

# Ornithogalum: a revision of the southern African species

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## ABSTRACT

A taxonomic revision of the genus *Ornithogalum* L. (Liliaceae) in southern Africa is presented. Three subgenera and 54 species are recognized; 8 of these species are new to science; there is one new subspecies, 3 taxa are accorded subspecific rank, one variety has been raised to specific rank, 4 were taken out of other genera and placed in *Ornithogalum* and one was placed under *Albuca* (see p. 372 for enumeration). Characters separating *Ornithogalum* from *Albuca* are defined. Historical notes on the genus are given and reference is made to poisonous and cultivated species.

## RÉSUMÉ

### ORNITHOGALUM: UNE RÉVISION DES ESPÈCES SUD AFRICAINES

Une révision taxonomique du genre *Ornithogalum* L. (Liliaceae) de l'Afrique australe est présentée. Trois sous-genres sont reconnus et 54 espèces; de celles-ci 8 sont nouvelles à la science; il y a une nouvelle sous-espèce; 3 taxa sont accordés le rang de sous-espèce, une variété a été relevée au rang d'espèce, 4 ont été retiré d'autres genres et remis dans *Ornithogalum* et un a été transféré à *Albuca*. Des caractères distinctives pour séparer *Ornithogalum* et *Albuca* ont été définies. Des notes d'intérêt historique sont présentées et les espèces toxiques et cultivées sont mentionnées.

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## NEW TAXA AND NEW NAMES

### SUBGENERA COGNITAE:

1. *Aspasia* (Salisb.) Oberm., comb. nov.
2. *Urophyllon* (Salisb.) Bak., comb. nov.
3. *Osmyne* (Salisb.) Bak.

### SPECIES NOVAE

- O. anguinum* Leighton
- britteniae* Leighton
- diluculum* Oberm.
- geniculatum* Oberm.
- glandulosum* Oberm.
- hallii* Oberm.
- naviculum* Barker
- puberulum* Oberm.

### SUBSPECIES NOVA

- O. tenuifolium* Delaroché subsp. **aridum** Oberm.

### NOMINA ET COMBINATIONES NOVAE

- O. apertum* (Verdoorn) Oberm. (*Albuca aperta* Verdoorn).

- O. esterhuiseniae* Oberm. (*Elsiea corymbosa* Leighton).
- O. unifoliatum* (Rowley) Oberm. (*Albuca unifoliata* Rowley).
- O. zebrinum* (Bak.) Oberm. (*Albuca zebrina* Bak.).

### STATUS NOVUS

- O. conicum* Jacq. subsp. **strictum** (L. Bol.) Oberm.
- O. hispidum* Hornem. subsp. **bergii** (Schlechtndl.) Oberm.
- O. pilosum* L.f. subsp. **pullatum** (Leighton) Oberm.
- O. tubiforme* (Oberm.) Oberm.

### SPECIES EXCLUSA

- O. amboense* Schinz = *Albuca amboensis* (Schinz) Oberm.

## INTRODUCTION

The genus *Ornithogalum* includes several species that are of importance to the flower trade and some that are very poisonous to livestock. Cytogologists are interested in this genus, because some of the species possess a low number of large chromosomes. It seemed useful, therefore, to revise the South African species, since there is now the opportunity of consulting old types housed in the European herbaria. This privilege was denied Leighton when she revised the species

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during the time of the Second World War, her work being published in the *Jl S. Afr. Bot. Vols 10-11* (1944-45). As a result, many names currently in use had to be replaced by earlier epithets overlooked by taxonomists.

The name *Ornithogalum* dates back to antiquity, the Greek *Ornithogalen* meaning Bird's Milk. Various suggestions have been put forward as to why it received this unusual name. Leighton cites old literature which stresses the whiteness of the flower. *O. umbellatum* L., a Mediterranean species common in Israel was probably the species referred to in the Bible as "Doves Dung", the scattered white flowers, seen from a distance, resembling bird droppings. Pegler, in a note on a sheet of *O. conicum* Jacq. (GRA; Pegler 219, Kentani, 1910a), draws attention to a Greek proverb which spoke of rare things, "as being as unobtainable as pigeon's milk". C. A. Smith, in *Common Names of South African Plants* (1966), noted that the phrase "Birds Milk" was frequently employed by the Romans to indicate something wonderful.

The vernacular name chinkerichees or tjenkerintjie, already in use in the eighteenth century, is an onomatopoeic attempt to imitate the characteristic squeaky sound produced when the fresh peduncles are rubbed against one another.

#### HISTORICAL NOTES

The oldest description of a South African species of *Ornithogalum* is that of Clusius in the *Curae Posteriores* on page 41, which was published in 1611 after his death in 1609. He was for many years Director of the Leyden Hortus Botanicus, called the 'Kruidthof', which was established in 1594. A translation from the Latin by Dr T. T. Barnard of Kirstenbosch is quoted here in full as it reveals the lively interest and knowledge of plants in those early days.

*Ornithogalum aethiopicum*, Clusius: "Bulbs of the genus *Ornithogalum* were brought to Amsterdam by Dutch sailors, who had collected them where they grew, in some bay situated to the west of that extreme and celebrated Promontory of Aethiopia commonly called the Cape of Good Hope, where they (their ship) had rested for some days to refresh (themselves). At the end of August 1605, Christian Porrett brought from Amsterdam a stem full of flowers of *Ornithogalum* which he gave to me and from which and from a few other characters of which I learned, I have put together this account.

According to David Mostart who sent me leaves of this species with some flowers also, it produces from a root very similar to that of the common *Ornithogalum major* (which some consider synonymous with Galen's *Asphodel*) many leaves a foot long and an inch or a little more broad, soft and, when broken, appearing furnished with fine (silk or down) threads exactly like the leaves of *Eriophorus* (a feature that I remember observing more than once in the leaves of other bulbous plants). Between these leaves arises a stout green stem a cubit high, from the centre of which to the top, right up to the apex, the flowers are produced on moderately thick green pedicels an inch or more long, (each) consisting of six snow white segments rather similar to those of *Ornithogalum arabicum* nor much smaller, their claws somewhat yellowish. From their 'umbilicus' arise six white stamens with yellow apices, of which three with broader bases surround the central 'capitulum'

which is furnished with a short thick style and is trigonous but in the course of time becomes oblong containing the seed."\*

From diaries kept by men sailing to India and touching at the Cape, long before van Riebeeck, it is apparent that they collected their plants and bulbs in the vicinity of the places where they filled their casks with fresh water. Leighton believed Clusius's plant to represent *O. conicum* (syn. *O. lacteum*), which appears most likely, as it is tall and has pure white flowers. However, both *O. conicum* and *O. thyrsoides* grow on the south-western Cape coast but, as the latter is usually somewhat smaller and has flowers with a dark centre, it seems more likely that *O. conicum* was the first Cape *Ornithogalum* species to be cultivated in Europe. Unfortunately a specimen was not preserved; this was seldom done in those early days. Parkinson in his *Paradisi in Sole* 138 (1629) refers to the Clusius plant.

Hermann, in his *Catalogue of the Leyden Botanical Garden* in 1687, mentions 13 species of *Ornithogalum*, but the two from the Cape are now placed in *Eriospermum* [*E. capense* (L.) Salter] and *Bulbine* [*B. tuberosa* (Mill.) Oberm.]. Similarly, Linnaeus in his *Species Plantarum*, 1753, records two Cape species, now also removed to other genera, viz. *Eriospermum capense* (L.) Salter and *Albuca canadensis* (L.) Light.

Towards the end of the eighteenth century a number of species was added to the genus. Houttuyn, in his *Nat. Hist.* 2, 12: 309, t. 82, f. 3 (1780), described a yellow-flowered Cape *Ornithogalum* which he compared with Hermann's species published in the above-mentioned Leyden catalogue under the phrase-name *Ornithogalum africanum luteum odoratum foliis cepaceis radice tuberosa*, which is now *Bulbine tuberosa* (Mill.) Oberm. He was dubious about his plant belonging to Hermann's species, hence he used the epithet *dubium*. Towards the end of the eighteenth century came the golden age of flower painting with especially the Jacquins and Redouté illustrating rare plants growing in royal gardens. The Jacquins, father and son, described and painted 22 plates of Cape *Ornithogalum* plants flowering at the Royal Gardens at Schönbrunn in Vienna, probably all collected by Boos and Scholl, who were commissioned to collect plants in southern Africa and elsewhere. Redouté in the *Liliacées* painted several Cape species and many more appeared in England, in Phillip Miller's works, Curtis's *Botanical Magazine*, Loddiges's *Botanical Cabinet*, *Botanicum Refugium* and elsewhere.

During the nineteenth century works on systematic botany by Willdenow, Roemer & Schultes, Kunth and later Baker in the *J. Linn. Soc.* 13 (1873), listed all the *Ornithogalum* species known to them. In 1897 in the *Flora Capensis* Volume 6, Baker dealt with

\* Comments by Dr T. T. Barnard on Clusius and the reference to *Eriophorus*: "Clusius used *Eriophorus* as the generic name for *Scilla peruviana* and also *Bulbus eriophorus* for *Scilla hyacinthoides* L. According to the *Bot. Mag.* sub. t. 1140, this latter species was called *Eriophorus* by Clusius because of the silky fibres which show themselves as wool on such parts of their coats or bases of the decayed leaves as are broken or torn, "a character not peculiar to this species". The observation applies apparently to the broken ends of the leaves that David Mostart gave him. Clusius does not state whether the leaves were glabrous or minutely ciliate. The "lanugo" are the silky threads that pull out of the leaf when it is gently broken (viz. the xylem conducting tissue). Of course by August 1605 the leaves would have been probably 'over-mature' to drying off. I have tried on *Ornithogalum* leaves here but they are very soft and disappear almost at once; perhaps in nature or in dry leaves they persist better."

the South African species. To these must be added those from South West Africa, which appeared in the Flora of Tropical Africa, Volume 7 (1898).

Leighton in the Journal of South African Botany in Vols 10-11 (1944-45) revised the South African species: she was the first systematist to be well acquainted with many live "chinks" in their natural habitats. I have been privileged to receive on loan type specimens from Uppsala, Lund, Kew, Zürich, Munich and Geneva, which greatly assisted me in my revision. Nevertheless, more cytological research and fieldwork are needed to help clear up many unresolved problems encountered.

#### SUBGENERA AND DIFFERENCES BETWEEN *ORNITHOGALUM* AND *ALBUCA*

Salisbury in his Gen. Pl. Fragm. (1866), which appeared after his death, divided *Ornithogalum* into 11 genera without convincing reasons for doing so. Baker, however, in J. Linn. Soc. 13: 258-262 (1873), adopted seven of Salisbury's names as subgenera and since then other systematists have followed suit. Under some subgenera, e.g. subgenus *Beryllis*, Baker listed Mediterranean as well as South African species, but I prefer to keep our species in three separate subgenera, based on three of Salisbury's genera which included only South African species. I have therefore taken up firstly, Salisbury's *Aspasia* as a subgenus to include the majority of our species for in it Salisbury included *O. conicum*, *O. thyrsoides* and *O. dubium*, secondly, his genus *Urophyllon* and thirdly, *Osmyne*, which had been accepted by Baker and Benthams & Hooker as a subgenus. The subgenera are shortly discussed below.

The first subgenus, *Aspasia*, is characterized by its attractive flowers; the large, white or brightly coloured perianth-segments are without a midrib, or, in some smaller species the shiny white "petaloid" segments develop a dorsal dark streak with age. The fusiform capsule contains many very small seeds. *O. thyrsoides* resembles the type species of the genus, *O. arabicum* L., a somewhat aberrant species from the Mediterranean, possessing 51 chromosomes, not the low number found in the southern species, which must have become isolated early on in their evolution.

Three groups are recognized. The first, the *Aspasiae*, contains the well known large-flowered Chinkerichees in which the white, yellow, orange or buff perianth segments show no dark midrib; the bracts are foliaceous or petaloid, boat-shaped and large and the margin is smooth. The second group, the *Hispidae*, forms the characteristic proteranthous leaf rosette, which becomes elongated when the peduncle develops. The plants and their white or rarely pink flowers are smaller than the *Aspasiae*, but the minute seeds closely resemble those of the first group. The bracts, however, are comparatively small, membranous, deltoid-aristate, somewhat auriculate and the margin denticulate. The third group, the *Angustifoliati*, develops bracts similar to those of the *Hispidae* group and also possesses white perianth-segments, which develop a dark dorsal midrib with age. The synanthous leaves vary from one to few to many and are mostly very narrow. Whereas the first two groups are predominantly Cape plants, the *Angustifoliati* are widespread, mostly in the summer rainfall region.

