited above.



FIG. 13.—*Crinum rautanenianum*, in a pan at Ondangwa, South West Africa. Photo by W. Giess.



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PLATE 6.—*Crinum carolo-schmidti* Dinter. From Flowering Plants of Africa, Vol. 41, Pl. 1629 (1972).



-M. E. Connel.

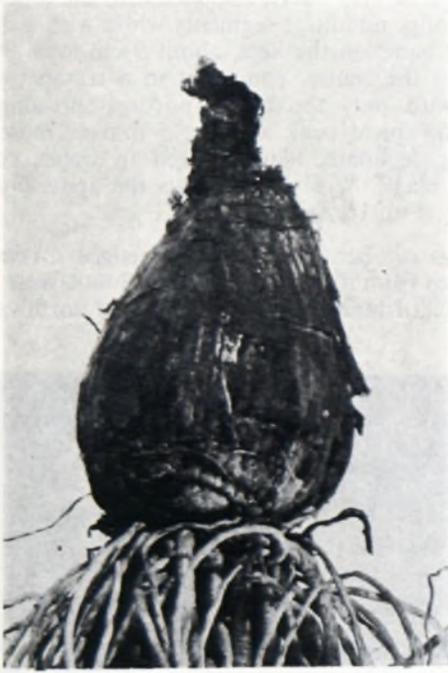


FIG. 14.—Bulb of *Crinum rautanenianum* originally from Ondangwa, growing in Pretoria.

The general appearance of the flowers in the wild is white like those of *C. carolo-schmidtii*, *C. euchrophyllum* and *C. paludosum*. The main difference is in the characteristic leaves of *C. rautanenianum* which are rather firm, suberect and so deeply channelled to appear terete towards the apex. Bulbs received from Ondangwa and grown at this Institute flowered in December 1971. One plant had a 3-flowered umbel and the other was 2-flowered. The flowers opened one at a time and were short lived. At first the small buds were stiffly erect, then developing quickly, one by one, they became cernuous and as the flower opened it assumed the erect or suberect position.

9. *Crinum carolo-schmidtii* Dinter, Neue Pfl. S.W. Afr. 26 (1914); Solch, Beitrage zu einer Fl. S.W.Afr., 95 (1960); Prodr. Fl. S.W.Afr. 150: 7 (1969) (under doubtful species); Verdoorn in Flow. Pl. Afr. 41: t.1629 (1973). Type: South West Africa, Guntas Dinter 2307 (B, holo.).

C. occidentale R. A. Dyer in Herbertia 15: 31 (1948); Solch in Prodr. Fl. S.W. Afr. 150: 7 (1969). Type: South West Africa, exact locality unknown, cultivated in Pretoria, sub PRE 28308 (PRE, holo.).

Bulb 3–6 cm long, 3–5 cm diam., usually narrowed into a long neck at the apex. Leaves 4–12 in a rosette or somewhat 3-ranked, narrowly linear, flaccid, 20–60 cm long, 3–15 mm broad when flattened, canaliculate, clearly nerved, margin sometimes with minute, soft, distant teeth. Peduncle erect, 15–40 cm tall. Spathe-valves 4, 5–8 cm long, 0, 5–1, 5 cm broad at the base, becoming papery and reflexing at least in the upper half; bracteoles narrowly linear. Umbel 1–3-flowered sometimes 4-flowered. Pedicels 0, 3–2 cm long. Perianth with a tube about 10 cm long; segments white, obscurely pink flushed or with a pale pink keel, usually becoming deep pink as they mature, conniving in a fairly narrow funnel-shape as they close, with only the apical portion recurved, about 8 cm long, the outer about 1, 6 cm broad the inner somewhat broader.

Stamens declinate, filaments white or faintly pink towards the apices. Style deep rose towards apex, stigma deep rose. Fruit not seen. PLATE 7.

Grows in shallow water or clay in or near pans, usually lime pans, or in flood plains of rivers. Recorded from the Okavango southwards to the Gobabis district and eastwards to the Caprivi Strip.

S.W.A.—1719 (Rundu): 16 km E. of Rundu (–DB). *De Winter* 3810. 1720 (Sambio): 6 km E. of Masari Camp Exp. Farm or road to Nyangana (–CC). *De Winter & Wiss* 4106. 1724 (Katima Molilo): 32 km from Katima on road to Linyanti Killick & Leistner 3112. 1920 (Tsumkwe): Simkue, 251 km E. of Grootfontein (–DA). *Story* 6112. 2118 (Steinhausen): Farm Okatjikurie (–BC), *Tölkén* sub PRE 30940.

This species is distinguished from two other species in South West Africa that grow in shallow water and have the open flowers predominantly white, namely *C. paludosum* and *C. rautanenianum*, by the very narrow, flaccid leaves. The areas of distribution differ too. *C. rautanenianum* and *C. carolo-schmidtii* have a restricted distribution in the northern regions of South West Africa whereas *C. paludosum* is found in the centre of the province and eastwards to Zululand.

As noted by the author of the species, K. Dinter, these pan Crinums can be cultivated in the usual way and need not necessarily be partly submerged as in nature, where, at least for part of the year, they grow in masses in shallow still water.

From a third shallow-water species, *C. euchrophyllum*, recently recorded from the eastern Caprivi, *C. carolo-schmidtii* differs in the very narrow, green, rosulate leaves, as opposed to the distichous and glaucous leaves of *C. euchrophyllum*.

10. *Crinum moorei* Hook. f. in Bot. Mag. t.6113 (1874); Bak. Handb. Amaryll. 93 (1888); Fl. Cap. 6: 200 (1896); Medley Wood, Natal Plants 6: t.504 (1912); Verdoorn in Flow. Pl. Afr. 34, t.1351 (1961). Type: Cult. Glasnevin, Eire, originally from S. Africa, exact locality unknown.

C. imbricatum Bak. in Gard. Chron. 1881, 16: 760 (1881)*; Handb. Amaryll. 92 (1888); Fl. Cap. 6: 200 (1896). Type: Eastern Cape, Butterworth Forest, *MacOwan* 2027. *C. maco: wanii* Bak. in Bot. Mag. t.6381 (1878) partly, as to figure only*

Bulb subglobose, varying in size, up to 19 cm diam., narrowing abruptly into a long stem-like neck, 30–120 cm high, multiplying prolifically from the base. Leaves from the top of the false stem, ensiform, narrowing towards apex and base, about 65–150 cm long and 6–12 cm broad, parallel veins obvious and the midrib thickened on the lower surface, margins slightly undulate, smooth. Peduncle about 70 cm long or longer, somewhat flattened 1, 5–3 cm broad. Spathe-valves 5–12 cm long, 1, 5–3 cm broad at base, narrowing towards apex; bracteoles narrowly linear. Umbel 5–10-flowered. Pedicels 1–8 cm long. Perianth with a long greenish cylindrical tube, widening slightly at the apex, 8–10 cm long, erect at first, becoming cernuous as the flower matures; segments white, usually suffused with pink (but without a deep red keel) subspreading or forming a rather wide funnel, oblong-elliptic, about 8–10 cm long, 2, 4–4 cm broad, the inner slightly broader than the outer, peaked apex green, 3–6 mm long. Filaments declinate, tinged pink or red in the upper portion. Style red towards the apex. Fruit not beaked. PLATE 8.

Grows in damp or marshy places and along rivers and rivulets. Recorded from the coastal and semi-coastal areas of the eastern Cape from Butterworth district northwards into Natal and as far as the Ngome Forest in Zululand.

NATAL.—2731 (Louwsberg): Ngome Forest Reserve (—CD), *Justin in F.D. Herb.* 6663; Ngome Forest (—CD), *Marasas* 682; *Strey* 9383; *Codd* 9598. 2831 (Nkandla): I. Garland's farm (—DD), *Venter* 2770. 2931 (Pietermaritzburg): Krantzklouf (—DD), *Moll* 4032. 3030 (Port Shepstone): Umzimkulu, *Levey in Herb. Galpin* 3200.

CAPE.—3129 (Port St. Johns): Between Ngqeleni and Umtata River Mouth (—CC), *Lewis* 67508; near Umgaza River (—CB), *Codd* 9745; 16 km N. of Umzimvubu River, *Theron* 1554. 3228 (Butterworth): Butterworth (—AC), *Van der Wal s.n.*; Kentani (—AD) *Pegler* 336; The Haven (—BB), *Gordon-Gray* 1319 (NH); banks of Qora River (—BC), *Van Breda* 884.

C. moorei differs from all other South African *Crinum*s in several respects. For instance, the neck of the bulb, made up of the thickened and hardened leaf-bases, forms a false stem, leafy only at the apex; the leaves mature in one year, that is they do not die back and grow out again the following year with a truncated apex; the segments of the flowers do not form the usual narrow funnel but are more spreading when open and they are not keeled dorsally with a deeper coloured band.

C. moorei was one of the first species of *Crinum* to be cultivated in Europe mostly under the horticultural names of *C. colenso*, *C. natalense* and *C. mackenii*. It is closely related to *C. jagus* (= *C. giganteum* Andr.) of tropical Africa and in some ways to the type species *C. americanum* as far as one can tell from the description and plate which do not include the habit of that species. Baker places *C. americanum* in the *Platyaster* group with perianth erect and stamens spreading, and *C. moorei* in the *Codonocrinum* group which is characterised by the perianth being funnel-shaped and stamens declinate. The stamens are certainly declinate but the perianth hardly funnel-shaped.

The type specimen of our species was grown by Dr. Moore at Glasnevin, Dublin, from seed collected by a Mr. Webb when serving in the army in South Africa in the 1860's. When Dr. Hooker described the species in the *Botanical Magazine* he called it after Dr. Moore who had communicated it to him.

The flowers are white or pink and so it was concluded that *C. imbricatum* Bak. is merely a colour form of this species.