The second subgenus, Salisbury's genus *Urophyllon*, meaning tail-leaved, consists of two different elements. The first, misidentified as *O. niveum* by Ker (t. 235 of Botanical Register), represents *O. graminifolium* Thunb. and belongs to the subgenus *Aspasia*. The second, *O. caudatum* "Jacq.", a synonym of *O.*

*longibracteatum* Jacq. with its long tapered bracts, was accepted by Baker as belonging to the "section" *Urophyllon*; this is mentioned in the text to this species, portrayed on Plate 262 of Saunders's Refugium Botanicum Vol. 4 (1871). However, in the previous year, in Volume 3, when he described *O. acuminatum* (t. 177), Baker had established the subgenus *Urophyllon* (Salisb.) Bak., providing it with a short Latin description. (The plate bears the erroneous caption "*O. canaliculatum*".) He stresses its close affinity to *O. virens* Lindl. and in the Flora Capensis 6: 513 1897, considers it to be a synonym of *O. ecklonii*, all now placed here under *O. tenuifolium* Delaroche, a species closely related to *O. longibracteatum*. In J. Linn. Soc. 13: 260 (1873) and afterwards in Flora Capensis 6: 496 (1897), however, the subgenus *Urophyllon* is not taken up: instead these species, together with many others and including species from Europe, are all placed by Baker in the subgenus *Beryllis*.

Species belonging to the subgenus *Urophyllon* were also placed in the genus *Urginea* by Baker, Rendle, Bremekamp, Weimarck and others, but this genus with its spurred bracts, flat, almost winged seeds and a bulb usually consisting of loose imbricate scales, is very different from *Ornithogalum*.

According to Prof. R. de V. Pienaar (personal communication) the karyotype of this subgenus differs markedly from the subgenus *Aspasia*. He was unable to cross species belonging to the subgenus *Aspasia* with species of the *O. tenuifolium* (= *O. virens*)—*O. prasinum* group here placed in the subgenus *Urophyllon*.

The species *O. stapffii*, *O. tubiforme*, *O. candidum* and *O. rautanenii* from South West Africa, were also placed in this subgenus although their morphology is not typical. *O. saundersiae* from Natal and the eastern Transvaal is also atypical in that the cream perianth-segments do not develop a dark midrib, but all these species possess capsules and seeds typical for this subgenus.

The eight species placed here in the third subgenus, *Osmyne* (Salisb.) Bak., form a natural group, which possesses very similar sweet-scented flowers, with the long, exerted, deflexed style and its pompom-like stigma being one of its outstanding characters. It is confined to the south-western Cape and southern South West Africa. It differs from *Albuca*, with which it has been identified at times, in its spreading to reflexed perianth segments, its 6 uniform stamens with subulate filaments and ovoid ovary. In *Albuca* the inner perianth segments are erect and connivent and bear a retrorse glandular-papillate flap at the apex. The stamens, whether all fertile or not, have the 3 inner with basally winged filaments moulded over the obtuse, 3-ribbed ovary; the wings curve inwards over the ribs at or below the style-base, thus giving the filament the waist-like appearance when dissected and figured. Typical species of *Albuca* have a scabrid prismatic style; in some species the style may be smooth and terete, but the bulbous stigma of *Ornithogalum* is absent.

#### PHYLOGENY

The phylogenetic pattern of *Ornithogalum* appears to be more or less similar to that of *Gladiolus*. It has been suggested that these two genera and a few others have evolved in the southern Cape, for here we find the greatest concentration of species with a low number of chromosomes. In the Mediterranean region there is a second but smaller focal point of speciation [Feinbrun (1941); Goldblatt (1971)]. One

species, *O. convallarioides*, is endemic to Madagascar. When Perrier described this species, he was somewhat doubtful about placing it in this genus, but the characters of the flowers, capsules and seeds agree with *Ornithogalum*.

One of the most primitive species appears to be *O. juncifolium* with its small unspecialized flowers. It is common, variable and widespread in the eastern Cape, extending its range further north along the escarpment but not penetrating very far to the west. It is placed here, together with other allied species in the third group, the *Angustifoliati* of the subgenus *Aspasia*. The second group, the *Hispidae*, are mainly clustered in the western Cape where they, as might be expected, have diversified into a number of closely related but distinct species. From the widespread *O. hispidum*-type of species the larger chinkeriches with their many beautiful flowers could have evolved. They are placed here in the first group, the *Aspasiae* and are endemic in the winter rainfall region with two species extending east as far as the Transkei and one, possibly a relic, found on the Drakensberg at high altitudes. The second, subgenus *Urophyllon*, with fewer species may have originated from a common ancestor or evolved separately. It has an eastern distribution extending from the eastern Cape to tropical East Africa, but there are also several species in South West Africa and southern Angola. The third subgenus, *Osmyne*, with eight species, appears to be an offshoot from *Urophyllon*. It is restricted to the western Cape and southern South West Africa and is closely related to *Albuca*, which is considered to be more specialized.

#### MORPHOLOGY AND PAEDOGENESIS

##### Morphology

##### Bulbs

The tunics are either completely fused and cylindrical or clasping with free margins. The bulbs, in the group *Angustifoliati* especially, are often markedly asymmetrical. Those of the winter rainfall region are mostly small in relation to the size of the plant, whereas those from the summer rainfall areas are large, firm and globose. Two species, *O. paludosum* and *O. esterhuysenae*, which grow in permanently wet habitats, do not form a normal swollen bulb as there is no need for reserve food storage; the underground part is more or less rhizomatous or there is a slight bulge. Leighton placed these two species in a separate genus, *Elsiea*, but this difference does not warrant generic separation. She also referred to the fusion of the perianth-lobes at the base, but I could not verify this observation.

##### Bulbils

These are commonly produced. In *O. longibracteatum* the bulbils were found to be stalked, serial, axillary buds situated on the abaxial side of the tunic above it, with the stalk fused to the tunic (cf. Samson & Karstens, 1971). This inherent trait of extreme proliferation has been used to good advantage in the production of cultivars.

##### Leaves

There is great variety in the leaves; from one to numerous, from filiform to flat and broad and in one instance a solitary succulent, clavate leaf was found (*O. unifolium*). In three e.g. *O. anguinum*, *O. monophyllum* and *O. zebrinum*, the 1–2 leaves are enveloped basally by a membranous tubular, transversely striped cataphyll, viz. a sheath without a lamina. If the leaf-blades are destroyed, a number of secondary slender, narrow leaves different from the original leaves often

make their appearance. From what zone of the bulb they are developed could not be seen on herbarium sheets. It is possible that they are formed from latent axillary buds. This phenomenon also occurs in *Albuca*. In nature, the leaves are usually deciduous, in response to predominantly dry conditions but, when growing in a mild climate all the year round, the leaves become larger, firmer and more numerous, as is seen in *O. conicum*(=*O. lacteum*), *O. graminifolium*(=*O. aloiforme*) and *O. longibracteatum*.

In cultivation under optimal conditions, the leaves of the plants can change considerably. This variability has led to a number of cultivated plants being described several times. A case in point is *O. unifolium*, a plant originally collected by Thunberg, who sent live bulbs to Retzius in Lund. When growing in dry karroid surroundings, it produces a small, leathery, oblong leaf just above the ground. In cultivation, the leaf elongates, becomes thin, green and erect and a second or even a third leaf may develop. Looking at the Jacquin plate of *O. fuscatum* (1795), with its leaves and attractive flowers (no doubt somewhat embellished by the painter), it is not obvious that it is the same as the Little Karoo plant with its one leaf and nondescript flowers. Fortunately, the basic parts of the flower, the stamens, gynoecium, capsule and seeds remain true to type.

A most unusual species, unfortunately known only from one gathering, is *O. britteniae* from the eastern Cape. The 4–7 xerophytic, hard and thick leaves are distichous and somewhat resemble those of some *Gasteria* species. The leaves appear to be permanent and not deciduous. The flowers conform to the subgenus *Aspasia*, the *O. juncifolium* group of species. One could speculate: does it represent an ancestral form of the tribe *Aloineae*?

##### Inflorescence

The simple racemes vary from long, many-flowered and subspicate to subcorymbose and often fewer- but bigger-flowered. The peduncle is always naked and smooth, erect or gently curved or, in one species geniculate.

*Bracts*.—They usually provide useful characters in placing species in the subgenera. In the true "chinks" viz. the subgenus *Aspasia*, group *Aspasiae*, they are mostly large with smooth margins, petaloid or foliaceous. In the groups *Hispidae* and *Angustifoliati* they are small, membranous and denticulate. In the subgenus *Urophyllon* the bracts develop and wither at an early stage; in some species, for instance in *O. pulchrum* and *O. longibracteatum*, the plants develop bracts which much overtop the flowers even in the bud stage, giving it a plumose appearance; but in some of these plants their growth is inhibited—a possible mutation. The same situation was observed in *Dipcadi viride*.

##### Flowers

The flowers are invariably actinomorphic. The perianth consists of 3 outer and 3 inner free segments and may be without, or possess a green or dark, 3–7-nerved midrib. Two species, *O. monophyllum* and *O. tubiforme*, are an exception in that the segments are fused basally to form a short tube. The majority of species bear white flowers but three Cape species, two with large flowers, develop colour. *O. dubium* may produce yellow, orange or deep orange-red perianths but in some cases it reverts to white although all flowers exhibit a dark centre. *O. maculatum*, also bearing large yellow or orange-red flowers, displays a black blotch near the apex of the outer segments. Thirdly, there is the smaller flowered *O. multifolium*

with buttercup yellow perianths. In the Transvaal and Natal there is one tall attractive species, *O. saundersiae* with deep ivory coloured perianth-segments and a very dark ovary.

### Stamens

The 3 outer filaments are always narrower than the 3 inner. The inner show a great deal of variation in the Cape and South-West African species, especially in members of the subgenus *Aspasia*. In most of these, the lower half of the filament forms lateral outgrowths which may be square, wing-like, fringed, horned or heart-shaped and adpressed to the ovary. Kerner & Oliver (1902) interpret these lateral expansions on the lower part of the filament as modified stipules. In some species, such as *O. tenuifolium* and *O. suaveolens*, where the filaments are normally ovate-acuminate, a small tooth may occur on each side. This is possibly an atavistic feature, but it is without importance for separation on specific level.

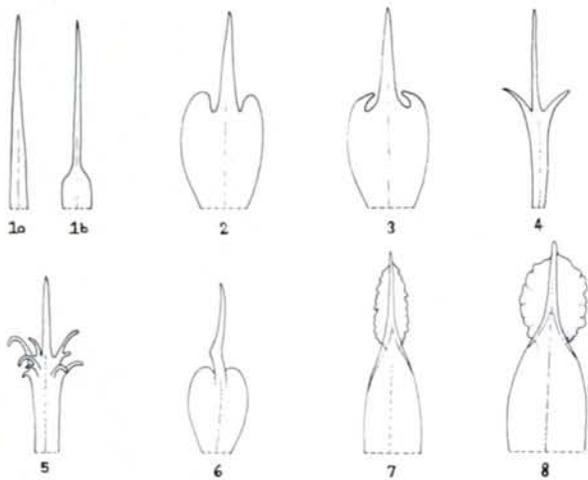


FIG. 1.—Filaments of some species of *Ornithogalum*. 1, *O. conicum* subsp. *conicum*, a, outer filament; b, inner (Pegler, s.n.). 2, *O. thyrsoides* (Leighton 16548). 3, *O. dubium* (Pillans 9186). 4, *O. bicornutum* (Leighton 2366a). 5, *O. deltoideum* (Dinter 4987). 6, *O. hallii* (Hall 4503). 7, *O. constrictum* (Dyer 3332). 8, *O. inclusum* (Esterhuysen 7635). Figs 2–8 showing inner filaments.

### Ovary

Two species from South West Africa, *O. rautanenii* and *O. stapffii*, form a broad 6-lobed disk at the base of the ovary. *Ovules*. In a number of species in the subgenus *Aspasia* the biseriata axial placentation of the ovules appears to have been doubled, resulting in a crowding of the minute ovules and seeds. The formation of multiseriata ovules appears to be an unstable character as in some species, e.g. *O. conicum* Jacq. and *O. graminifolium* Thunb., they were biseriata in some specimens and multiseriata in others. This may possibly be linked to more favourable conditions for it was often the cultivated individuals that would show multiseriata ovule development. The style is absent or very short in a few species, e.g. *O. dubium*, *O. maculatum*, *O. multifolium* and *O. rupestre*, but well developed in all others, about as long as the ovary, or longer in the subgenus *Osmyne*. In this latter subgenus it is always deflexed to one side at anthesis. A few plants in the *Hispidae* group are reported on occasion as having the style bent to one side when flowering. The stigma varies from small and 3-lobed with the edges of the lobes minutely glandular to large and pompom-like because of the many long stipitate glands present in the subgenus *Osmyne*.

### Septal glands

Opposite the broader inner filaments the grooves, partitioning the locules of the ovary, secrete nectar from septal glands, which spills into the cavities between ovary and filaments. Thus the wide filaments fulfil a useful function in furthering pollination.

### Capsules

In the subgenus *Aspasia*, group *Aspasiae*, the capsules are fusiform topped by the persistent style-base, transparent and hidden inside the closed, smooth, papery, dry perianth-segments. In the smaller flowered species they protrude from the old perianth. The capsules of the other two subgenera are usually oblong-ovoid, globose or ovoid and obtuse to retuse, bluntly or sharply triangular with distinct ribs. The perianth-segments dry up haphazardly or they may be reflexed. (Fig. 2).

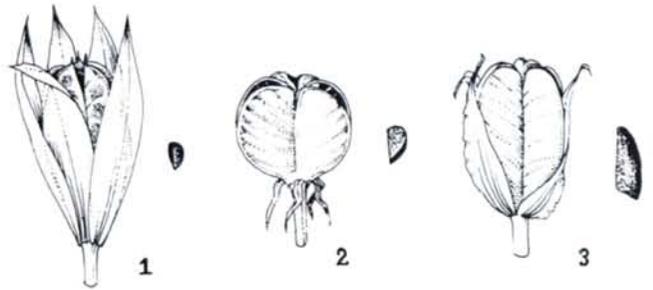


FIG. 2.—Capsules and seeds. 1, *O. conicum* (Pegler 219). 2, *O. tenuifolium* (Strey 5144), 3, *O. suaveolens* (Acocks 14740).

### Seeds

The seeds are all black and shiny. A survey of the seeds shows the heterogeneous nature of the species placed in this genus. Species belonging to the subgenus *Aspasia*, groups *Aspasiae* and *Hispidae*, produce minute seeds 0.5–1 (–2) mm long, which are typical in shape and sculpture for each species. They are cuneate, pear- or comma-shaped or many-sided but never flattened. The seed coat is papillate to spiky. (Fig. 3). The third group, the *Angustifoliati* produces seeds that are usually larger (up to 4 mm) and they are usually flattened or many-angled with raised ridges. (Fig. 4.5–6).

In the subgenus *Urophyllon* the seeds are larger, flattish and angular. In some of the larger species they are discoid, up to 9 mm in diameter. They are placed in one longitudinal row, the right and left seeds from the two placental ridges alternating with one another. (Fig. 4.7). In the subgenus *Osmyne* the seeds are also flattened, mostly D-shaped with the straight side forming a thickened ridge (Fig. 4.8a, b).

### Paedogenesis

*Ornithogalum* plants flower at an early stage in their development. These young plants form perfect miniatures of the older, much larger and taller parents, but bear fewer leaves and flowers. The seed is very fertile and in previously disturbed areas large numbers of plants, all of the same size, can be observed. If circumstances are unfavourable they may remain small, as can be seen for instance in *O. juncifolium*. When occurring in rock-crevices in the mountains, this species is not more than 10 cm tall with thin fine leaves, but in the eastern Cape karroid areas it becomes tall, coarse and xeromorphic.

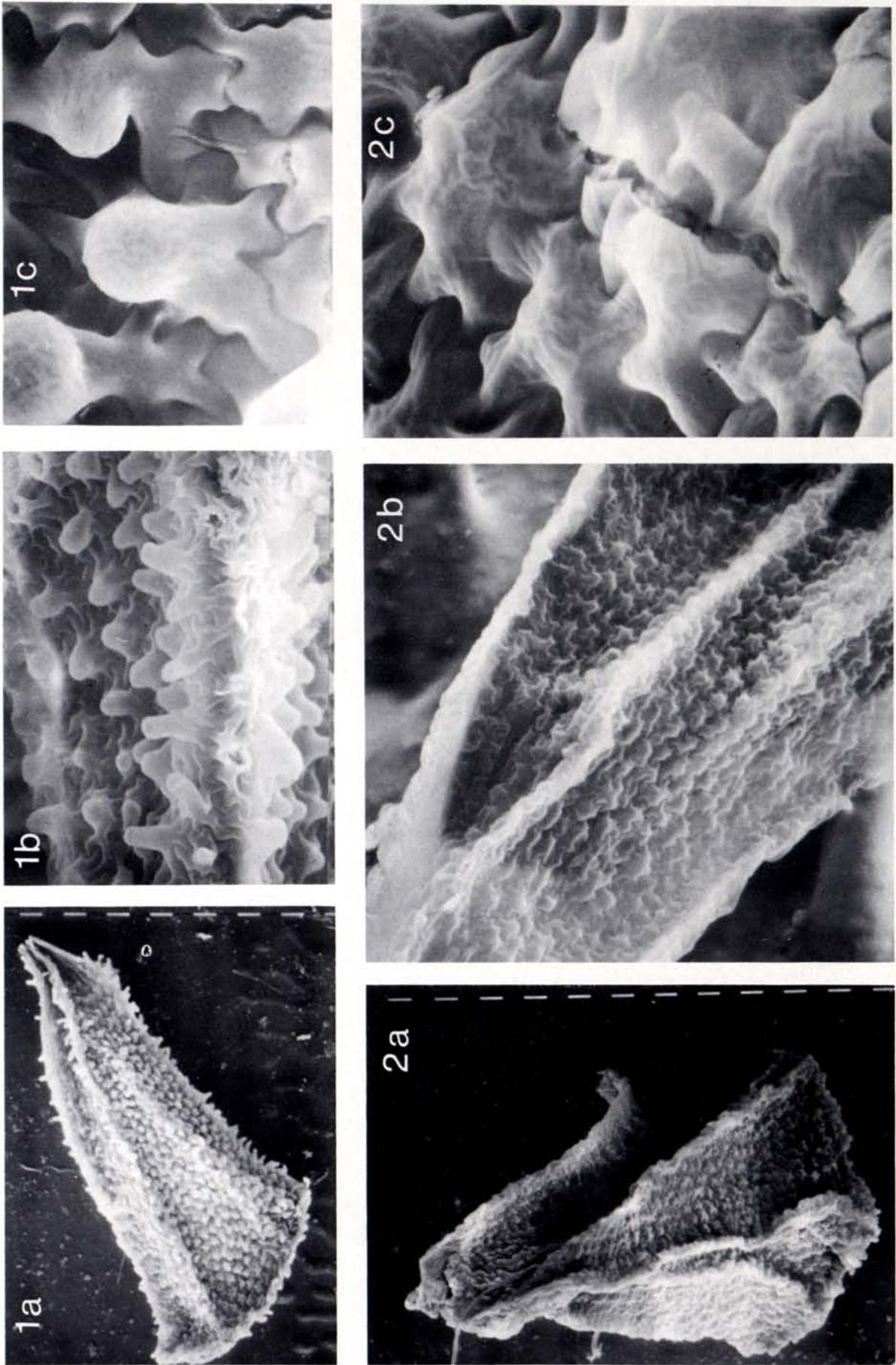


FIG. 3.—Seeds of *Ornithogalum* species. 1, *O. conicum* subsp. *strictum* (Godfrey SVH 1250): a,  $\times 40$ ; b,  $\times 160$ ; c,  $\times 640$ . 2, *O. thyrsoides* (Mauve 4980). a,  $\times 40$ ; b,  $\times 80$ ; c,  $\times 640$ .

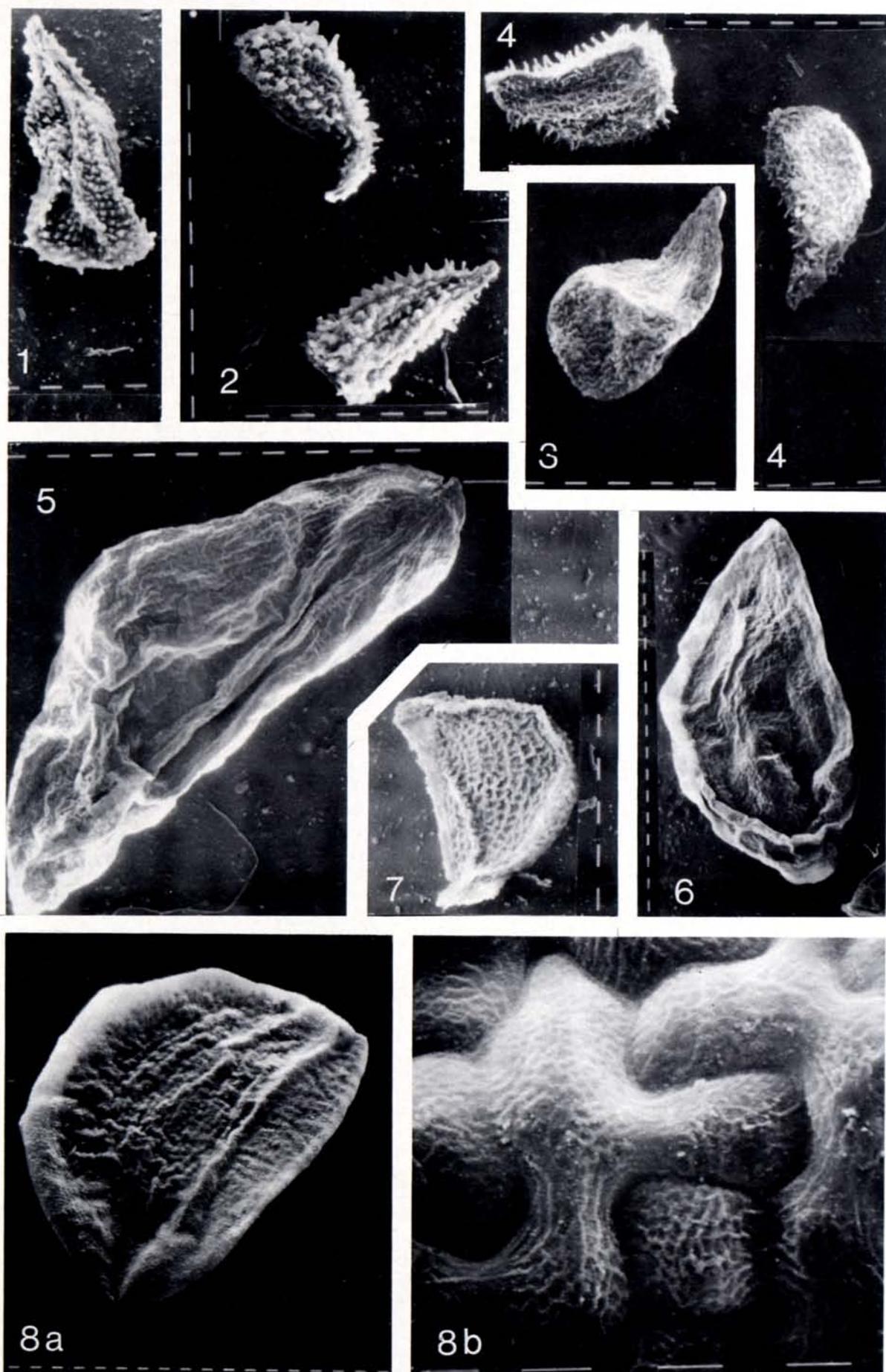


FIG 4.—Seeds of *Ornithogalum* species. 1, *O. pruinosum* (Bayliss 563)  $\times 40$ . 2, *O. dubium* (Oliver 5198)  $\times 40$ . 3, *O. maculatum* (Marloth 17052)  $\times 40$ . 4, *O. hispidum* (Oliver 5070)  $\times 40$ . 5, *O. graminifolium* (Acocks 16547)  $\times 40$ . 6, *O. juncifolium* (Dahlstrand 2187)  $\times 40$ . 7, *O. tenuifolium* (Venter 2565)  $\times 20$ . 8, *O. suaveolens* (Barker 10470): a,  $\times 20$ ; b,  $\times 1250$ .

## CYTOLOGY

Quintanilha & Cabral (1947) published their discovery of an *Ornithogalum* (*O. virens* Lindl., a synonym of *O. tenuifolium* Delaroché) with only 3 haploid chromosomes, an unusually low number. Weyers & Reusch (1952) discussed the meiosis of the species and Warden (1954) also studied this species. J. M. J. de Wet (1957) was the first cytologist to study the South African tribe *Scilleae* in the family Liliaceae, to which the genus *Ornithogalum* belongs. Examining about 35 plants belonging to 11 different species, he found that the majority possessed 12 somatic chromosomes ( $n=6$ ). In some, an extra pair was present, but morphologically these individuals could not be distinguished.