11. *Crinum kirkii* Bak. in *Bot. Mag.* 36: t.6512 (1880); *Handb. Amaryll.* 91 (1888); *Fl. Trop. Afr.* 7: 402 (1898); *Uphof in Herbertia* 9: 79 (1942). Type: Zanzibar, *Kirk s.n.*

C. ornatum Bury, *Hexand.* Plate 18 (1834), partly, as to specimen figured, excluding syn. *Amaryllis ornata* Ait.

Bulb varying in size, about 15 cm diam., narrowing into a neck up to about 15 cm long. *Leaves* in a rosette at ground level, erect at first becoming flaccid and somewhat undulate, reflexed from about the middle, 60 cm long or longer, 5–10 cm broad, long acuminate with a longitudinal dorsal thickening resembling a midrib; margins sparsely ciliate with cartilaginous hairs. *Peduncle* lateral, erect, about 60 cm long, up to 3 cm broad, 1.5 cm thick, with a thin bloom and reddish at the base. *Spathe valves* 6–10 cm long, 3.5–5 cm broad, acuminate only in the upper half, overlapping at the base and tightly enveloping the bases of the flowers usually with only the upper portion reflexing; bracteoles narrowly linear. *Umbel* 10–15-flowered.

Pedicels 0 or very short. *Perianth* with the tube about 10 cm long, nodding; segments white with a distinct maroon band on the keel, about 9 cm long, 3–4 cm broad in the centre, connivent in a trumpet of bell shape with only the upper portion spreading and recurved, apical peak aristate, 5 mm or more long. *Stamens* declinate, filaments red in upper portion, anthers black. *Style* red towards the apex. *Fruit* not seen. FIG. 15, 16.

Grows on banks of rivers or edges of marshes. Recorded from the Caprivi Strip in South-West Africa on Mpilila Island. Also in Zambia and northwards to Kenya.



FIG. 15.—*Crinum kirkii* showing the spathe valves tightly enveloping the bases of the flowers, and the long acuminate leaves. Originally from the Caprivi Strip (*Vahrmeijer* 2204).

S.W.A.—1725 (Livingstone): Caprivi Strip, Mpilila Island, *Killick & Leistner* 3384; Schuckmansburg, *Vahrmeijer* 2204.

ZAMBIA.—Barotseland, Nangweshi, *Codd* 7141.

My concept of this species stems from bulbs and specimens collected by Dr. Codd on the banks of the Zambesi at Nangweshi, Zambia. When the plants flowered at Pretoria they were studied in detail and certain characteristics noted. For example the spathe-valves remained erect longer than in other related species known, overlapped each other and tightly enveloped the bases of the flowers; the flowers in this instance did not open widely at maturity and the segments are clearly banded with maroon; the peaks to the segments were long and awn-like and the leaves had an indication of a midrib. It was found that these plants matched the one figured in the *Botanical Magazine* t.6512, the type of *C. kirkii*, and also specimens collected in Kenya by Colonel Bayliss under that name.



PLATE 8.—*Crinum minimum* Milne-Redh. From *Flowering Plants of Africa*, Vol. 40, Pl. 1577 (1969–70).



FIG. 16.—A close-up of the umbel of *Crinum kirkii* showing the distinct band along the keel of the segments (Vahrmeijer 2204).

It was found too that they match the specimen figured by Mrs. Bury (1836) named *C. ornatum* (Ait.) Bury. Baker, in his Handbook of Amaryllidaceae (page 90) and in the Flora of Tropical Africa, cited Mrs. Bury's plate under *C. sanderianum* Bak. This raises the question as to whether *C. kirkii* and *C. sanderianum* are conspecific. An authority on tropical African species of *Crinum* will probably settle this question in time.

C. kirkii shares with *C. moorei* the feature of the dorsal, longitudinal thickening of the leaf which suggests a midrib but in most other respects it does not approach that species. There is no false stem to *C. kirkii*, the segments of the flower do not open as widely as *C. moorei* and they have a decided band of colour on the keel.

A specimen collected in the Caprivi Strip, Vahrmeijer 2204, flowered in Pretoria on 21st February, 1972. In the morning the segments were fairly wide open showing the black anthers, but at midday they closed at the throat with upper portions only reflexed.

12. *Crinum acaule* Bak. in Fl. Cap. 6: 532 (1897); Uphof in Herbertia 9: 82 (1942). Type: Zululand, Sambaans territory, Saunders s.n. (K, holo.).

Bulb from about 7 to 12 cm long, 4–8 cm diam., produced into a neck about 4–9 cm long. Leaves linear, usually deeply troughed, firm, 20–50 cm long or longer, 4–14 mm broad, margin ciliate with minute teeth. Peduncle mostly underground, about 5 cm long. Spathe-valves 9–13 cm long, 0.8–1.2 cm broad at the base, narrowing gradually towards the obtuse apex, more or less erect, the basal part encasing the basal portion of the flower; bracteoles narrowly linear, 5–8 cm long. Umbel 1–2-flowered, rarely 3-flowered. Pedicels 0 or very short. Perianth funnel shaped, with the tube about 10 cm long; segments white with a pink flush, usually keeled with deep pink, 10–12 cm long, the inner about 2.5 cm broad, the outer slightly narrower, conjoining to form a funnel with only the upper third spreading to slightly recurved; apical peak on the inner segments very short, about 1 mm long, on outer up to 5 mm long. Fruit beaked. FIG. 17, 18.

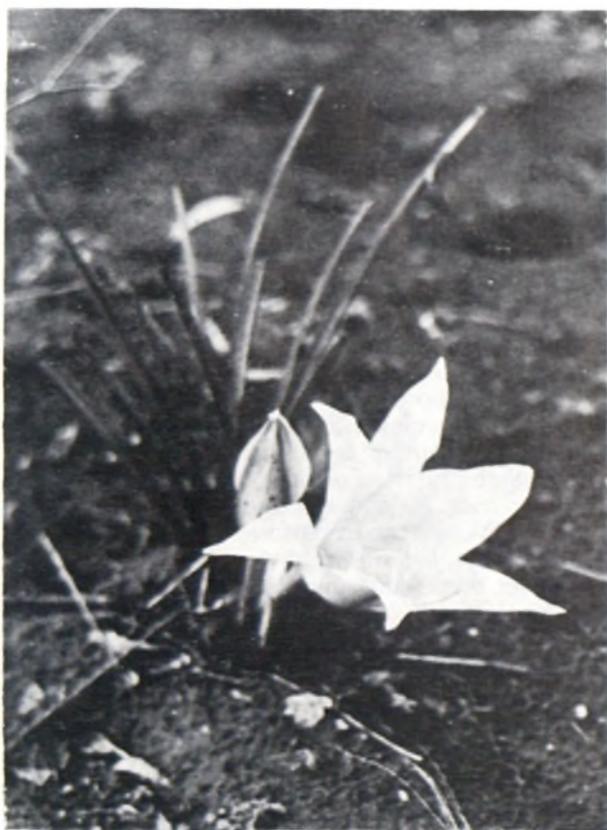


FIG. 17.—*Crinum acaule*, on the Makatini Flats, Natal, taken at dusk. Photo by Dr. R. A. Dyer.

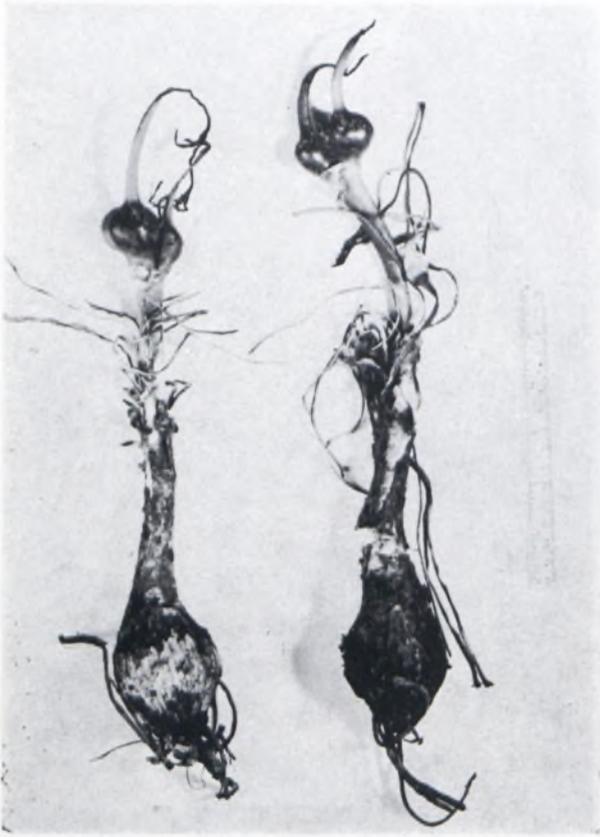


FIG. 18.—Bulbs and fruit of *Crinum acaule* from the Makatini Flats.

Found in sandy grassland. Recorded from Zululand, from Ndumu in the north to Hlabisa district in the south.

NATAL.—2632 (Bela Vista): Ndumu Hill (—CC), *Pooley 106* (NH). 2732 (Ubombo): 19 km E. of Pongola Poort (—AC), *Dyer & Verdoorn 5842*. 2832 (Mtubatuba): Palm Ridge Farm (—AC), *Harrison 337*; near Makakatana Forest, Lake St. Lucia (—AD), *Codd 10263*. Without precise locality, Zululand, *Roux s.n.*

The description of this species, with its unusually large flowers in comparison with the width of the leaves, has been drawn up from the few specimens cited. Although bulbs were planted in the gardens of the Institute over eight years ago, they have not yet flowered. While it can be expected that this species, like several others, has an east to west distribution, to date it has not been found outside Zululand. It resembles the more widely distributed species, *C. minimum*, which also has one- to two-flowered umbels and rather large flowers compared with the narrow leaves, but differs mainly in the leaves being flaccid, not stiff and toothed on the margins as in *C. acaule*.

The specimen figured on Plate 1253 of Curtis's Botanical Magazine under the name *C. ornatum* (several distinct elements have been figured under that name), looks remarkably like our species having a one-flowered umbel, a large trumpet-shaped flower and narrow, firm leaves, but the leaves are distichous and the peduncle longer than in *C. acaule*. It is reputed to have come from Seirra Leone.

Several collectors remarked on the pleasant scent emitted by this species, one described it as "scent like carnations".