From 1963 to 1968 R. de V. Pienaar published the results of his extensive cytogenetic studies. In the *Jl S. Afr. Bot.* (1963) he dealt with a large number of species, ecotypes, forms and hybrids. In some cases he did not agree with De Wet's findings. Together with Roos (1966) and Van Niekerk (1968) he published a further detailed account of the Cape chinkeriches and their relationships. Roos (1964) wrote an M.Sc. thesis on the same subject. Cytogenetically, Van Niekerk & Pienaar (1968) recognized in the *Aspasiae* group (those with large flowers), seven monotypic cenospecies and two species complexes, the two complexes being *O. dubium* (= *O. miniatum*) and *O. thyrsoides*. Three cenospecies easily recognized are *O. maculatum*, *O. multifolium* and *O. pruinatum*. However, the following regarded by them as four separate species, namely *O. conicum*, *O. lacteum*, *O. synanthifolium* and *O. lacteum* forma nov. with  $X=5$  (not  $X=6$  as in all others), appear to me to belong morphologically, to one species complex viz. *O. conicum*.

Overseas cytologists mainly studied the Mediterranean species, but Neves (1952, 1953a, 1953b, 1962) examined several South African species.

## POISONOUS SPECIES

The species *O. thyrsoides* and *O. conicum* from the Cape are known to be extremely poisonous. All parts of the plant contain the poison, the seeds proportionately more. The poison is present in extracted toxic resins, but so far its chemical composition is not known. A single inflorescence, fresh or dry, accidentally included in forage, may kill a horse. Cattle are somewhat more resistant. Typical of *Ornithogalum* poisoning is blindness, which may become permanent in severe cases. If much is consumed, there may be sudden heart failure. Other symptoms are a loss of appetite, diarrhoea, weakness of the hindquarters causing a swaying gait and a rapid deterioration of condition. In the summer rainfall region *O. saundersiae* Bak. from the eastern Transvaal and northern Natal is known to be very poisonous. *O. prasinum* Lindley from the Karoo and north-western Cape and drier areas of the south-western Transvaal and the Springbok Flats has also been tested and found to be toxic. The closely related species *O. seineri* Oberm. has been suspect but, although the tested animals showed the typical symptoms of *Ornithogalum* poisoning, they did not succumb.

## CULTIVATED SPECIES AND CULTIVARS

*O. thyrsoides* and *O. conicum* are the two species mainly involved in the production of cut-flowers for the trade. Because of their long lasting freshness, these "chinks" are ideal for export. The stalks after cutting are dipped in wax and will last for weeks, the buds

expanding gradually. A project of hybridizing these species with others was undertaken in Stellenbosch by Pienaar (1963-1968) and his students during the 1960's in an attempt to improve existing stock and to introduce if possible yellow- and orange-coloured flowers. The cytogenetic results accomplished by them laid the foundations for a better understanding of this difficult, variable group. At present the work of breeding new cultivars is being continued at the Horticultural Research Institute at Roodeplaat near Pretoria. Several outstanding cultivars have evolved, some producing tall, sleek spikes with open flowers from the bottom to the top, others with large-flowered subcorymbose racemes. The crosses also enhanced the production of a stronger sweet scent. A great asset of the genus is its ability to multiply by bulbils, the so called "kraaltjies" or beads. Treated in a certain way the bulb scales will produce strings of bulbils which will come into flower within 18-24 months.

In the eastern Transvaal and neighbouring Swaziland and Natal, we find *O. saundersiae*, one of the few attractive northern species that are of interest to the gardener. This tall plant with its cream flowers and dark ovary is often cultivated. Unfortunately, it is also poisonous to livestock and has multiplied alarmingly in some of these areas.

## ORNITHOGALUM

*Ornithogalum* L., Sp. Pl. 306 (1753); Gen. Pl. ed. 5: 145 (1754); Kunth, Enum. 4: 349 (1843); Harv., Gen. Pl. 397 (1868); Bak. in *J. Linn. Soc.* 13: 257 (1873); Benth. & Hook. f., Gen. Pl. 3: 815 (1883); Bak. in *Fl. Cap.* 6: 494 (1897) and *Fl. Trop. Afr.* 7: 544 (1898); Leighton in *Jl S. Afr. Bot.* 10: 86 (1944); Phill., Gen. ed. 2: 191 (1951); Oberm. in *Dyer, Gen.* 2: 936 (1976). Type species: *Ornithogalum arabicum* L.\*

*Caruelia* Parl., *Nuov. Gen.* 22 (1854); Walp., *Ann.* 6: 119 (1861).

*Ardernia*, *Aspasia*, *Beryllis*, *Brizophile*, *Cathissa*, *Eustachys*, *Monotassa*, *Myanthe*, *Osmyne*, *Phaeocles*, *Taeniola*, *Urophyllon* Salisb. in *Gen. Pl. Fragm.* 33-35 (1866).

*Elsiea* Leighton in *Jl S. Afr. Bot.* 10: 55 (1944).

Petaloid bulbous plants with parts above ground usually deciduous. *Bulb* with fleshy tunics sometimes extended above into a neck; occasionally poorly developed in wet habitats; bulbiferous. *Leaves* proteranthous or synanthous, rosulate or distichous, 1-many, filiform to oblong, acute to acuminate, clavate and succulent in one species, glabrous or hairy, margin smooth, ciliate, fimbriate or muricate; in a few species surrounded basally by bladeless tubular cataphylls. *Inflorescence* a simple subspicate to corymbose raceme, many- to few-flowered; peduncle naked, erect or somewhat curved or geniculate; bracts large to small, various, persistent, often precocious; pedicels short to long. *Flowers* bisexual regular, large and showy to small, diurnal, rarely nocturnal, scented or scentless. *Perianth-segments* 6, free or rarely fused at the base, in two subequal

\* *O. arabicum* L., now accepted as the type species of the genus, comes from the Mediterranean Region. Clusius, in his *Hist.* 11: 186 (1601), described and illustrated the species as *O. arabicum* and this epithet was adopted by Linnaeus, who added "Habitat juxta Alexandriam, Egypt." It is occasionally cultivated in South Africa and somewhat resembles *O. thyrsoides*, but can be distinguished from the latter by its 6-ribbed, obovoid black ovary, the lanceolate filaments and the fairly large, dirty white perianth turning yellowish with age. It is propagated by bulbils; apparently it does not set seed. *Chromosomes*:  $2n=51$ . cf Neves (1952).

whorls, the inner slightly larger, spreading at least at anthesis, persistent, white, green, yellow, orange or buff, without or with a median green or dark striate central longitudinal band, apex cucullate with minute stipitate glands. *Stamens* 6, in 2 whorls, usually subequal; filaments filiform to ovate-acuminate, or forming lateral expansions variously shaped, the outer usually narrower; anthers bilocular, versatile, introrse. *Ovary* 3-locular, ovoid or globose, rounded or trigonous with prominent ribs, sessile or stipitate, rarely on a saucer-shaped, 6-angled disk; ovules axile, biseriate or multiseriate, few to many; style terete, erect or deflexed, or absent; stigma apical, small, 3-lobed to large, globose and glandular-stipitate. *Capsule* loculicidal, fusiform, globose to

deeply trigonous and prominently ribbed; walls transparent or leathery; seeds variously shaped, minute (0,5 mm) to large and discoid (8 mm in diam.), black, shiny, epidermis smooth, colliculate, papillate or echinulate; endosperm firm, embryo small. *Chromosomes* (S. Africa):  $2n=6, 10, 12, 14, 16, 18, 24, 54$ .

A genus consisting of about 200 species found in Europe, Africa and western Asia. In southern Africa 54 species are recognized, with the greatest concentration of species in the south-western Cape; their habitats vary from dry, karroid areas with great extremes in temperatures, to marshes, riverbanks and alpine localities. Common names are Chinkerichees, Tjienks, Tjienkerintjie and Star of Bethlehem.

## KEY TO SPECIES

- Style absent to about as long as ovary and stamens, erect, rarely deflexed at anthesis; stigma small, obscurely 3-lobed or capitate with sessile glands; perianth segments large to small, without or with a midrib; (to p. 333):
- Capsule fusiform to ellipsoid, transparent, hidden inside or protruding above from the dry closed perianth, the segments without or with a dorsal midrib at senescence; seeds 0,5-2(5) mm, pyriform, comma-shaped, cuneate or variously compressed; (to p. 332):
- Bracts boat-shaped, firm, entire; flowers bowl-shaped to patent, white or variously coloured, without a midrib, often with a dark centre; perianth segments 10-24 mm long; subgenus 1. *Aspasia*; group 1, *Aspasiae*:
- Leaves lorate, canaliculate or flat, margin usually minutely fimbriate:
- Style about as long as ovary, thin; perianth white, with or without a dark centre; bracts petaloid and whitish when dry; seeds fairly smooth:
- Usually tall plants up to 1 m high; racemes many-flowered; filaments filiform, the inner with or without short lateral square appendages; seeds 1-3 mm, fairly smooth. . . . . 1.0. *conicum*
- Usually smaller plants less than 1 m tall; 3 or 6 filaments with lateral pointed wings or all narrowly ovate; seeds 0,5-2 mm:
- Leaves glabrous, margin fimbriate or smooth:
- Bulb comparatively small, 10-30 mm in diam., with soft whitish tunics; perianth white or cream, often with a green, buff or yellow centre which fades with age; ovary obtuse; style long, slender; seeds 2 mm, somewhat papillate; plants inhabiting vleis, sandy flats or lower mountain slopes. . . . . 2.0. *thyrsoides*
- Bulb c.30 mm in diam. (smaller in *O. subcoriaceum*) globose, firm, with hard dark tunics; perianth white; ovary attenuated into the style; seeds 0,5 mm; plants usually inhabiting rock pockets:
- Plants c. 0,15-0,35 m tall:
- Leaves contemporary with the flowers, glaucous, oblong, erect with smooth margins; Clanwilliam to Richtersveld. . . . . 3.0. *pruinosum*
- Leaves usually withered at anthesis, prostrate, dark green, soft, margin fimbriate; widespread in western and eastern Cape. . . . . 4.0. *fimbrimarginatum*
- Plants 0,05-0,1 m tall, dwarf, usually with 3-4 leaves contemporary with flowers; peduncle short; S.W. Cape mountains. . . . . 5.0. *subcoriaceum*
- Leaves softly puberulous, thin, contemporary with flowers; southern S.W. Africa. . . . . 6.0. *puberulum*
- Style absent or, if present, short and stout, the ovary attenuated into the style which forms the beak of the capsule; perianth orange, yellow, red, buff or white, with or without a dark heart or the outer segments with black apical spots; bracts foliaceous, beige coloured when dry; seeds minute, 0,5-1 mm, echinulate, reticulate or fairly smooth:
- Filaments somewhat fleshy, with broad pointed incurved wings or ovate, dark above; perianth orange, yellow, red, buff or white, with a dark heart; seeds pyriform, echinate. . . . . 7.0. *dubium*
- Filaments subulate, the inner often somewhat wider; perianth yellow, orange or bright orange-red with the outer segments bearing a black or transparent apical spot; seeds wrinkled. . . . . 8.0. *maculatum*
- Leaves terete or narrowly linear with inrolled margins; perianth segments 5-10 (15) mm long; perianth yellow; leaves usually many. . . . . 9.0. *multifolium*
- Perianth white or with a pinkish tinge; leaves few:
- Stigma sessile, conical with 3 decurrent lobes; ovules multiseriate; S.W. Cape. . . . . 10.0. *rupestre*
- Stigma on an erect terete style; ovules biseriate; Natal Drakensberg. . . . . 11.0. *diphyllum*
- Bracts small, deltoid-aristate, auriculate, sparsely denticulate, membranous; flowers stellate to reflexed at anthesis, usually many on long subspicate racemes, white or pinkish; perianth segments 5-10 (15) mm long, usually with a dark midrib appearing at senescence:
- Leaves 3-5, proteranthous forming a basal rosette, ovate to broadly linear, usually hairy; when the peduncle develops the encircling leaf-sheaths also lengthen as well as the blades, especially upper younger ones, which then become long and narrow; style filiform, rarely deflexed during receptive stage; seeds very small, papillate or spiky; group 2, *Hispidae*; (to p. 332):
- Bulb with firm black shiny tunics; peduncle and pedicels punctulate; lamina glabrous, margin ciliate; 1-5 inflorescences per bulb. . . . . 12.0. *pilosum*
- Bulb with soft whitish or light brown tunics; peduncle and pedicels smooth; leaves variously hairy or glabrous; 1-2 inflorescences per bulb:
- Leaves mesophytic, not succulent, hairy or glabrous, flat (to p. 332):
- Stamens equally long; anthers equal in size:
- Peduncle bent into an acute angle above uppermost leaf; flowers corymbose. . . . . 13.0. *genuiculatum*