13. *Crinum minimum* *Milne-Redh.* in *Kew Bull.* 1947: 33 (1947); *Solch in Fl. S.W. Afr.* 150: 5 (1969); *Verdoorn in Fl. Pl. Afr.* 40: t.1577 (1969). Type: Zambia, Mwinilunga, Cha Mwana Plain, *Milne-Redhead 2761* (K, holo.; PRE).

C. parvibulosum *Dinter ex Overkott* in *Mitt. Bot. Munchen* 1: 444 (1954). Type: Karibib, *Dinter 6793* (M, holo.). *C. walteri* *Overkott, l.c.* (1954). Type: Benhop, *Schwerdtfeger* in herb. *Walter 1/302* (M, holo.).

Bulbs from about 5 to 8 cm long, 3–5 cm diam., produced into a neck from about 3 to 10 cm long, tunics at the apex comparatively thin and papery. Leaves about 8, flaccid, narrowly linear, about 18 cm long, deeply canaliculate, 1.5–4 mm broad when flattened, glabrous, margins smooth, many nerved on dried specimens, nerves obscure in fresh leaves. Peduncle short arising from dense papery tunics at the apex of the bulb, 3–11 cm long. Spathe-valves soon becoming thin and papery, 7–10 cm long, 3–9 mm broad at the base, narrowing towards the apex. Umbel usually 1-flowered. Pedicel 0 or very short. Perianth with a tube 8–12 cm long, nodding; segments white with a deep rose dorsal keel, sometimes pale pink tinted, 9–12 cm long, 0.8–1.6 cm broad, attenuate to an acute apex, the inner slightly broader than the outer, conniving in a funnel shape, at a stage somewhat zygomorphic, the three lower segments spreading and the three upper ascending and somewhat recurved, apical peak 2–5 cm long. Stamens declinate, filaments white or pink flushed. Style declinate, deep rose. Fruit subglobose, (not known whether beaked or not), about 2 cm diam.; seed smooth. PLATE 9. ♂

Found in hot dry country in pebbly, sandy soil on gentle slopes or in open patches near rivers, in Mopane-Combretum veld and near Baobab trees. Recorded from Karibib in South-West Africa eastwards through Botswana and the northern Transvaal to the Kruger National Park. Also recorded from Rhodesia, Zambia, and Tanzania.

S.W.A.—2115 (Karibib): Karibib (—DD) *Dinter 6793*. 2119 (Epukiro): Farm Anderson (—CC), *Tölken 1300*. 2214 (Swakopmund): 55 km E. of Henties Bay (—BB), *Hardy & de Winter 1405*. 2218 (Gobabis): Farm Renette (—CC), *Merxmuller 1064*.

TRANSVAAL.—2229 (Waterpoort): near Zoutpan (—CC), *Schlieben 478*. 2230 (Messina): Messina (—AC), *Pole Evans 1777*. 2231 (Pafuri): Between Punda Milia and Pafuri (—CA), *Mockford s.n.* 2327 (Ellisras): Spruyts Kloof, *Theron 2013*. 2328 (Baltimore): Glen Alpine Dam (—BA), *Verdoorn 2500*; *Erens s.n.*; *Hardy s.n.* 2330 (Tzaneen): Hans Merensky Nature Reserve, *Oates 63*. 2531 (Komatiport): between Skukuza and Malelane (—BC), *Van Wyk 4747*.

BOTSWANA.—2426 (Mochudi): 48 km N. of Sikwana (—AB), *Reyneke 435*; 9 km N. of Sikwana (—CB), *Reyneke 450*.

This species is characterised by the usually 1-flowered umbel, the large funnel-shaped flowers on short peduncles and the few rather short, very narrow, flaccid leaves. It is distinguished from *C. acaule* of Zululand mainly by the somewhat smaller flowers and the narrower flaccid leaves with smooth margins. The distribution extends from near the west coast in S.W. Africa eastwards through hot, dry country to the eastern Transvaal. Our specimens agree well with herbarium specimens collected in Rhodesia, Zambia and Tanzania. These include the type specimen of *C. minimum* from Mwinilunga, Zambia, and consequently bear that specific name.



PLATE 9.—*Crinum lineare* L.f. From Flowering Plants of Africa, Vol. 37, Pl. 1471 (1966).



1

Walters

PLATE 10.—*Crinum variabile* (Jacq.) Herb. From Flowering Plants of Africa, Vol. 36, Pl. 1433 (1964).

14. *Crinum lineare* L. f., Suppl. 195 (1781); Thunb. Fl. Cap. ed. Schult. 301 (1823); Bak. Handb. Amaryll. 92 (1888); Fl. Cap. 6: 199 (1896); Uphof in *Herbertia* 9: 81 (1942); Verdoorn in *Flow. Pl. Afr.* 37: t.1471 (1966.) Type: Cape, between Van Stadens and Swartkops Rivers, *Thunberg* s.n. (UPS, holo.)

C. revolutum (L'Hérit.) Herb., in *Bot. Mag.* sub. t.2121 (1820) in obs.; *Amaryll.* 267 (1837).

Amaryllis revoluta L'Hérit., *Sert.*, *Angl.* 14 (1788); *Gawl.* in *Bot. Mag.* t.915 (1806). Type: Originally from "Prom. bonae Spei".—var. *gracilior* Ker-Gawl. in *Bot. Reg.* t.623 (1822).

Bulbs 7–14 cm long, 6–9 cm broad, produced into a neck sometimes up to 14 cm long, new bulbs form readily from the base. *Leaves* grass green, linear, canaliculate, rather firm, about 65 cm long or longer, 0,5–2,5 cm broad near the base when flattened, arching from the base; margins smooth or with minute distant teeth. *Peduncle* 18–60 cm long, subcompressed in the lower portion, 1–1,8 cm broad, 0,7 cm thick. *Spathe-valves* 4–7 cm long, 1–2 cm broad at the base, fairly substantial on preserved flowering specimens, reflexed. *Umbels* 4–14-flowered. *Pedicels* from very short to 2,5 cm long. *Perianth* with the tube shorter than the segments in some plants and longer in others, 3–10 cm long, curving; segments white suffused with pale pink and with a deep-rose dorsal keel, fading pink, the outer 1,4–2 cm broad, the inner slightly broader, conniving to form a funnel with the upper third recurved; apical peaks 4–5 mm long on the outer segments, shorter on the inner. *Stamens* declinate; filaments white or the upper portion purplish red; anthers black. *Style* purplish-red towards the apex. *Fruit* with a short beak. PLATE 10.

Found in sandy soil on the northern slopes of coastal hills or in open grassveld a few kilometres from the sea, often among *Acacias*. Recorded from the vicinity of Port Elizabeth and eastwards from near Port Alfred and also from near Waterloo Bay in the Peddie district.

CAPE.—3325 (Port Elizabeth): Walmer (–DC) *Urton* s.n.; Draaifontein (–DC), *Archibald* 4884; Witteklip (–CD), *Long* 1342. 3326 (Grahamstown): near Port Alfred (–DB), *McNeil* 19b; east of Port Alfred *Archibald* 5 05; near the Aerodrome, *McNeil* s.n. 3327 (Peddie): N. of Waterloo Bay (–AC), *Story* 4862.

For many years after this species had been collected by the Swedish Botanist, Carl Thunberg, in 1773, it seems to have escaped the attention of plant collectors. Only since the year 1936 have a few specimens reached this Institute. The first few, like the type specimen, had the unusual feature of a perianth-tube that is shorter than the segments. But soon specimens came in from slightly further east with long perianth-tubes. They were obviously the same species, characterised by the narrow, linear, rather dark green and somewhat firm leaves and the readily multiplying bulbs forming groups of two or more plants. This is one of several species with a limited distribution.

C. algoense Herb., described in 1837 (*Amaryll.* 272), is probably a synonym of this species but the flowers were not seen and so it must remain a doubtful species.

15. *Crinum variabile* (Jacq.) Herb., *Amaryll.* 268, t.44, fig. 23 (1837); Bak. in *Fl. Cap.* 6: 199 (1896), partly, excluding specimen from British Caffraria; Uphof in *Herbertia* 9: 81 (1942), partly, excl. syn. var. *roseum*; Verdoorn in *Flow. Pl. Afr.* 36: t.1433 (1964). Type: Cult. Vienna, originally from the Cape, specimen figured in *Jacq. Hort. Schoenbr.* t.429.

Amaryllis variabilis Jacq., *Hort. Schoenbr.* 4: 14 t.429 (1804). *Crinum crassifolium* Herb., *Append.* 23 (1821), nomen nudum.

Bulb about 26 cm long, narrowing gradually towards the apex (not abruptly narrowed into a neck), 5–9 cm diam. near the base, new plants sprouting around the bulb and from within the tunics. *Leaves* deep green, rather firm, varying in length and width on the same plant, 8–35 cm long, 0,4–4 cm broad; margins with a cartilaginous border and with minute, distant teeth. *Peduncle* 30–40 cm long, slightly compressed, 1–1,8 cm broad. *Spathe-valves* 6–7 cm long, 1,5–2 cm broad at the base, reflexing and becoming somewhat papery. *Umbel* 6–12-flowered. *Pedicels* 2,5–5 cm long. *Perianth* with the tube shorter than the segments, 3–4 cm long, curved; segments white suffused at the base with green and with rose dorsally, turning deep pink as they fade, conniving into a funnel shape, the upper portion spreading and recurving, 6–9 cm long, 1,5–2 cm broad; apical peak small about 2 mm long. *Ovary* swelling rather more obvious than in other species, not tapering as much to base and apex, fruit without a beak or shortly beaked; seed smooth. PLATE 11; FIG. 19, 20.

Found in beds of the rivers that flow to the Atlantic and are often dry for long periods. Recorded from Namaqualand from near Garies and near Nieuwoudtville.

CAPE.—3017 (Hondeklop Bay): Groen River near Garies (–DB), *Hardy* 513; 1709. 3119 (Calvinia): 11 km south of Nieuwoudtville (–AC), *Hall* 1080.



FIG. 19.—Fructing umbel of *Crinum variabile*, originally from Garies, Namaqualand.