- Peduncle straight or laxly curved below; flowers racemose:  
 Filaments with the basal appendages forming 2 spreading curved horns; leaf-margin sometimes swollen with retrorse setae above and below; flowers nocturnal... 14.0. *bicornutum*
- Filament appendages not as above; leaf-margin various:  
 Filaments with fringed appendages; flowers nocturnal... 15.0. *deltoideum*  
 Filaments terete, linear, ovate or with rounded or acute appendages; flowers diurnal; leaves strigose, especially on margins; leafsheaths green or white, often with red or green spots; pedicels 10–20 mm:  
 Inner filaments filiform or expanded below but not covering ovary; raceme with the peduncle bare above, usually about as long as rhachis or longer; perianth-segments 10–15 mm long:  
 Perianth-segments narrowly elliptic to oblong, 8–15 mm long; pedicels firm, short or long, erect or spreading; robust plants normally 0,3–0,4 m high... 16.0. *hispidum*  
 Perianth-segments linear, 6–8 mm long; pedicels short, filiform, erect; small slender plants 0,1,5–0,25 m high... 17.0. *thermophilum*  
 Inner filaments with the appendages expanded, cordate, moulded over the ovary; raceme with a short peduncle covered with leaf bases; flowers many, close together on short pedicels; perianth segments 5 mm long... 18.0. *hallii*
- Stamens unequal, the 3 outer stamens shorter than inner but with larger anthers; inner filaments dilated to apex:  
 Flowers in lax, usually long racemes with pedicels c. 8 mm; leaves absent at anthesis, forming a basal rosette flat on ground; S. and S.E. Cape... 19.0. *constrictum*  
 Flowers in compact subspicate racemes c. 50 mm long; pedicels 2–5 mm; leaves superposed, usually still present at anthesis; Clanwilliam District... 20.0. *inclusum*  
 Leaves succulent, boatshaped, glabrous; (from p.331)... 21.0. *naviculum*
- Leaves many, few or 1, synanthous (absent under adverse conditions, or at anthesis in *O. graminifolium* in winter rainfall region), filiform to linear to ensiform, their bases often forming a neck; seeds 2–8 in a locule, up to 6 mm long, angled, smooth, or (in *O. nanodes*) very numerous, minute, comma-shaped. Summer rainfall region, or rarely winter rainfall region. Group 3, *Angustifoliati*; (from p. 331):
- Leaves more than 1–2, not surrounded by a bladeless, horizontally striped sheath:  
 Leaves up to 6, linear, up to 8 mm broad and erect, or ovate and up to 12 mm broad, spreading, sericeous or rarely glabrous; leaf sheaths often purplish, brittle, soon breaking up horizontally... 22.0. *graminifolium*
- Leaves few to many, linear, filiform or ensiform; sheaths, if present, not breaking up as above:  
 Hygrophytes with the bulbs usually poorly developed; perianth-segments not developing a distinct midrib with age:  
 Raceme subspicate; pedicels 2–4 mm long; eastern Cape to Natal and eastern Transvaal... 23.0. *paludosum*
- Raceme corymbose or racemose with pedicels up to 50 mm long:  
 Perianth-segments c. 10 mm long; raceme subcorymbose; S.W. Cape... 24.0. *esterhuyseniae*  
 Perianth-segments c. 4 mm long; raceme cylindrical, lax; widespread from southern Cape to Natal, Transvaal, S.W. Africa and further north... 25.0. *ornithogaloides*
- Geophytes in grassveld, karroid areas and rocky outcrops; bulbs well developed, perianth-segments with the midrib darkening with age:  
 Leaves ensiform, conduplicate, 50 mm long and 10 mm broad, leathery... 26.0. *britteniae*
- Leaves filiform to narrowly linear:  
 Leaves normally very numerous, forming a bristly neck and/or a bushy tuft of old leaf bases:  
 Leaves minutely reticulate and shiny when dry, laxly contorted; bulb-tunics clawed, hard; seeds 0,5 mm, comma-shaped, papillate... 27.0. *nanodes*  
 Leaves ribbed, margin strigose, the bristles often retrorse, rarely smooth; bulb-tunics not breaking up into claws, leathery; seeds 1–2 mm, angled, colliculate... 28.0. *juncifolium*
- Leaves 5–10, usually synanthous; the neck, if present, not composed of bristles:  
 Leaves wiry up to 0,6 m long, with long basal, often faintly spotted sheaths which break up into long thin, often reticulate strips; raceme subspicate, many flowered... 29.0. *dregeanum*
- Leaves soft, shorter; basal neck, if present not as above; raceme subcorymbose or cylindrical, lax; small montane plants growing in rock crevices:  
 Bulbs forming a neck; raceme subcorymbose:  
 Perianth 8 mm in diam.; peduncle stiff, wiry; Natal... 30.0. *capillare*  
 Perianth 10 mm in diam.; peduncle flaccid, curved; Cape... 31.0. *niveum*
- Bulbs near ground level, not forming a neck; raceme cylindrical:  
 Leaves linear, flat, up to 60 mm long... 32.0. *rogersii*  
 Leaves filiform, over 60 mm long, at least in mature plants... 28.0. *juncifolium*
- Leaves 1–2, each surrounded by a cataphyll, viz. a bladeless, membranous sheath bearing dark horizontal stripes (absent in young plants);  
 Ovary sessile; perianth-segments free; eastern Cape... 33.0. *anguinum*  
 Ovary stipitate; perianth forming a tube at the base; Swaziland, eastern Transvaal... 34.0. *monophyllum*
- Capsule tricolpate, oblong-globose, coriaceous, usually fully or half exposed, the perianth-segments withering irregularly, with a green or dark midrib; seeds 3–12 mm, usually flattened; subgenus II, *Urophyllon* (from p. 331):  
 Leaf 1, rarely 2–3 in older thriving plants, oblong, c. 50 mm long, proteranthous, usually flat on ground; karroo and adjoining areas... 35.0. *unifolium*

- Leaves 2-12, synanthous, erect to erecto-patent, linear to narrowly ovate, often long-acuminate; summer rainfall region (*O. xanthochlorum* excepted):
- Leaves 2 (-3); S.W. African species:
- Ovary not enlarged to form a basal disk; filaments linear:
- Perianth-segments fused basally to form a short tube; pedicels c. 15 mm long, straight... 36.0. *tubiforme*
- Perianth-segments free; pedicels up to 40 mm long, apex attenuate, recurved... 37.0. *candidum*
- Ovary enlarged basally to form a disk; filaments with winged, pointed appendages... 38.0. *rautanenii*
- Leaves 5-12:
- Ovary enlarged basally to form a disk; filaments with square basal appendages which form an annulus around ovary; S.W. Africa... 39.0. *stapffii*
- Ovary without a basal disk:
- Leaves synanthous, linear to broader, erect; summer rainfall region:
- Racemes subspicate, usually very long and many-flowered with the flowers close together:
- Pedicels 4-10 mm:
- Plants 0, 1-0, 75 m tall, variable; bracts short, capsule globose, 5 mm high; seeds flattened, semilunar, c. 3-4 mm; widespread... 40.0. *tenuifolium*
- Plants usually larger and taller (polyploids); bracts usually overtopping flowers; capsule globose, 10 mm high, obtuse, apiculate; seeds somewhat discoid or angled, 5-7 mm; eastern Cape to Natal and Mozambique... 41.0. *longibracteatum*
- Pedicels up to 40 mm long; bracts much longer, forming a plume-like apex to long raceme; capsule broadly cordate in outline, broader than long, deeply 3-lobed, depressed in centre; seeds discoid, 8 mm in diam.; northern S.W. Africa, Angola, southern tropical Africa... 42.0. *pulchrum*
- Racemes subcorymbose; pedicels up to 50 mm:
- Perianth-segments white or greenish with a distinct midrib, not reflexed in fruit, ovary green:
- Flowers greenish, perianth-segments 8 mm... 43.0. *prasinum*
- Flowers white with a green midrib, perianth-segments 12-20 mm... 44.0. *seineri*
- Perianth-segments creamy white without a dark midrib, reflexed in fruit; ovary dark green or black... 45.0. *saundersiae*
- Leaves proteranthous, 9-12, lorate, forming a basal rosette; peduncle stout; coarse plants; western Cape... 46.0. *xanthochlorum*
- Style longer than ovary and stamens, deflexed; stigma globose, with long stipitate glands; perianth-segments firm with a broad dark striate central band; capsule oblong-globose to ovoid; seeds D-shaped with the straight edge usually thickened; subgenus III, *Osmyne* (from p. 331).
- Leaves 2-many:
- Leaves glabrous or, if with stipitate glands, few, not rosulate:
- Leaves 2-10, opposite or rosulate, broadly linear-acuminate or short and oblong:
- Leaves 2-5 (-7), erect, opposite, clasping basally, long-acuminate, soft, often synanthous... 47.0. *suaveolens*
- Leaves up to 10, arranged in a basal rosette, oblong, acute to obtuse, proteranthous, margin hyaline, fimbriate or entire... 48.0. *secundum*
- Leaves more than 10, narrowly linear to filiform, loosely placed beside one another on the broad flat apex of bulb:
- Leaves narrowly linear, spirally coiled from top to bottom like a corkscrew, proteranthous; perianth-segments yellow and green... 49.0. *apertum*
- Leaves terete, rarely linear, erect, bases flat, forming loose irregular apical coils when withering, usually synanthous; perianth-segments usually white and green... 50.0. *polyphyllum*
- Leaves covered by stipitate glands, many, rosulate, filiform... 51.0. *glandulosum*
- Leaf 1:
- Leaf filiform, surrounded basally by a membranous sheath transversely striped with black bands... 52.0. *zebrinum*
- Leaf succulent, clavate, erect, small, c. 40 mm long... 53.0. *unifoliatum*
- Leaf oblong, canaliculate, c. 80 mm long, glaucous, leathery with a thickened margin... 54.0. *diluculum*

I. Subgenus *Aspasia* (*Salisb.*) *Oberm.*, stat. nov.  
*Aspasia* Salisb., Gen. Pl. 34 (1866).

*Phaeocles* Salisb., l.c.

Leaves proteranthous, rarely synanthous, many to few or 1. *Bracts* boat-shaped foliaceous, petaloid or small, membranous, deltoid-acuminate. *Flowers* bowl-shaped or stellate; perianth-segments white, yellow, orange, red or buff, without a dark midrib or the latter appearing dorsally when fading. *Stamens* with 3-6 filaments variously expanded. *Ovary* with the ovules multiseriate and numerous to biseriate and fewer; style as long as ovary to shorter or absent. *Capsule* fusiform to ellipsoid, often transparent, hidden inside or protruding from dry perianth; seeds minute, variously compressed, pyriform or comma-shaped, papillate to echinate. Predominantly Cape winter rainfall species. Type species: *O. conicum* Jacq.

1. Group *Aspasiae*. Leaves basal, rosulate, (3) 5-15. *Bracts* boat-shaped, entire firm, foliaceous or petaloid. *Flowers* large to smaller, bowl-shaped, white, yellow,

orange red or buff, often with a dark heart but without a dark midrib. *Ovary* with numerous ovules, biseriate or multiseriate; style absent, or short to about as long as ovary; stigma obscurely 3-lobed. *Capsule* fusiform, enclosed in dry perianth. *Seeds* small. Predominantly Cape species. Type species: *O. conicum* Jacq. (species 1-11).

1. *Ornithogalum conicum* Jacq., Ic. Pl. Rar. 2, t. 428 (1789), Coll. 3: 232 (1789). Type: t. 428 in Jacq., Ic. Pl. Rar.

Plants 0, 4-1 m tall. *Bulb* attenuated from a broad flat base, 40-60 mm in diam. with pale membranous tunics. *Leaves* 6-12, synanthous or withered at anthesis, in a basal rosette or clasping peduncle and ascending, pale green. *Raceme* conical or subcorymbose at first, lengthening with age, or cylindrical, subspicate, many flowered; peduncle sturdy, terete; bracts petaloid, broad and auriculate, clasping below, acuminate; pedicels 1-6 cm long. *Flowers* stellate, with white, thin, shiny narrowly ovate perianth-

segments, 10–20 mm long, apex acute, almost translucent with age, encircling capsule. *Stamens* about half as long as perianth-segments; filaments filiform to subulate or 3 inner with a short square basal expansion. *Ovary* ovoid, yellow or green; ovules biseriate or multiseriate; style about as long as ovary, thin, terete; stigma small, capitate with 3 decurrent papillate ridges. *Capsule* fusiform to oblong-ovoid, 3-ribbed, apiculate, chartaceous, translucent; seeds variously compressed, 2–3 mm, smooth to rugose, epidermal cells forming verrucose papillae with spreading branched bases ( $\times 640$ ). *Chromosomes*:  $2n=12$  (10). FIGS 1. 1a–b; 2. 1; 3. 1a–c.

Widespread in the Cape from Namaqualand in the west to the eastern Cape as far as the Transkei; flowering November–December. Two closely related subspecies are recognized.

#### Key to subspecies

Inflorescence conical to subcorymbose; rhachis 0.06–0.12 m long; pedicels 10–60 mm long; leaves contemporary with the flowers or withered at anthesis, in a basal rosette.....1a. subsp. *conicum*

Inflorescence narrowly cylindrical; rhachis up to 0.3 m long; pedicels 5–15 mm long; leaves forming an elongated rosette, their bases clasping the peduncle below, or leaves basal, withered at anthesis. .1b. subsp. *strictum*

#### 1a. subsp. *conicum*

*O. conicum* Jacq., Ic. Pl. Rar. 2: 19, t. 428 (1789); Coll. 3:232 (1789); Leighton in JI S. Afr. Bot. 10:103 (1944). Type: t. 428 in Jacq., Ic. Pl. Rar.

*O. lacteum* Jacq., Ic. Pl. Rar. 2:20, t. 434 (1795); Coll. 5:76 (1797); Andr., Bot. Rep. 4, t. 274 (1803); Curtis in Curtis's bot. Mag. ser. 1, t. 1134 (1808); Red., Lil. 7, t. 418 (1813); Bak. in Fl. Cap. 6:505 (1897) excl. var.; Leighton in JI S. Afr. Bot. 10:102 (1944). *Aspasia lactea* (Jacq.) Salisb., Gen. Pl. Fragm. 34 (1866). Type: t. 434 in Jacq., Ic. Pl. Rar.

*O. lacteum* var. *conicum* (Jacq.) Bak. in J. Linn. Soc. (Bot.) 13:284 (1873); Fl. Cap. 6:505 (1897).

*O. baurii* Bak. in Fl. Cap. 6:504 (1897). Type: E. Cape, Baziya Mountain, Baur 552 (K, holo!; PRE, photo; GRA!; SAM!).

*O. aestivum* L. Bol. in S. Afr. Gdng Ctry Life 24: 50, 55 (1934). Type: Cape between Malmesbury and Mamre, L. Bolus sub BOL 20974 (BOL, holo!).

*O. synanthifolium* Leighton in JI S. Afr. Bot. 11:176 (1945). Type: Cape, Kingwilliamstown District, Perie Mts., Galpin 2528 (PRE, holo!).

Plants 0.4–0.6 m tall. *Bulb* with pale membranous tunics 20–50 mm in diam. *Plants* experiencing a dry summer have two growth periods; leaves are developed in wintermonths, mature in spring but wither when inflorescence appears in November–December; they form a rosette of c. 6 leaves spread flat on ground; lamina linear-oblong, c. 90 mm long, 25 mm broad, margin fimbriate. *Plants* growing actively throughout the year, form 6–12 soft leaves in an erect or drooping rosette, linear, up to 400 mm long, 20–30 mm broad, margin smooth. *Inflorescence* subcorymbose, lengthening with age; pedicels 20–60 mm, ascending. *Flowers* typical. FIG. 5.

Recorded from the western and eastern Cape, on rocky slopes, in moist hollows or on sandy flats. Flowering in November–December in the south-western Cape, but also earlier and later in the eastern Cape.

CAPE.—3126 (Queenstown): Gwatyn (–DD), Galpin 8248, 8249; Madeira Hill (–DD), Galpin 2528. 3128 (Umtata): Baziya (–CB), Baur 508; Umtata (–CB), Pienaar 8. 3227 (Stutterheim); Keiskammahoek (–CA), Story 3691; Hogsback (–CA), Barker 1916; Komga (–DB), Flanagan 788, Compton 17769. 3228 (Butterworth): Kentani (–CB), Pegler 219. 3318 (Cape Town): Melkbosch (–CB), Wasserfall 779, Cassidy 127; Camps Bay (–CD), Zeyher 5047, MacOwan 2652. 3326 (Grahamstown): Grahamstown (–BC), Van Dam sub TRV 18862. 3418 (Simons-town): between Gordonsbay and Steenbras River (–BB), Lewis 2185.

1b. subsp. *strictum* (L. Bol.) Oberm., stat. nov.



FIG. 5.—*Ornithogalum conicum*; Jacq., Ic. Pl. Rar. 2, t. 428 (iconotype).

*O. strictum* L. Bol. in J. Bot., Lond. 71: 72 (1933). *O. conicum* Jacq. var. *strictum* (L. Bol.) Leighton in JI S. Afr. Bot. 10: 104 (1944). Type: Cape, Vanrhyns Pass, Ross Frames sub BOL 20072 (BOL, holo!). *O. conicum* sensu Curt., bot. Mag. 10, t. 3538 (1836).

Leaves about 5 in an elongated rosette with the tubular leaf-bases clasping the lower part of the peduncle, usually synanthous, soft, linear-acuminate, up to 0.3 m long; or forming a basal rosette in winter, withering at anthesis. *Raceme* sub-spicate with the flowers overlapping; pedicels short, c. 10 mm long.

Recorded from the western Cape, Namaqualand to Hopefield and Montagu.

CAPE.—2917 (Springbok): Steinkopf (–BD), Taylor sub NBG 3149/35. 3118 (Vanrhynsdorp): Gifberg (–DC), Smith 6447. 3119 (Calvinia): Vanrhyns Pass (–AC), Barker 10330; Grasberg (–AC), Barker 9796. 3218 (Clanwilliam): Olifants River Dam (–BB), Barker 4766. Smuts 2017; Paleisheuwel (–BC), Hall 4542; Aurora Hills (–CB), Barker 9738. 3219 (Wuppertal): near Pakhuis (–AA), Leighton sub NBG 1495/33. 3318 (Cape Town): Hopefield (–AB), Letty sub PRE 22826. 3320 (Montagu): Bantamskarron (–BA), Compton 1217.

*Ornithogalum conicum* is usually a tall plant with large pure white, shiny flowers; the stamens possess thin, fairly long, erect filaments; the ovules are biseriate or multiseriate and the seeds comparatively large (2–3 mm).

The species has an eastern and western distribution in the Cape Province and shows differences in habit and development, which can be attributed to climatic conditions. The type, Jacquin's plate illustrates a cultivated plant bearing leaves and an inflorescence; t. 434 in this series, the type of *O. lacteum*, represents an older more luxuriant plant. This mesophytic form occurs in the eastern Cape, where conditions for growth are usually favourable throughout the

year and the bulbs are therefore comparatively small. These plants flower repeatedly, even in winter, and it could not be established whether there is a dormant period.

The original bulbs sent to Europe most likely came from or near the Cape Peninsula, where it appears to have been fairly common. Here the plant is dormant during the hot and dry summer months, after flowering in November–December. With the onset of winter and the rainy season, a rosette of rather short fimbriate leaves, lying flat on the ground, is developed and has matured by August. By the time the inflorescence is in full bloom the leaves have withered. This phenomenon of two active growth-periods may be observed in many other Cape geophytes—a useful adaptation.

The presence of the leaves sheathing the basal part of the peduncle, which is often seen in the western plants, here placed in the subsp. *strictum*, may be an adaptation to the weather. The development of the inflorescence is accelerated at an earlier stage, if it turns warmer early on and the young leaves are then elevated with the lengthening of the peduncle.

From distribution records it was seen that there is a gap between the eastern and western populations, no plants having been collected between the Caledon and Bathurst districts. This separation into an eastern and western area, places it in Weimarck's (1941) phytogeographical group, of Cape ubiquitous with a Knysna interval, an interesting distribution pattern not yet fully explored.

It seems likely that this species hybridizes with *O. dubium* Houtt. White-flowered plants showing intermediate characters such as a dark bulb, expanded filaments, multiseriate ovules and smaller papillate seeds are often collected in the eastern Cape where both species occur. These putative hybrids are indistinguishable from *O. fimbrimarginatum* Leight. (cf. No. 4).

Pienaar (1968) and his colleagues in Stellenbosch crossed *O. synanthifolium* Leighton, an eastern Cape species, with *O. conicum*, but it failed to produce hybrids. They therefore consider *O. synanthifolium* to be a good species, but morphologically they cannot be separated. They also record a form of *O. conicum* from Sutherland with 10 instead of 12 chromosomes, which could be accorded specific rank, but it could not be recognized in the herbarium.

*O. conicum*, usually referred to as *O. lacteum*, is cultivated on a large scale for the sale of its flowers. It flowers somewhat later than *O. thyrsoides*. Larger and more-flowered cultivars have been produced in recent years. It is poisonous to horses and cattle.

The plant seen and described by Clusius in *Curae Postiores* (1611) may be this species (cf. p. 324).

**2. *Ornithogalum thyrsoides* Jacq., Hort. Vind. 3: 17, t. 28 (1776); Thunb., Prodr. 62 (1794); Fl. Cap. ed. Schult. 315 (1823); Ker in Curtis's bot. Mag. t. 1164 (1809); Red., Liliac. 6, t. 333 (1811); Ker in Bot. Register 4, t. 316 (1818); Lodd., Bot. Cab. 12, t. 1159 (1826); Saund., Ref. Bot. 1, t. 20 (1869); Bak. in Fl. Cap. 6: 499 (1897) excl. vars; Marloth, Fl. S. Afr. 4: 106, t. 28 (1915); Leighton in Jl S. Afr. Bot. 10: 97 (1944); Mason, W. Cape Sandveld Flowers, t. 6, fig. 1,2 (1972). Type: t. 28 in Hort. Vind. 3.**

*Aspasia thyrsoides* ("Ker") Salisb., Gen. Pl. Fragm. 34 (1866).

*Ornithogalum conico laxo pedunculis longissimis floribus erectis.* Mill., Figures of Plants t. 192, p. 128 (1760).

*O. coarctatum* Jacq., Ic. Pl. Rar. 2, t. 435 (1795); Coll. 5: 77 (1797); Bak. in Fl. Cap. 6: 505 (1897). Type: t. 435 in Jacq., Ic. Pl. Rar.

*O. revolutum* sensu Ker in Curtis's bot. Mag. t. 653 (1803), Bot. Register t. 315, (1818), non Jacq. 1797.

*O. bicolor* Haw., Misc. Nat. 177 (1803). Type: ex Whitley's Nursery; from Cape of Good Hope (type not traced).

*O. ceresianum* Leighton in J. Bot., Lond. 71: 72 (1933) & in Jl S. Afr. Bot. 10: 92 (1944). Type: Cape, near Ceres, Cook sub Nat. Bot. Gard. 1756/25 (BOL, holo.).

*O. hermannii* Leighton in S. Afr. Gdng Ctry Life 23: 62 (1933) & in Jl S. Afr. Bot. 10: 93 (1944). Type: Cape, Citrusdal, Salter 2806 (BOL, holo.).

*O. gilgianum* Schltr. ex V. Poelln. in Feddes Repert. 54: 23 (1944). Type: Cape, Bainskloof Schlechter 9131 (Breslau, holo.; PRE, iso.).

Plants 0,2–0,5 m tall, variable in size and shape of inflorescence, flowering at an early age. *Bulb* comparatively small, depressed globose 20–30 mm in diam. usually with whitish soft fleshy tunics, bulbiliferous. *Leaves* synanthous or usually withered at anthesis, few to about 7, spreading and flat on ground or forming a shortly raised, erect, sometimes elongated rosette, linear, acute to acuminate, 150–300 mm long and 5–15 mm broad, smooth, dark green, margin usually ciliate. *Raceme* 0,2–0,5 m tall, ovoid, corymbose, thyrsoid or cylindrical, dense and many-flowered or rarely flowers few, laxly arranged; bracts broadly ovate, acuminate to cuspidate, clasping rachis and pedicel, white, shiny; pedicels erect or erecto-patent, (10) 20–40 mm long. *Perianth* stellate or bowl-shaped, white, shiny, usually with a dark brown or green centre, which may fade with age; segments elliptic to ovate, 15–30 mm long. *Stamens* erect, c. 8 mm long, the outer filaments subulate, the inner with winged expansions in lower half which curve inwards over the ovary. *Ovary* oblong, obtuse, brown or dark green; ovules multiseriate; style terete, about as long as ovary, thin, white; stigma capitate with three decurrent papillate ridges. *Capsule* oblong-ovoid, thin walled, tipped by style-base, c. 15 mm long; seeds 2–3 mm, angled by pressure, usually attenuated towards hilum, indistinctly striate-papillate with minutely muricate margins; the epidermal cells bulging, grooved and interwined ( $\times 640$ ). *Chromosomes*:  $2n=12$ . FIGS 1.2; 3.2a–c; 6.