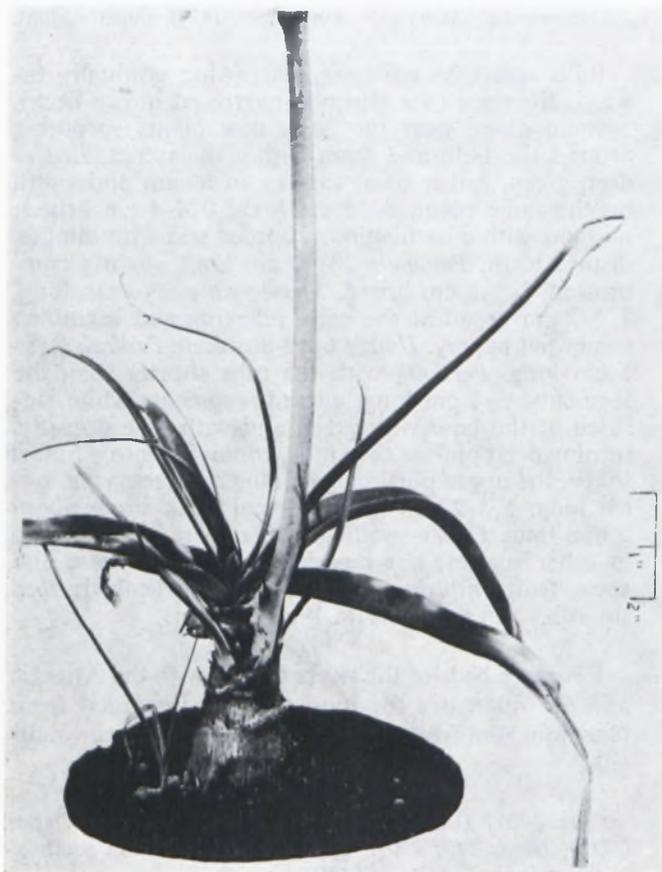


FIG. 20.—Lower portion of a *Crinum variable* plant to show new plants sprouting around the bulb and from within tunics.

This species is another with a restricted distribution. To date it has not been found outside Namaqualand. For years it has been confused with another species with a short perianth tube. Herbert was the first to distinguish between the two, noting that in the one the leaves are dark green and rather stiff and the flowers fade dark pink whereas in the other the leaves are a lighter green, rather flaccid and the flowers fade brownish (Amaryll. 268). This was investigated and

confirmed and resulted in the description of *Crinum macowanii* subsp. *confusum* Verdoorn. It has been found since, see under *C. macowanii*, that it is merely a local form of *C. macowanii*.

C. variable resembles *C. bulbispermum* in the bulb which is not abruptly narrowed and the flowers that fade a deep pink or red, but it differs very markedly in the shape of the flowers and the size, colour and texture of the leaves. From its nearest relative *C. lineare* it differs mainly in the broader leaves and the distribution. It resembles *C. lineare* in the colour and texture of the leaves and the way young plants develop prolifically around the parent bulb. Milne-Redhead & Schweickerdt (1939) state that one inflorescence on the Thunberg specimen named by him *C. longifolium* is *C. variable* (the others are *Amaryllis belladonna*). Since it is an inflorescence only, there is the possibility that it may be one of the other two short-tubed *Crinum*s, *C. lineare* or *C. macowanii*. Thunberg could have collected these, but probably not *C. variable*.

16. *Crinum foetidum* Verdoorn in Bothalia 10: 56 (1969). Type: 112 km N. of Vaalwater, Louw 3460 (PRE, holo.).

Bulb more or less globose, 15–18 cm diam., abruptly narrowed into a neck of varying lengths. Leaves about 15, dull blue-green, about 70 cm long, 12 cm broad, distinctly ciliate with cartilaginous hairs which are mostly over 1 cm long. Peduncle suberect, short, 14–25 cm long, 2,5 cm broad, 1,5 cm thick. Spathe-valves 8–11 cm long, 2–3 cm broad at the base, narrowing towards the apex, soon reflexing. Umbel 7–11-flowered. Pedicels 0–1,5 cm long. Perianth with a tube about 10 cm long; segments conniving in a funnel-shape with the apical third recurved, white with a pale-pink dorsal keel, about 10 cm long, outer about 2 cm broad, inner 2,5 cm broad, all acuminate in the upper third, apical peak often deep rose, 2–8 mm long sometimes slightly longer. Stamens declinate filaments white or tinged with rose towards the apices. Style red in the upper portion. Capsule subglobose, beaked at first eventually shortly so; seeds sepia coloured rough with raised papillose ridges (lamellate?). FIG. 21, 22.



FIG. 21.—*Crinum foetidum*, Thabazimbi district, Transvaal.



Cythera
Letty.

1.

2.

3.



PLATE 12.—*Crinum delagoense* Verdoorn. From Flowering Plants of Africa, Vol. 35, Pl. 1389 (1962).

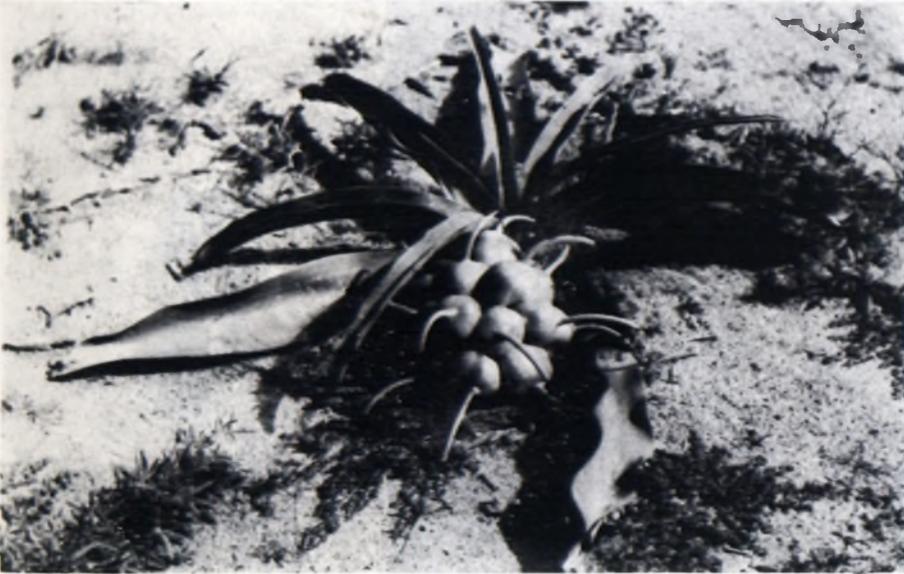


FIG. 22.—Fruiting specimen of *Crinum foetidum* showing the long beaks to the capsules, but these shorten later to some extent.

Found growing in deep sand in open woodland in the drainage basin of the upper reaches of the Limpopo and Okavango Rivers. Also recorded from the Victoria Falls, Ngamiland and Tanzania.

S.W.A.—1719 (Rundu): about 12 km E. of Rundu (—DC), *De Winter* 3777. 1720 (Sambio): about 64 km W. of Rundu (—CD), *Le Roux s.n.* 2118 (Steinhausen): farm Sturmfeld (—DB), *Tölkén* 1003.

TRANSVAAL.—2328 (Baltimore): 132 km N. of Vaalwater, *Louw* 3460; Steilloop (—BC), *Verdoorn* 24 8; 2499. 2427 (Thabazimbi): near Vaalpenskraal (—AC), *Verdoorn* 2495; west of Vaalwater, near Sterkstroom (—BD), *Verdoorn* 2497.

This species is characterised by the broad dull, blue-green, distinctly ciliate leaves. It was found when these plants were examined in the veld, that the leaves tore readily and a watery sap dripped from them. The flowers were strikingly white with a pale rose keel to the segments. The funnel was narrow, and the segments were perceptibly acuminate in the upper third. The subglobose fruits, bulging with the large rounded seeds, were beaked by the remains of the long perianth tube. A feature not observed before in any other species was the dark colour and roughness of the seed coats. Parts of the plant that were injured or torn turned blackish, and emitted a foetid odour. This character may not be constant as it was not observed in cultivated plants the following season.

The specimens cited came from open woodland near the tributaries of the Limpopo in the north-western Transvaal and from near the Okavango River in South-West Africa. Baines's painting of a *Crinum* growing in Namaqualand, now housed in the Kew Herbarium, and mentioned on page 220 of his "Exploration of S.W. Africa," appears to be this species. It is obvious, too, that the plant of which a photograph appears in "Guide to the Victoria Falls" by H. Wild, under the name *C. zeylanicum* L., is our species. Because not one of the published descriptions was found to fit this species exactly, it was described as new.

17. *Crinum graminicola* Verdoorn in Flow. Pl. Afr. 29: t.1155 (1953), spalm *graminicolum*; African Wild Life 17: 153 (1963). Type: Moot Halt, about 57 km west of Pretoria, *Verdoorn* 2408b (PRE, holo.).

Bulb more or less globose, 12–14 cm diam., abruptly narrowed into a neck 4–10 cm long. Leaves few, willow-green, broad, spreading at ground level, up to 14 cm broad, obviously ciliate with cartilaginous hairs. Peduncle arising laterally, arcuate ascending, up to 40 cm long, about 2,5 cm broad and 1,5 cm thick. Spathe-valves 7–11 cm long, up to 3 cm broad at the base, narrowing gradually towards the apex, not early withering and reflexing; bracteoles narrowly linear, up to 10 cm long. Umbels several to many flowered, 8–30 recorded. Pedicels subsessile or 0,5–2,5 cm long. Perianth with a curved tube, 7–11 cm long; segments broadly keeled with deep rose or almost entirely that colour, fading towards the margins, conniving into a funnel shape with only the apical portion recurved, about 9 cm long, the outer 1,5 cm broad just above the middle, inner 2,5 cm broad above the middle, apical peak 3–7 mm long, the reflexed true apex often papillate. Stamens declinate, filaments white or suffused with deep rose towards the apex. Style deep rose in the upturned apical portion. Capsule oblong to oblong-globose, bulging with seeds, beaked with the basal portion of the perianth tube. Seeds subglobose of irregular shape, about 2 cm diam. PLATE 12; FIG. 23.

Grows in open grass country usually in sandy soil. Recorded from central and northern Transvaal and as far south as the Dundee district in Natal.