Very common on the Cape Peninsula, extending north-west to Namaqualand and eastwards to Caledon; often in vleis, disturbed lands, sandy flats or on lower mountain slopes. Flowering October to February. Fires are said to stimulate flowering.

CAPE.—Without precise locality: Namaqualand, Scully 254, 3017 (Hondeklipbaai); near Kamieskroon (–BB), Barker 10524, 3118 (Vanrhynsdorp); Klaver (–DC), Ross-Frames sub N.B. Gard. 1241/26, 3218 (Clanwilliam); Papkuilsvele (–CB), Barker 2646; Berg River Islands near Piketberg (–DC), Leighton 196, 3219 (Wuppertal); Nieuwoudt Pass (–AC), Compton sub N.B.G. 3171/34; near Citrusdal (–CA), Salter sub N.B. Gard. 590/32, 3318 (Cape Town); Skeleton Gorge (–CD), Esterhuysen 11503; Campsbay (–CD), Zeyher SAM 23325; Bokbaai Farm near Darling (–DB), Barker 10801; Tygerberg (–DC), Cross 72; Vlottenberg Vlei (–DD), Compton 15260; Jonkershoek, streamside vlei (–DD), Compton 15261, 3319 (Worcester); Tulbagh (–AC), Pappé sub SAM 23365; Witsenberg (–AC), Pillans 9566; Laken Vlei near Ceres (–BC), Compton 12082; Bainskloof (–CA), Barker 5347; Naudesberg (–DA), Lewis 5701, 3418 (Simons-town); Faure (–BA), Oliver 5133, 3419 (Caledon); Caledon (–AB), Galpin 4767; Hermanus (–AC), Rogers 26507; Arieskraal, Palmiet River Valley (–BD), Lewis 2188; Hagel Kraal vlei (–DA), Compton 18982.

*Ornithogalum thyrsoides* is now extensively cultivated both in South Africa and overseas for the lasting qualities of the cut flowers. Being very common in the southern Cape, it often causes poisoning in horses and cattle. One raceme, accidentally included in forage, may cause the death of a horse.



FIG. 6.—*Ornithogalum thyrsoides*; Jacq., Hort. Vind. 3, t. 28 (iconotype).

As in the previous species, *O. conicum*, the plant will also push up its peduncle during an early warm spell towards the end of winter before the leaves have quite matured. They become superposed with their bases surrounding the lower part of the peduncle. The species is not only bulbiferous, but also sets fertile seed freely. Young bulbs only 10 mm in diameter will produce racemes 0,3 m tall, bearing 5–20 flowers. Under good conditions, the flowers of mature plants will be twice the size of those that lacked water and nutrients

The species is here interpreted as a very variable one, reacting strongly to habitat, whether in dry or wet surroundings, in fertile or poor soil or in cold or warm, sheltered or exposed situations. Leighton placed them in seven forms, but it was impossible to uphold these even to some small extent; moreover two species described as new by Leighton are here also included in this species. The typical ecotype has the dense raceme somewhat ovoid or thyrsoid in shape and is common in the Cape Peninsula. An attractive form with a corymbose inflorescence and large open flowers is found in the neighbourhood of Bokbaai and Malmesbury (cf. Mason, W. Cape Sandveld Flrs t. 6, Fig. 1, 2). A common form, especially further north has an elongated and cylindrical raceme. Some Namaqualand collections consist of rather large, coarse plants. It does not seem to hybridize easily.

*Doubling of flowers.*—Aberrant horticultural strains in which the flower parts are doubled, have been raised at Kirstenbosch. cf. J. bot. Soc. S. Afr. 18: 11, 12 (1931).

*Malformed inflorescence.*—Marloth (4916) collected a curiously malformed inflorescence at Caledon in February 1910. Amongst normal flowers some pedicels about 40 mm long, bear fasciated flowers in the form of spikes about 30 mm long. These spikes consist of a dense succession or irregularly placed perianth-segments and stamens.

3. *Ornithogalum pruinatum* Leighton in JI S. Afr. Bot. 10: 104 (July 1944). Type: Cape between Garies and Kamieskroon, *L. Bolus* sub BOL 22781 (BOL, holo.!).

*O. glaucophyllum* Schltr. ex V. Poelln. in Feddes Repert. 54: 23 (September 1944). Type: Cape, Arakup (Arakooop about 13 km NNW of Kamieskroon), *Schlechter* 11249 (Breslau, holo.; GRA!; PRE!).

Plants 0,1–0,3 (0,6) m tall, often clustered. *Bulbs* epigeal, or nearly so, globose, hard, 20–30 (40) mm in diam. with firm brown gaping outer tunics, the inner yellow; roots in a dense excentric circle around basal disk; root hairs long, forming a dense cover. *Leaves* 3–6, synanthous, erect, narrowly obovate to oblong, 60–140 mm long, 10–20 mm broad, sheathing at the base, apex obtuse or acute, margin smooth or undulate, glaucous, firm, occasionally striate. *Raceme* somewhat cylindrical to subcorymbose, few to many-flowered, on a long firm peduncle 0,1–0,6 m tall; bracts narrowly ovate-aristate, white, transparent; pedicels thin, patent-erect, 10–20 mm long. *Flower* sweet scented, stellate with white shiny ovate perianth-segments about 15 mm long, rarely with a dark heart. *Stamens* about half as long as segments, the outer with filiform filaments, inner linear-acuminate or with pointed wings. *Ovary* ovoid, green or dark; ovules multiseriate; style filiform, yellow; stigma capitate with three decurrent papillate ridges. *Capsule* ovoid; seeds cuneate to comma-shaped, 1 mm, papillate or echinulate. *Chromosomes*:  $2n=12$ . FIG. 4.1; 7.

Common locally from the Richtersveld, south to Vanrhynsdorp on rocky granite or dolomite slopes in arid succulent karroo. Flowering mainly in September.

CAPE.—2817 (Vioolsdrif): Richtersveld, Stinkfontein (–CD), Marloth 13276. 2916 (Port Nolloth): 32 km S. of Port Nolloth (–BD), Hall 833. 2917 (Springbok): Steinkopf (–BC), Meyer sub Marloth 6826; Spektakel Hill (–DA), Martin 836, Thompson 1288; Komaggas (–DC), Compton 22072; Mesklip (–DD), *Stokoe* sub SAM 60648. 2921 (Kenhardt): near Kenhardt (–AC), Leipoldt sub NBG 73654. 3017 (Hondeklipbaai): Brakdam (–BD), Lewis 1425. 3018 (Kamiesberg): near Garies (–CA), Rodin 1396. 3019 (Loeriesfontein): 48 km from Calvinia on Loeriesfontein Road (–AB), Maguire 2004. 3118 (Vanrhynsdorp): 40 km E. of Sout River Bridge (–AA), Hall 3397; Kobe Mountain (–DB), Bayliss 563; Gifberg, on upper plateau (–DC), Barker 9585. 3119 (Calvinia): Akkerdam (–BD), Barker 9503.

This species displays much variation in size; young flowering plants may be only 0,15 m tall, while older plants may be up to 0,4 m, with large ovoid bulbs. Pienaar & Van Niekerk were able to cross *O. pruinatum* (pistillate plant) with *O. dubium*. Hybridization may explain the rather heterogeneous collections gathered at various times on the Gifberg Plateau near Vanrhynsdorp.

4. *Ornithogalum fimbriarginatum* Leighton in JI S. Afr. Bot. 11: 105 (1945). Type: Cape, Laingsburg Division, Whitehill Ridge, Leighton 273 (BOL, holo.!.; NBG).

*O. thyrsoides* forma *iota* Leighton l.c. 11:177 (1945). Type: Cape, Middeldrift, Crampton 102 (PRE, lecto.!).

Plants 0,2–0,45 m tall, with a globose obtuse bulb 10–30 mm in diam. covered with thin, hard, dark outer tunics. *Leaves* usually withered at anthesis, about 5, usually in a flat rosette, narrowly oblong to



FIG. 7.—*Ornithogalum pruinosum* from Namaqualand (holotype: L. Bolus sub BOL 22781).

ovate, 50–100 mm long, 10–15 mm wide, with a fimbriate or rarely smooth margin, obtuse. Raceme subcorymbose to cylindrical, c. 20-flowered; peduncle up to 0,4 m long, firm; bracts ovate-cuspidate, transparent, white; pedicels up to 30 mm long. Flower faintly sweet scented, with ovate, spreading perianth-segments 10–15 (–22) mm long, white, with or without a dark centre. Stamens about half as long as perianth-segments, with the outer filaments subulate to ovate-acuminate, the inner broader than outer. Ovary ovoid, yellow; ovules multiseriate; style as long or somewhat shorter than ovary; stigma apical, 3-lobed with decurrent papillate ridges. Capsule ovoid, c. 10 mm long; seeds c. 1,5 mm, angled through pressure, papillate to echinulate along ridges. Chromosomes:  $2n=12$  (18).

Widespread in the western and eastern Cape, usually on mountain slopes, locally frequent. Flowering September–January.

CAPE.—3118 (Vanrhynsdorp): Gifberg (–DC), Barker 9585 Phillips 7624. 3225 (Somerset East): near Cookhouse (–DB), Smith 2870. 3226 (Fort Beaufort): Tamboekiefontein near Adelaide (–CB), Acocks 12122. 3227 (Stutterheim): Keiskamma Hoek (–CA), Stayner 56. 3318 (Cape Town): April Peak, Paarl (–DB), Bond 733. 3319 (Worcester): Mosterthoek Twins (–AD), Wasserfall 792. 3320 (Montagu): Cabidu near Constable (–BA), Barker 7292; Whitehill (–BB), Compton 15238, Barker 4898. 3325 (Port Elizabeth): Sundays River E. of Port Elizabeth (–DB), Mauve 4431. 3326 (Grahamstown): Alicedale (–AC), Rogers 94; near Grahamstown (–AD), Dyer 2200; Spadona Halt (–DA), Archibald 4884.

Pienaar *et al.* (1968), in their cytogenetical work, placed *O. fimbriatum* Leighton in the *O. dubium* complex. The species is based on a specimen collected at Whitehill near Laingsburg. Many collections from both the eastern and western Cape match this type collection morphologically. To me it appears to be a hybrid between *O. dubium* and *O. conicum*, for it possesses characters of both species which also occur in these areas. From *O. conicum* it inherited the white flowers, long style and thin bracts; from *O. dubium* the dark globose bulb and distended inner filaments. The seeds examined were mostly papillate with often echinulate ridges. It has been frequently recorded from around Grahamstown, Somerset East and Stutterheim. Further west it was often collected on the western mountain ranges around Paarl, Ceres and Vanrhynsdorp.

Leighton (1945) on p. 177 in the appendix placed a number of specimens from the eastern Cape, which I believe to be *O. fimbriatum*, under *O. thyrsoides* as forma *iota*; Pienaar *et al.* (1968) place this taxon in the *O. dubium* complex.

5. *Ornithogalum subcoriaceum* L. Bol. in S. Afr. Gdng Ctry Life 24:50 (1934); Leighton in Jl S. Afr. Bot. 10:92 (1944). Type: Cape: Calvinia Division, near Nieuwoudtville, L. Bolus sub BOL 20090 (BOL, holo!).

Usually small plants, rarely up to 0,2 m tall. Bulb globose, 10–30 mm in diam. with hard, dark tunics often gaping above and with a dense mat of roots below. Leaves mostly synanthous, 2–3 (–5), narrowly ovate to linear-oblong, 30–80 mm long, 10–20 mm broad, shortly sheathing at the base, apex obtuse to acute, margin smooth to densely fimbriate, somewhat leathery, shiny, spreading or erect. Raceme usually short 2–6 (16) flowered; peduncle short, stout; bracts ovate-acuminate, green, margin smooth or fimbriate; pedicels up to 20 mm long. Flower with white, narrowly ovate perianth-segments 8–14 mm long. Stamens erect, encircling ovary, the outer either subulate or both whorls ovate-acuminate. Ovary oblong-ovoid; ovules multi-seriate; style terete, as long as ovary; stigma apical, 3-lobed with papillate stigmatic margins. Capsule spindle-shaped; seeds pear- or comma-shaped, 1 mm, papillate.

Confined to mountain ranges from Calvinia to Ceres, in sandy, humus-rich rock pockets. Flowering September–October.

CAPE.—3118 (Vanrhynsdorp): Kromme River (–BB), Stokoe sub SAM 64702; Kobe Pass (–DB), Hall 4511. 3119 (Calvinia): near Nieuwoudtville (–AC), L. Bolus sub BOL 20090. 3218 (Clanwilliam): Cold Bokkeveld Mts. N. of Diepkloof basin (–DB), Hanekom 2463. 3219 (Wuppertal): Pakhuis Pass (–AA), Compton 9623, Esterhuysen 14957; Tafelberg in the Cedarberge (–AC), Pocock 467, Cedarberg (–AC), Thode A2096; Wolfberg (–AD), Kruger Kr 918. 3319 (Worcester): Gydo Pass (–AB), Compton 18718.