TRANSVAAL.—2229 (Waterpoort): About 6 km along Bluegums Poort Road (—DD), *Leach* 11339. 2230 (Messina): Originally from Rusfontein, R. Schlieben's farm (—DD), *Schlieben & Strey* 8360. 2329 (Pietersburg): Between Duivelskloof and Louis Trichardt (—BD), *Werdermann & Oberdieck* 1935; 28 km E. of Pietersburg (—DC), *Van Vuuren* 1369; Boyne (—DD), *Thompson s.n.* 2526 (Zeerust): Zeerust (—CA), *Thode* A1506. 2527 (Rustenburg): Rustenburg (—CB), *Collins* 57; Horn's Nek (—DB), *Dyer & Erens* 3513; Moot Halt, 57 km W. of Pretoria (—DC), *Verdoorn* 2408a,b,c, & d. 2528 (Pretoria): Wonderboom aerodrome (—CA), *Robertson* 9; 10; Villieria (—CA), *Schweickerdt* 1726; Rietondale (—CA), *Pole Evans s.n.*; Pretoria West (—CA), *Kresfelder s.n.*; University farm, Pretoria (—CA), *Verdoorn* 2344; *Codd* 3699; 4184. 2529 (Witbank): about 3 km W. of Middelburg (—CD), *Reynolds* 3349; Middelburg townlands (—CD), *Van der Merwe s.n.*; about 6 km S. of Middelburg (—CD), *Verdoorn* 2422; 17 km E. of Middelburg (—CD), *Bruce* 467. 2626 (Klerksdorp): Grasfontein (—AA), *Sutton* 340; Uitgevon-



FIG. 23.—Fruiting specimen of *Crinum graminicola*, near Pretoria, showing the beaked fruits. Photo by Dr. L. E. Codd.

den, Lichtenburg, *Liebenberg* 19. 2627 (Potchefstroom): Farm Somerville, 64 km W. of Krugersdorp (–AB), *Codd* 2127; 67 km W. of Tarlton (–AC), *Phillips* 21; Jackson's Drift (–BD?) *Gilliland in Moss Herb* 26268; Randfontein (–BA) *Gunn* 1; Krugersdorp (–BA or BB) *Webster s.n.* 2628 (Johannesburg); near Bapsfontein (–AB), *Dyer & Verdoorn* 5852; Kaalfontein (–AB), *Pole Evans in Govt. Herb.* 16825; *Mogg s.n.*; 5 km W. of Kendal (–BB), *Reynolds* 3347; Delmas (–BD), *Van der Plank s.n.* 2630 (Carolina); Piet Retief, *Galpin* 10894; near Idalia (–DC), *Sidey* 2319.

NATAL.—2729 (Volksrust): 8 km N. of Newcastle (–DB), *Reynolds* 4055. 2830 (Dundee); near Rorkes Drift (–AD), *Codd* 2241.

In the broad, distinctly ciliate leaves which spread at ground level, and the shape and colour of the flowers this species resembles *C. delagoense* which is described next, No. 18. It differs principally in the shorter peduncle and pedicels and the fruits which are oblong-globose and long beaked at the apex. The fruits of *C. delagoense* are subglobose, without a beak, and more brightly coloured at maturity. The areas of distribution differ too. *C. graminicola* occurs in open grassveld at medium to high altitudes of the Transvaal and bordering areas of Natal while *C. delagoense* is found in the lowveld and in the basins of the Limpopo and Zambesi Rivers with a concentration of plants at the coast near the river mouths.

18. *Crinum delagoense* *Verdoorn* in *Flow. Pl. Afr.* 35: t.1389 (1962). Type: Inhaca Island, *Mogg* sub PRE 29010 (PRE, holo.).

Amaryllis forbesi var. *purpurea* Lindl. in *Trans. Hort. Soc. Lond.* 6, 1: 285 (1826). Type: No specimen preserved but presumably this species.

Crinum forbesianum var. *punica* Herb., *Amaryll.* 267 (1837). Type: no specimen preserved but presumably this species. *C. forbesianum* sensu Bak. in *Bot. Mag.* t.6545 (1881); *Fl. Cap.* 6: 201 (1896), pro majore parte, excl. syn.

Bulb large, 11–22 cm diam., abruptly narrowed in a neck of varying lengths. *Leaves* grass green, spreading at ground level, comparatively few, broad, 11–21 cm broad, distinctly ciliate. *Peduncle* arcuate ascending 40–50 cm long, up to 3 cm broad. *Spathe-valves* up to about 8 cm long, about 3,5 cm broad at the base, narrowing gradually towards the apex; bracteoles narrowly linear about 8 cm long or longer. *Umbel*

10–30-flowered. *Pedicels* 2–5 cm long; longer in fruiting specimens. *Perianth* with a long curved tube, 7–10 cm long; segments white with a distinct broad, deep-rose or purplish red, dorsal keel, or the whole flushed rose or purplish red with the keel a deeper rose, conniving in a funnel shape with only the apical third recurved, about 9 cm long, the inner about 2,5 cm broad just above the middle, the outer somewhat narrower, apical peak short and obtuse on the inner lobes, about 1,5 mm long, and longer on the outer 3–5 mm long, reflexed true apex papillate. *Stamens* declinate, filaments white or suffused with rose. *Style* deep rose in the upper upturned portion. *Fruit* subglobose, 5–7 cm diam., purplish red or scarlet when mature, not beaked, the perianth dying back to a short crown at the base. PLATE 13; FIG. 24.

Found in deep sand in the Transvaal lowveld and in the basins of the Limpopo and Zambesi rivers with a concentration of plants at the coast from Zululand northwards to Mozambique as far as the Zambesi mouth and probably beyond. Recorded near tributaries of the Limpopo in the western Transvaal and eastwards to the lowveld of the Transvaal and Zululand.

TRANSSVAAL.—2327 (Ellisras): Rietspruit (–DC), *Louw* 4210. 2328 (Baltimore): Tambotiekloof (–CC), *Theron s.n., cult. PRE, G.N.* 22207. 2331 (Phalaborwa): Madeira Farm (–DC), *Mc Neil s.n.* 2430 (Pilgrim's Rest): 25 km, S. of Olifants River (–AC), *Reynolds* 5800. 2431 (Acornhoek): Tshokwane (–DD) *Codd* 5725. 2531 (Komatipoort): Skukuza (–AB), *Van der Schijff* 3462; 3461; *Codd* 5091; between Skukuza and Lower Sabie (–BA or BB) *Van der Schijff* 2879; 8 km S. of Skukuza (–BC), *Van der Schijff* 2145; Komatipoort (–BD), *Rogers* 22213; Tonetti SidingCB), *Leach* 12673.

NATAL.—2632 (Bella Vista): Mabibi (–DC), *Edwards* 2592; 24 km from Ingwavuma/Ndumu (–DC), *Moll* 4127. 2732 (Ubombo): 17 km E. of Pongola Poort, S. of Pongola River (–AC), *Dyer & Verdoorn* 5841. 2832 (Matubatuba): 19 km S. of Lake Bengazi (–AB), *Codd* 10252; near St. Lucia (–AB), *Codd* 10265; Dukuduku farm (–AC), *Strey* 6132.

This species is characterised by the few broad, ciliate leaves spreading at ground level. One collector described the plants as “Welwitschia-like, sprawling on the sand.” The bulb is large and the umbel many-flowered, each flower striped like a barber's pole or



Cynthia
Letty

PLATE 13.—*Crinum lugardiae* N.E.Br. From Flowering Plants of Africa, Vol. 14, Pl. 532 (1934) under the name *Crinum crispum*.



FIG. 24.—Bulb and fruiting umbel of *Crinum delagoense*. Note the perianth dies back to a short crown at the apex of the capsule. suffused with purplish red. The fruits too are brightly coloured, and Mrs. Monteiro (Verdoorn, l.c., 1962) describes them as: "almost as showy as the flowers, each one growing to the size of a large apple and when ripe turning a bright crimson."

In the past *C. delagoense* has been very generally known as *Crinum forbesianum* Herb. and it is under that name that it appears in the Botanical Magazine (Baker, l.c., 1881) and in the Flora Capensis (Bak, l.c., 1896). *Crinum forbesianum* is an illegitimate name based on *Amaryllis forbesii* Lindl. As pointed out by Verdoorn, l.c., Lindley's original description does not fit this species and the conclusion has been reached that, since it is impossible to establish what it describes, the name must be discarded as confused. To date no type specimen has been traced and the diagnostic

characters taken together are not applicable to any known species of *Crinum* in that area. The large bulbs and many-flowered umbels (Lindley, l.c.) characterise two species in the vicinity, *C. delagoense* and *C. macowanii*, but neither of these has "flowers of a most delicate pink colour" nor leaves that are narrow, flaccid and glaucous" (Lindley, l.c.). The species *C. paludosum* Verdoorn has flowers white suffused with pale pink and comparatively narrow leaves and Forbes could have collected this species along the Tembe River, but the bulbs are not large and the umbels are not many flowered.

19. *Crinum lugardiae* N.E. Br. in Gard. Chron. 2: 49 (25th July, 1903); Kew Bull. 1909: 142 (1909); Uphof in Herbertia 9: 82 (1942); Solch in Prodr. Fl. S.W. Afr. 150: 7 (1969). Type: Kwebe Hills, Ngami-land, *Lugard* 43 (K, holo.).

C. polyphyllum Bak. in Bull. Herb. Boiss 2nd series, 3: 667 (31st July, 1903); Uphof in Herbertia 9: 81 (1942); Solch in Prodr. Fl. S.W. Afr. 150: 7 (1969). Type: Hereroland, east of Windhoek, *Dinter* 826. *C. crispum* Phillips in Fl. Pl. Afr. 14: t.532 (1934); Uphof in Herbertia 9: 82 (1942). Type: Roodeplaat, near Pienaars River, *Letty* 17 sub PRE 15877 (PRE, holo.).

Bulb 6–9 cm long, 4–7 cm broad, narrowed into a neck 4–12 cm long. *Leaves* many, the majority narrow, innermost 0,2 cm broad, the outermost up to 2,5 cm broad and in certain circumstances undulate and spreading at ground level but usually suberect and canaliculate, margin ciliate. *Peduncle* 5–30 cm long, 0,8–2,5 cm broad and up to 9 mm thick. *Umbel* 4–10-flowered, often 8-flowered. *Spathe-valves* 4,5–11 cm long, 1–2,5 cm broad at the base, tapering to the apex, some becoming papery; bracteoles narrowly linear. *Pedicels* from very short up to 2 cm long. *Perianth* with the tube 8–13 cm long, from slightly to distinctly curved; segments white with a distinct deep rose keel, 8–9 cm long, 1,5 to 2 cm broad conniving in a funnel with the upper third curved and revolute; apical peaks about 1 mm long on the broadly rounded inner segments, about 2 mm long on the slightly narrower outer segments. *Stamens* declinate, filaments white, anthers black. *Style* rose coloured. *Fruits* subglobose about 3 cm diam., distinctly beaked; seed globose about 1 cm diam. PLATE 14; FIG. 25.



FIG. 25.—*Crinum lugardiae*, near Gaborone, Botswana. Photo by Dr. L. E. Codd.

Found in grassy depressions or black turf flats usually in thorn veld. Recorded from South-West Africa, Botswana, central Transvaal and Griqualand West.

S.W.A.—2217 (Windhoek): Otjiserwa (-BD), *Kinges* 790; Otjiveru, 24 km W. of Omitara (-BD), *Tölken s.n.*; 11 km W. of Omitara (-BD), *Codd* 5822; Gochaganas (-CC), *Giess* 8368; Haigamas (-CC), *Giess* 9597.

TRANSVAAL.—2427 (Thabazimbi): Makoppa (-AC), *Codd* 8650. 2428 (Nylstroom): 17 km N.E. of Naboomspruit (-BD), *Reynolds* 5810; Nylstroom (-CB), *Lang sub TRV* 32751; Du Toits Kraal (-D), *Galpin s.n.*; Klippan (-C), *Meeuse s.n.*; Mosdene (-DB), *Galpin M* 337; Grootvlei (-DB), *Galpin* 11678. 2429 (Zebediela): Potgietersrus (-AA), *Leach s.n.*; *Commins* 902; 14 km N.W. of Marble Hall (-CC), *Codd & Verdoorn* 10443. 2527 (Rustenburg): Welgevonden near Brits (-DB), *Fochema s.n.* 2528 (Pretoria): 0,5 km from Pienaars River (-AB), *Kies & Bruce* 35; 1 km S. of Pienaars River (-AB), *Codd & de Winter* 3441; Rooikop (-BA) *Smuts & Gillett* 3050; Rust de Winter (-BA), *Mogg* 17318; Pretoria (-CA), *Phillips s.n.*; Zeekoegat, *Vogts s.n.*

CAPE.—2625 (Delareyville): 64 km S. of Mafeking (-DA), *Godfrey & Gilliland V.H.* 1825. 2824 (Kimberley): 25 km S. of Kimberley (-DA), *Leistner* 2104. 2922 (Prieska): Spitzkop Marloth 974.

In the past this species was known to us as *C. polyphyllum* Bak. with *C. crispum* Phillips as a synonym but in 1967 when, through the courtesy of the Director of the Royal Botanic Gardens, Kew, photographs of paintings by Mrs. Lugard and Thomas Baines of the species described as "*C. lugardae*" were seen, it became obvious that the last mentioned was also conspecific. Being the first published name, although only 6 days earlier than *C. polyphyllum*, it is the correct name for the species. The author, N. E. Brown, published the specific epithet as "*lugardae*" but according to later Rules of Nomenclature this must now be changed to "*lugardiae*".

C. lugardiae is characterised by its many narrow leaves in a rather tight tuft. This feature, by the way, presumably suggested the specific epithet "*polyphyllum*". Under some conditions, or at certain stages of growth the outer leaves are markedly undulate (the reason for the name "*crispum*") and spread at ground level, but usually all the leaves are suberect and eventually arcuate; they are deeply channelled and the outer only obscurely undulate. The flowers resemble those of *C. macowanii* in that the deep rose colour is confined to the strip down the keel while the rest of the segment is white and the black anthers show up against the white inner face of the segments. The fruits also resemble those of *C. macowanii* being distinctly beaked but they are smaller in size.

20. *Crinum macowanii* Bak. in Gard. Chron. 9: 298 (1878), as to *MacOwan* 2122 and part of the description; Bot. Mag. sub. t.6381 (1878), partly, excl. t.6381; Handb. Amaryll. 94 (1888), partly; Fl. Cap. 6: 202 (1896), partly, incl. *MacOwan* 2122 and 508; Uphof in *Herbertia* 9: 80 (1942), partly, excl. Bot. Mag. t.6381; Verdoorn in J. S. Afr. Bot. 22: 79 (1956). Lectotype: Eastern Cape, No Mans Land, *MacOwan* 2122 (K, lecto.; PRE, photo).

C. gouwssii Traub in *Herbertia*, Plant Life: 40 (1954). Type: Cult. California from seed from Duivelskloof, Transvaal, *Traub* 522 (TRA, holo.).

C. macowanii subsp. *confusum* Verdoorn in J. S. Afr. Bot. 32: 67 (1966). Type: Albany, Carlisle Bridge near Grahamstown, *Archibald* 7513 (PRE, holo.).

Amaryllis revoluta sensu Ker-Gawl. in Bot. Mag. t.1178 (1809).



FIG. 26.—*Crinum macowanii*. near Pietermaritzburg, the same form as that which grows in the eastern Cape Province from where the type specimen came. Photo by Dr. R. A. Dyer.

Bulb varying in size, large in some localities, 6–25 cm diam., fairly abruptly to abruptly narrowed into a short to long neck. *Leaves* variable, green or glaucous, spreading at ground level or arcuate from a short stemlike base, deeply canaliculate, from slightly to very strongly undulate, 80 cm long, or longer, 2–16 cm broad, margins with a narrow cartilaginous border and sparsely to fairly densely ciliate with short to about 1 mm long cartilaginous hairs. *Peduncle* arcuate-erect or erect and arcuate at the base only, varying in length, 18–90 cm long, 1,5–3 cm broad and 0,6–1,7 cm thick. *Spathe-valves* 6–10 cm long, 2–4 cm broad just above the base, rather thick, becoming parchment-like but not very thin, eventually partly reflexed; bracteoles narrow linear. *Umbels* on the average 8–25-flowered. *Pedicels* varying in length, 1–4 cm long. *Perianth* with a long or short tube, the segments conniving in a wide trumpet shape with the apical portion recurved; tube 3–11 cm long, cernuous; segments about 7–11 cm long, white with a distinct rose coloured keel, rarely, in some areas, the whole segment rosy with a deep carmine keel; apical peak on outer segments about 5 mm long, on obtuse inner segments, short and broad. *Stamens* declinate, filaments usually white; anthers black. *Style* white with the apical portion red. *Fruit* subglobose, 3–6 cm diam. beaked with



FIG. 27.—Bulb of *Crinum macowanii* which can be up to, or over, 20 cm in diameter. Originally from Greytown, Natal.

the basal remains of the perianth tube; seeds subglobose to depressed globose, about 2 cm diam. in greatest width, very pale green or whitish, skin smooth becoming reticulate. FIG. 26, 27, 28, 29, 30, 31.

Found in various types of habitat, from mountain grassveld and stony slopes to grassveld in hard dry shale, gravelly soil or sandy flats, along rivers and at the coast. Recorded from all the provinces but absent from the south-western Cape. Also occurring in neighbouring tropical countries to the north of South Africa.

S.W.A.—1917 (Tsumeb): Nosib (—BD), *Schoenfelder* 932. 2116 (Okahandja): 32 km E. of Karibib on road to Okahandja (—CD), *Van Vuuren* 994. 2117 (Otjosandu): Quickborn (—AA), *Bradfield* 55; farm Okarupa (—CC), *Giess* 9594. 2416 Maltahöhe: Buellspoor (—AB), *Strey* (photo only).

BOTSWANA.—2426 (Mochude): 24 km N. of Sikwane (—AD), *Reyneke* 445.

TRANSVAAL.—2230 (Messina): Lake Funduzi (—CD), *Codd* 4511; Rambuda Location (—DA), *Van Warmelo* 51219/1; Mbayinbayi (as Boiandboi), 44 km S.W. of Punda Milia (—DD), *Lang in TRV* 33275A; Tshaulu, 38 km N.E. of Sibasa (—DD), *Codd* 6914. 2231 (Pafuri): 9,6 km S. of Punda Milia (—CC), *Codd* 6003; Klopperfontein (—DA), *Van der Schijff* 4091. 2328 (Baltimore): Blaauberg, (—BB), *Codd & Dyer* 9191 (photo only). 2329 (Pietersburg): Haenertsburg (—DD), *Thompson s.n.* 2330 (Tzaneen): Tzaneen, Vygeboompoort (—AB?), *Van Dam sub TRV* 13624; Merensky Dam (—CA), *Scheepers* 842; 12,8 km N.W. of Tzaneen (—CA), *Reynolds* 5803; 1,6 km S.E. of Tzaneen (—CC), *Reynolds* 5804; Magoebaskloof (—CC), *Mogg* 10575; near Debegeni Falls, Magoebaskloof (—CD), *Mauve* 4318. 2427 (Thabazimbi): 8 km S. of Thabazimbi (—CB),



FIG. 28.—*Crinum macowanii*, the colour form growing near Escourt, Natal. The segments of the flower are suffused with rose and the dorsal band is a deep carmine. Photo by Dr. R. A. Dyer.



FIG. 29.—*Crinum macowanii*, form with glaucous leaves growing near Lydenburg. Note the beaked fruits on the right. Photo by Dr. L. E. Codd.

Codd 8676. 2428 (Nylstroom): about 13 km W. of Roedtan (–DB), Codd & Verdoorn 10379; about 11 km S. of Warmbaths (–DD), Verdoorn 2404; 13 km S. of Warmbaths (–DD) Verdoorn 2405; 2406; 2406a; 2507. 2430 (Pilgrim's Rest): Bosboustasie, Mariepskop (–DB), Van der Schijff 5071; Van Dam in TRV 26250; 22,4 km W. of Pilgrim's Rest (–DC), Codd & Verdoorn 7606; 7607; 28 km W. of Pilgrim's Rest (–DC), Codd & Verdoorn 7608; 22,4 km N. of Lydenburg near Krugerspos (–DC), Codd & Verdoorn 7609; 20,8 km N. of Lydenburg (–DC), Codd & de Winter 3356. 2431 (Acornhoek): Tshokwane (–DD), Van der Schijff 1358. 2524 (Zeerust): 24 km N. of Groot-Marico (–AD), Louw s.n. 2527 (Rustenburg): Farm Welgevonden Brits (–DB), Mogg 14504. 2528 (Pretoria): Pretoria, without precise locality, Reek 598; Gouws s.n.; 8 km N. of Radium (–AB), Bruce & Kies 38; Onderstepoort (–BA), Verdoorn 2395; 2396; s.n. sub G.N. 8990 (figured but

not published); Haakdoringboom, Onderstepoort (–BA) Hanekom 1323, 0,8 km S. of Pyramid Station (–BA), Codd & de Winter 3443 (photo only); N. of Onderstepoort (–BA); Laughton s.n.; Rietondale (–CA), Verdoorn s.n.; N. of Derdepoort (–CA), Makink s.n.; Kaalplaats, about 17 km N.W. of Pretoria (–CA), Du Toit s.n.; Pretoria University Farm (–CA), Verdoorn 2339; Wonderboom (–CA), Leendertz 964; Pyramids (–CA), Mogg 16776; Doornkloof, Irene (–CD), Verdoorn 2391; 2392; 2394; 2398; 2399. 2530 (Lydenburg): 18 km S.W. of Lydenburg (–AB), Codd & Verdoorn 7594; 6 km S. of Lydenburg (–AB), Codd & Verdoorn 7619; 7c23; 17 km S.W. of Lydenburg (–AB), Codd & de Winter 3242; 9,7 km S.W. of Lydenburg (–AB), Codd 5643; 9 km E. of Lydenburg (–BA), Codd & Verdoorn 7598; 13 km W. of Sabie (–BA), Codd & Verdoorn 7603; 7 km E. of Sabie (–BB), Codd 5652; 4 km S. of Machadodorp (–CB), Codd 8067; Mariepskop, between sawmill and waterfall (–DB), Van der Schijff 5855. 2531 (Komatipoort): Sigaas (–AD) Van der Schijff 3219; across Crocodile River from Malelane (–BC), Godfrey SV 1686; Barberton (–CC), Codd 8172; Umvoti Creek, Barberton (–CC), Galpin 667; 14 km S.E. of Kobinga (–DD), Codd 7801. 2630 (Carolina): Carolina (–AA), Cross s.n. sub G.N. 7683.

O.F.S.—2826 (Brandfort): 8 km S.W. of Winburg (–DB), Codd (photo only).

SWAZILAND.—2631 (Mbabane): between Piggs Peak and Bremersdorp (–AD), Wells 2034; below Stegi (–BD), Rodin 4570; Hlatikulu (–CD), Compton 28136.

NATAL.—2729 (Volksrust): Near Laings Nek (–DB), Mauve 4466; 17,8 km N.W. of Newcastle on Memel road (–DB), Marais 926. 2731 (Louwsburg): Between Pongola Poort and road bridge to Transvaal (–BC), Dyer & Verdoorn 5847. 2732 (Ubombo): Ingwavuma (–AA), Codd 7035; 17,9 km N. of Otobotini Store (–AC), Codd & Verdoorn 10298. 2829 (Harri-smith): Van Reenen's Pass, Mauve 4473; 9,6 km W. of Weenen (–DD), Hardy 1910; 4 km out of Estcourt on road to Innesdale (–DD), West 390. 2830 (Dundee): Mashunka (–CB), Edwards 939; 8,9 km from Tugela Ferry on road to Greytown (–CB), Killick & Marais 2115; Dundee (–AA or AB), Dahlstrand 39; Weenen (–CC), Codd 8614. 2831 (Nkandla): east of Middledrift, bank of Tugela (–CD), Strey 4179; Hlabisa (–BB), Codd 10266; Umlalazi Game Reserve (–DD), Ward 4324. 2929 (Underberg): western outskirts of Estcourt (–BB), Dyer 4861; 4862; Willow-grange (–BB), Plowes 2203; Griffins Hill (–BB), Mauve 4472. 2930 (Pietermaritzburg): 4 km from Greytown on road to Maritzburg (–BA), Killick 2115A; B; between Scottsville and Alexandra Road (–CB), Dyer 4869; Pietermaritzburg (–CD), Goossens 134; Inanda Farm (–DB), Strey 4836. 2931 (Stanger): Umhlali (–CA), Meeuse 9658; Isipingo (–CC), Ward 5897. 3030 (Port Shepstone): Umtwalumi-Ungeni junction (–BC), Strey 4446.



FIG. 30.—The robust, many-flowered form of *Crinum macowanii* found in Mozambique and the Kruger National Park. Photo by Herbert Lang.



P. Broun.

PLATE 14.—*Crinum bulbisperrnum* (Burme.) Milne-Redh. & Schweick. From Flowering Plants of Africa, Vol. 29, Pl. 1150 (1939).



FIG. 31.—The short-tubed form of *Crinum macowanii* formerly described as subsp. *confusum* of this species. Plant originally from near East London.

CAPE.—3126 (Queenstown): 27,2 km N.W. of Queenstown (-DC), *Codd 16679*; 25,6 km N. of Queenstown (-DC), *Mauve s.n.*; Queenstown (-DD), *Galpin 2210*; *Theron 2146*. 3128 (Umtata): 8,8 km from Umtata (-DA), *Killick & Marais 2068*. 3227 (Stutterheim): 8 km from Cathcart (-AC), *McNeil s.n.*; 15,5 km from King William's Town to Berlin (-CD), *Comins 1439*; 1440; 9,6 km W. of Komgha (-DB), *Codd 6349*; Gonubie Drift (-DB), *Flanagan 1708*; grassy hills near Komgha (-DB), *Flanagan 624*. 3228 (Butterworth): Butterworth (-AC), *Leach 12555*; *Pegler 1802*; 4,8 km from Butterworth along railway line (-AC), *Dyer 4509*; near Kei mouth (-CB), *Flanagan 625*. 3326 (Grahamstown): 6 km S. of Carlisle Bridge (-AB), *Archibald 7513*; Dikkop Flats (-AB), *Archibald 7566*.

This is the most widely distributed species in southern Africa reaching from the tropics southwards through South West Africa, Botswana, O.F.S., Swaziland and Natal to the north-western and eastern Cape. Although it varies considerably having several local forms yet it is recognisable, when living plants in the wild have been studied, as a definable species, characterised, among other things, by the rather open mouth of the curved, trumpet-shaped flower with black anthers showing up against the usually white inner surface of the recurved segments. The leaves are flaccid but vary in colour, width and degree of undulation. Only a few new leaves develop each year and can be seen as complete narrow leaves in the centre of the leaf cluster. As noted by most collectors of this species, the flowers are sweetly scented. This is not so in all the species.

Baker, when intending to describe a dried specimen sent in by Dr. P. MacOwan, No.2122, originally from "No Man's Land" in the eastern Cape, mistakenly concluded that it was the same as two plants flowering at that time in the Kew Gardens. One of these plants was figured on Plate 6381 of the Botanical Magazine, and it is in no wise like *MacOwan 2122*. It is *C. moorei* Hook.f., described four years earlier. Anyone who has tried to identify a *Crinum* from pressed material will appreciate that such a mistake could be made but from the living plants it is obvious that these two belong to distinct species. Having studied the living *Crinums* in the eastern Cape there can be no doubt

that *MacOwan 2122* represents the species here described. The herbarium specimen with which Baker dealt, *MacOwan 2122*, is preserved in the Kew Herbarium and since, in Baker's handwriting, the name *Crinum macowanii* (written "Macowani") appears on the label, this specimen was selected as the lectotype by Verdoorn (1956).

With regard to the subspecies *confusum* Verdoorn (1966), a further study of the species in the eastern Cape revealed a number of intermediates in the same area and it is now concluded that the specimens with the short perianth tube and long pedicels represent one of the several localized variants of this species. Two other such variants are the colour-form in the Estcourt area and the large, luxuriant form around Punda Milia and in Portuguese East Africa. The short-tubed variant of the eastern Cape (i.e. "subspecies *confusum*") is the subject of notes by Herbert (1837) where he points out under *C. variabile* that the *Crinum* figured on Plate 1178 of the Botanical Magazine is not *C. variabile* because the leaves are glaucous and the flowers do not become "red" as they fade. In this he is correct but his further conclusion that the figure "agrees better with the plants that I have of *C. capense*" are not very helpful because, as far as one can judge, his concept of *C. capense* (illegitimate name) includes *C. bulbispermum*. The figured specimen is undoubtedly the short-tubed *C. macowanii*.

A study of the description and photograph of the type specimen of *Crinum gouwsii* Traub (1954) together with specimens collected by Gouws and housed in the herbarium of the University of Pretoria, show this to be *C. macowanii*. It will be interesting to learn whether any investigator has again found, as Prof. Gouws did, the unusual chromosome number of $2n=72$ in this or any other species of *Crinum*.

21. *Crinum bulbispermum* (Burm.f.) Milne-Redhead & Schweickerdt in J. Linn Soc. (Bot.) 53: 161 (1939); Verdoorn in Flow. Pl. Afr. 29: t.1150 (1953). Type: not known to have been preserved.

Amaryllis bulbisperma Burm.f., Prodr. Fl. Cap. 9(1768). *A. longifolia* sensu Jacq., Icon. Pl. Rar., t.362 (1786); sensu L.f. in Ait. Hort Kew 1: 419 (1789), partly, as to Masson's specimen cited; sensu Red., Liliac. t.347 (1802-1815); sensu Ker-Gawl in Bot. Mag. t.661 (1803).

Crinum riparium Herb., App. 23 (1821); Amaryll. 269 (1837). Type: Burchell's specimen from the Nu-Gariep figured in Bot. Reg. on t.546 as *A. longifolia* var. *riparia* Ker-Gawl. *C. capense* sensu Herb., Amaryll. 269 (1837), non (Mill.) Herb. *C. longifolium* (L.) Thunb., Prodr. 59 (1794), partly, as to descr. and loc.; sensu Bak., Handb. Amaryll. 93 (1888); Fl. Cap. 6: 201 (1896), partly, excl. name and specimens cited from the coastal and eastern regions of the Cape.

Bulbs 7-13 cm diam. near the base and narrowing gradually towards the apex (not abruptly narrowed into a neck). Leaves glaucous green, sheathing at the base to form a false stem up to about 30 cm high, flaccid, arcuate, the outermost the broadest, up to 11 cm broad, all with a narrow cartilaginous border and scattered minute cartilaginous teeth or hairs, several to many new leaves complete with tip produced in the centre. Peduncle from 50-90 cm long, up to 2,5 cm broad and 1,5 cm thick. Spathe-valves up to about 8 cm long, 3,5 cm broad at base, becoming chartaceous but not very thin and reflexed at least the upper half; bracteoles linear. Umbels 6-16-flowered. Pedicels of different lengths, 4-9 cm long. Perianth normally with a long cylindrical tube up to 11 cm long, rarely tube only about 5 cm in young flowers; segments conniving in a narrow funnel with the apices subspreading or slightly recurved, white with a dark red keel or entirely suffused with red and the keel very dark red, 6-10 cm long, the outer about 2 cm wide, the inner about 3 cm wide about the middle or in upper half, apical peak on inner segments broadly acuminate short and blunt, on the acuminate outer segments 2-4 mm long with minute papillose hairs on inner base. Stamens declinate white or partly suffused with deep pink; anthers greyish or light brown; style deep pink in the upper portion, stigma small. Fruit subglobose, green, partly suffused with red-purple, 3-7 cm in diam., crowned with a ring but not beaked. Seeds large 1-2 cm diam., appearing smooth when turgid, reticulate later. PLATE 15; FIG. 32.

Found along rivers and streams or in damp depressions, in black clay or sandy soil. Recorded from the

Transvaal, Orange Free State, Lesotho and the north-western Cape in the drainage basins of the Orange and Vaal rivers practically throughout their lengths; also from the south-eastern Transvaal (Wakkerstroom and Piet Retief) and Natal (Estcourt, Ladysmith and Dundee) in the catchment areas of the Pongola and the Tugela rivers with exceptional records from nearer the coast, in the Pietermaritzburg region and near the mouth of the Umhlatuzi River, that is near Richard's Bay.

TRANSVAAL.—2529 (Witbank): Loskop dam (-AD), Theron 1821; Middelburg (-CD), Van der Merwe s.n.; Wassenaar s.n.; King A. 2530 (Lydenburg): 5,6 km W. of Machadodorp (-CA), Codd & Verdoorn 7593. 2627 (Potchefstroom): Frederikstad (-CA), Louw 452; Louw s.n.; 9,7 km N. of Vereeniging (-DB), Verdoorn 2340; Vereeniging (-DB), Leendertz 3890. Henley-on-Klip (-DB), Bruyn 174. 2628 (Johannesburg): Delmas (-BA), Dyer & Codd 4765; 0,8 km N. of Delmas (-BA), Codd 2181; Leslie (-BD), Van der Plank s.n.; 27 km S.E. of Vereeniging on north bank of Vaal River (-CC), Verdoorn 2341; between Balfour and Greylingstad (-DA), Reynolds 4051; Greylingstad (-DB), Dyer & Verdoorn 2378. 2629 (Bethal): 1,6 km W. of Trichardt (-AD), Tölkén 1101; 12,8 km W. of Bethal (-AD), Dyer & Codd 4764 14,4 km S.E. of Ermelo (-DB), Codd 4773; Nootgedacht (-DB), Henrici 1694; S. of Ermelo near Vaal River (-DB), Dyer & Verdoorn 5826. 2630 (Carolina): Carolina (-AA), Rademacher sub TRV 7482; Mavriestad (-CA), Pott 5166; Iswepe (-DC), Sidey s.n. 2725 (Bloemhof): between Bloemhof and Christiana (-CB), Marloth 800a; 800b. 2729 (Volksrust): 12,8 km S.E. of Paardekop (-BA), Reynolds 4053; Sandspruit (-BD), Burt Davy sub TRV 10464; Volksrust (-BD), Wedermann & Oberdieck 1229; near Volksrust (-BD) Schweickerdt 633; 3 km N.W. of Sandspruit (-BD), Reynolds 4054. 2730 (Vryheid): St. Helena near Dirkesdorp (-AC), Devenish 1059; Piet Retief (-BB), Sidey 2046; Collins sub TRV 13402.

O.F.S.—2627 (Potchefstroom): Venters Kroon (-CD), Pole Evans 19477H. 2727 (Kroonstad): near Vals River (-CA), Pont 304. 2728 (Frankfort): 14,4 km S. of Marsala (-BC), Acocks 13887; Wilge Rivier (-BC), Acocks 13896. 2828 (Bethlehem): 31,7 km from Bethlehem on Lindley road, near Vals River (-AB), Marais 1091; Clarence (-CB), Van Hoepen sub TRV 18158. 2925 (Jagersfontein): Piet River near Fauresmith (-CB), Henrici 3511.

NATAL.—2729 (Volksrust): Ballengeich, 16 km S. of Newcastle (-DD), Reynolds 4056. 2730 (Vryheid): Vryheid (-DD), Gerstner (photo only). 2829 (Harrismith): Matiwane station, 19 km N. of Ladysmith (-BD), Reynolds 4057; 20,8 km N.E. of Ladysmith (-BD), Codd & Dyer 6255; 22,4 km W. of Bergville, (-CB), Codd & Dyer 6237. 2830 (Dundee): Vantsdrift, 33,6 km E. of Dundee (-AA), Codd 5613. 2831 (Nkandla): near Umhlatuzi River mouth (-DD), Dyer 4285; Umhlatuzi,



FIG. 32.—*Crinum bulbisperma* on the banks of the Vaal River near Vereeniging. Photo by Dr. L. E. Codd.

Sugar Estate (-DD), *Dyer* 4285. 2929 (Underberg): 8 km W. of Estcourt on banks of Little Bushmans River (-BB), *Dyer* 4860. 2930 (Pietermaritzburg): Howick (-AC), *Moll* 853; 1097; Dargle Road (-AC), *Mogg* 5743; 0,4 km from Albert Falls (-AD), *Bruce* 458.

LESOTHO.—2828 (Bethlehem): Leribe (-CC), *Dieterlen* 304; 304a. 2927 (Maseru): Mamathes (-BB), *Guillarmod s.n.*

CAPE.—2819 (Ariamsvlei): Namaqualand, on banks of the Orange River (-CC), *Kraphol* 4992. 2821 (Upington): Louisvale (-AC), *Van Wyk s.n.* 2824 (Kimberley): Warrenton, on banks of Vaal River (-BB), *Hafstrom* H964; Caerwinning, on banks of Vaal (-DA), *Esterhuysen* 1193. 2923 (Douglas): Reads Drift, 40 km from the junction of the Orange and Vaal rivers (-BA), *Anderson* 611.

As pointed out by Milne-Redhead and Schweickerdt (1939), this species, generally known as the Orange River Lily, was mistakenly identified, towards the end of the 18th century, as *Amaryllis longifolia* L. (see L.f., 1784), which these authors have shown to be *Cybistetes longifolia* (L.) Milne-Redh. & Schweick. They suggested *C. bulbispermum* (Burm.) Milne-Redh. & Schweick. as the correct name for the Orange River Lily and Burmann's description of *Amaryllis bulbisperma* (Burm. 1768) exactly describes the species as we know it today. Because of the mistaken application of Linnaeus's name, it follows that Thunberg's combination under *Crinum*, *C. longifolium* (L.) Thunb. was consistently and erroneously applied to this species and Baker in *Flora Capensis* (1896) used it in this sense, but not only is the name incorrect in that work but Baker has included at least two foreign elements in his concept. Having today established the distribution of *C. bulbispermum* it is obvious that the specimen from near Cape Town must belong to another genus (there is no *Crinum* native to the Peninsula) and those from the Transkei are probably *Crinum macowanii*.

Herbert in his *Amaryllidaceae* (1837) places the Orange River Lily under the name *C. capense* (Mill.) Herb. which, as pointed out by Milne-Redhead and

Schweickerdt (1939), was an illegitimate name as well as a wrong identification. From Herbert's notes under *C. variabile* (Herb. 1837) he too included *C. macowanii*, as depicted on Bot. Mag. t.1178, in his concept of our species, the Orange River Lily.

C. bulbispermum is characterised by a combination of the following features: Leaves flaccid consistently glaucous green, their sheathing bases forming a stem-like column up to about 30 cm long with several narrow, flaccid new leaves developing in the centre; the perianth segments conniving in a narrow funnel shape with the apical portion spreading to slightly recurved, becoming reddish as the flower fades; the pedicels are long and of various lengths in the same umbel; anthers not black and fruit not beaked.

EXCLUDED SPECIES

Crinum capense (Mill.) Herb., *Amaryll.* 269 (1837), based on *Amaryllis capensis* Mill., *Gard. Dict.* ed. 8 (1768), nom. illeg., antedated by *Amaryllis capensis* L. = *Hypoxis*. In addition Miller's description does not fit Herbert's specimen but rather describes *Amaryllis belladonna*. As far as is known, no specimen was preserved of Miller's species. Herbert was dealing with the *Crinum* figured on Bot. Mag. t.661 (in error 631) which is now classified as *C. bulbispermum*.

Crinum forbesii (Lindl.) Schultes f. in *Syst. Veg.* 7: 864 (1830), based on *Amaryllis forbesii* Lindl. in *Trans. Hort. Soc. Lond.* 6, 1: 87 (1826), confused name. No type specimen has been traced to date and the description does not fit any known *Crinum* from the area travelled by Forbes (see *C. delagoense*, p. 44, 45)

Crinum longifolium (L.) Thunb., *Prodr.* 59 (1794), based on *Amaryllis longifolia* L., *Sp. Pl.* 421 (1753) = *Cybistetes longifolia* (L.) Milne-Redhead & Schweick. (1939).

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