A montane dwarf species related to *O. dubium*. The colder climate at high altitudes may have caused the dwarfing of this species.

6. *Ornithogalum puberulum* Oberm. sp. nov. *O. pruinosii* Leighton affinis, sed folio molliter puberulo basi breve tubiformi differt.

Planta 0,06–0,28 m alta. Bulbus ovoideus vel globosus tunicis brunneis duris. Folia c. 3 laete viridia oblonga dense puberula. Inflorescentia breve vel longe pedunculata, subcorymbosa vel elongata; bractae ovato-acuminatae membranaceae niveae margine fimbriato. Perianthii segmenta albidia anguste ellipsoidea. Filamenta staminum exteriora angustiora interiora basi expansa. Ovarium ovoideum. Capsula oblongo-ovoidea; semina nigra colliculata vel spinosa.

TYPE: South West Africa: 2816 (Oranjemund): Kahanstal, Loreley (-BB), *Merxmüller & Giess* 3365 (PRE, holo.!; M; WIND).

Plants 0,06–0,28 m tall. *Bulb* ovoid, 15–20 mm in diam. with hard dark scales frayed above. *Leaves* synanthous, about three, broadly to narrowly oblong, 50–90 mm long, 12–24 mm broad, soft, closely puberulous, margin fimbriate, apex obtuse, apiculate, base shortly tubular. *Raceme* subcorymbose to elongated, usually many-flowered; peduncle 30–180 mm long, glabrous; bracts narrowly ovate-acuminate white, membranous; margin fimbriate or smooth; pedicels up to 30 mm long, spreading or curved. *Perianth* white membranous, with the segments narrowly elliptical, 10–12 mm long, 5 mm broad. *Stamens* c. 5 mm long; filaments ovate-acuminate, the outer narrower. *Ovary* ovoid; ovules multiseriate; style shorter than ovary, with three apical stigmatic decurrent, papillate ridges. *Capsule* ovoid, 6 mm; seeds black, variously compressed, colliculate to apiculate, 1 mm.

A rare species only thrice collected in southern South West Africa, on mountain slopes amongst loose quartz pebbles. Flowering September.

S.W.A.—2716 (Witpütz): farm Namuskluft: LU88 (-DD), *Giess* 12896; farm Zebrafontein Nr. 87, Spitzkop (-DD), *Wiss* 2083b, 2816 (Oranjemund): Kahanstal c. 8 km N. of Loreley (-BB), *Merxmüller & Giess* 3365 (holo.).

Although the type collection has rather short peduncles it was chosen, because several isotypes exist and because it is also more complete than other collections, *Giess* 12896 and *Wiss* 2083b possess peduncles up to about 180 mm long.

7. *Ornithogalum dubium* Houtt., Nat. Hist. 2, 12:309, t. 82, fig. 3 (1780). Type: ex Cape of Good Hope, in Houttuyn herbarium (G, holo.!; PRE, photo.).

*O. flavescens* Jacq., Icon. Pl. Rar. 2: 20, t. 437 (1789), Coll. 3:233 (1791). *O. thyrsoides* var. *flavescens* (Jacq.) Ker in Bot. Register t. 305 (1818); Bak. in Fl. Cap. 6:499 (1897). *Aspasia flavescens* (Jacq.) Salisb., Gen. Pl. Fragm. 34 (1866). Type: t. 437 in Jacq., Ic. Pl. Rar.

*O. miniatum* Jacq., Icon. Pl. Rar. 2:20, t. 438 (1789); Coll. 3:233 (1791); Leighton in JI S. Afr. Bot. 10:87 (1944). *O. thyrsoides* var. *miniatum* (Jacq.) Bak. in Fl. Cap. 6:500 (1897). Type: t. 438 in Jacq., Ic. Pl. Rar.

*O. aureum* Curtis in Curtis's bot. Mag. 6, t. 190 (1792); Red., Liliac. 8, t. 439 (1814); Lodd., Bot. Cab. 12, t. 1183 (1826); Fl. de Serres, ser. 1, 2, t. 4 (Febr. 1846); Marl., Fl. S. Afr. 4: 146, t. 28 (1915); *O. thyrsoides* var. *aureum* (Curt.) Bak. in Fl. Cap. 6:500 (1897); Merrill in J. Arnold Arbor. 19:325 (1938). *Aspasia aurea* (Curt.) Salisb., Gen. Pl. Fragm. 34 (1864). Type: t. 190 in Bot. Mag.

*O. flavissimum* Jacq., Icon. Pl. Rar. 2:20, t. 436 (1795); Coll. 5: 75 (1797); Andr., Bot. Rep. 8, t. 505 (1808); Leighton in JI S. Afr. Bot. 10:90 (1944). *O. thyrsoides* var. *flavissimum* (Jacq.) Bak. in Fl. Cap. 6:499 (1897). Type: t. 436 in Jacq., Ic. Pl. Rar.

*O. vandermerwei* Barnes in S. Afr. Gdng Ctry Life 21:14 (1931). *O. miniatum* Jacq. var. *vandermerwei* (Barnes) Leighton in JI S. Afr. Bot. 10:89 (1944). Type: Cape, Swellendam near Bonnievale, *Van der Merwe* sub Nat. Bot. Gdn. 1814/29 (BOL, holo.).—var. *album* Barnes l.c. Type: Cape, Robertson, *Hurling & McNeil* sub BOL 19296 (BOL, holo.).

*O. fergusoniae* L. Bol. in S. Afr. Gdng Ctry Life 22:57 (1932); Leighton in JI S. Afr. Bot. 10:89 (1944). Type: Cape, near Still Bay, *Ferguson* in Nat. Bot. Gdn. 45/31 (BOL, holo.).

*O. brownleei* Leighton in S. Afr. Gdng Ctry Life 23:62 (1933), in JI S. Afr. Bot. 10:91 (1944). Type: E. Cape, Kingwilliams-town Division, Middledrift, *Brownlee* sub BOL 20366 (BOL, holo.).

*O. leipoldtii* L. Bol. in J. Bot., Lond. 71:71 (1933); Leighton in JI S. Afr. Bot. 10:94 (1944). Type: Cape, Clanwilliam division, Olifants River Valley near the weir, *Leipoldt* sub BOL 19941 (BOL, holo.).

*O. alticola* Leighton in JI S. Afr. Bot. 10:93 (1944) as *alticolum*. Type: Cape, Paarl division, top of Dutoitskloof, *Pillans* 8384 (BOL, holo.).

*O. pillansii* Leighton in JI S. Afr. Bot. 10:96 (1944). Type: Cape, Piketberg division, near Het Kruis, *Leighton* 134 (BOL, holo.!; PRE!).

*O. citrinum* Schltr. ex V. Poelln. in Feddes Repert. 54:22 (1944). Type: Cape, Caledon division, Genadendal, *Schlechter* 9797 (Breslau, holo.; GRA!; PRE!).

*O. perulochrum* V. Poelln. in Feddes Repert. 54:24 (1944). Type: Cape, Rietfonteinpoort near Elim, *Schlechter* 9681 (Breslau, holo.; GRA!; PRE!).

Plants 0,1–0,5 m tall with a soft appearance; sometimes bulbiferous. *Bulb* ovoid, c. 30 mm in diam., with tough brown tunics; roots many, thin, short. *Leaves* 3–8, synanthous or withering at anthesis, linear to narrowly ovate, 50–200 mm long, and 5–30 mm broad, smooth, glabrous except for ciliate margin, yellowish green. *Raceme* 10–20-flowered, usually somewhat corymbose at first, lengthening with age, up to 500 mm tall; peduncle firm, terete with a soft curve below; bracts ovate-acuminate, cuspidate, enveloping base of pedicels, green or turning chartaceous; pedicels 20–50 mm long. *Flower* shallowly cup-shaped to stellate with age, yellow to deep orange, buff or white, often with a green or brown heart; perianth-segments ovate, 10–20 mm long. *Stamens* about half as long or shorter; filaments with fleshy winged membranous involute expansions; the upper part often a darker brown than the heart of the flower. *Ovary* oblong-ovoid, green or brownish; ovules multiseriate; style absent or very short; stigma capitate, trisulcate, with 3 decurrent papillate ridges. *Capsule* oblong, c. 15 mm long; seeds somewhat pear-shaped to comma-shaped, 0,5 mm, echinulate. *Chromosomes*: 2n=12 (10,24, 12+5B). FIG. 1.3; 4.2; 8; 9; 10.

Widespread and often locally frequent in the southern and eastern Cape as far north-east as Kentani; also widespread but less common in the western Cape, from Worcester to Ceres, Piketberg and Clanwilliam; absent from the Peninsula; inhabiting rocky slopes or stony clay or sand flats. Flowering August to December. Known as Geeltjienkerintjie.

CAPE.—3218 (Clanwilliam): Piketberg, mountain top near village (-DA), *Barker* 7605, 7579; Het Kruis (-DA), *Leighton* 234, *Barker* 2581, 3219 (Wuppertal); near Pakhuis (-AA), *Leighton* sub Nat. Bot. Gard. 1503/33; Nieuwoudt Pass (-AC), *Compton* sub Nat. Bot. Gard. 3171/34; Algeria, Cedarberge, *Compton* 12772; western end of Elands Kloof (-CA), *Lewis* 2563, 3220 (Sutherland); Boesmanskloofriver (-BA), *Leighton* 136; Sutherland (-BC), *Acocks* 17778, 3226 (Fort Beaufort); Middledrift, Njwaxa location (-DD), *Crampton* 101,102, 3227 (Stutterheim); Kingwilliamsstown (-CD), *Flanagan* 2238, 3228 (Butterworth); Kentani (-CB), *Batten* s.n. 3319 (Worcester); Tulbagh (-AC), *Thode* sub STU 5460, *MacOwan* 505, 1818; mountains near Karroopoot (-BC), *Marloth* 6589; between Glen Heatle & Rebbokskraal (-DA), *Oliver* 5028, 3320 (Montagu); Fisantekraal valley (-BC), *Compton* 21151, 3321 (Ladismith); Toorkopkloof (-AC), *Wurts* 1204, 3322 (Oudtshoorn), Meiringspoort (-BC), *Thorns* s.n.; George Forest (-CD), *Barker* 6859, 3323 (Willowmore); 16 km S. of Avontuur (-CA), *Theron* 956; S. of Prince Alfred's Pass (-CC), *Wurts* 2266, 3324 (Steytlerville); Suuranysberg (-CC), *Rycroft* 3020, 3325 (Port Elizabeth); Baakens Valley beyond Sunridge Park (-DC), *Olivier* 834, 3326 (Grahamstown); Grahamstown (-BD), *Glass* 381, *Dyer* 2198, 3419 (Caledon); near Bot River (-AB), *Van Breda* 1449, 3420 (Bredasdorp); Swellendam (-AB), *Galpin* 4768, *Wurts* 458, 3421 (Riversdale); sandy flats 30 km E. of Riversdale on road to Albertinia (-AV), *Oliver* 5501, 3423 (Knysna); Knysna (-AA), *Acocks* 21522; Plettenberg Bay (-AB), *Taylor* 4325.

In Houttuyn's The Natural History, etc., Volume 2, Part 12, deals with bulbous plants and was published in 1780. Houttuyn describes a yellow-flowered *Ornithogalum* from the Cape, which he could not place. He compared it with Hermann's *Ornithogalum africanum luteum, odoratum foliis cepaceae radice tuberosa* (Hort. Lugdb. p. 446, t. 467 (1687)), now *Bulbine tuberosa* (Mill.) Oberm., which also had star-like yellow flowers, but its filaments were bearded



FIG. 8.—*Ornithogalum dubium* Houtt.; Cape, near Worcester, Oliver 5028.





FIG. 9.—*Ornithogalum dubium* (holotype: Houttuyn Herbarium in G).

and this was not so in his case. So, being dubious, he named it *Ornithogalum dubium*. The raceme is preserved in the Geneva Herbarium and it clearly shows the distended filaments and the nearly sessile stigma. Unfortunately, the artist who illustrated the raceme in Houttuyn's work on t. 82, f. 3, drew the filaments as being filiform.

The type of *O. pillansii*, Leighton 134 from Het Kruis, Piketberg and other gatherings, e.g. Compton 12772 from Algeria, Cedarberge, Lewis 2563 from Elandskloof, Clanwilliam, show some affinity to *O. pruinosum* e.g. erect synanthous leaves, long style, etc., but the larger and firmer flowers resemble those of *O. dubium*. Similarly, *O. leipoldtii* from Clanwilliam, cannot be separated from this complex which Pienaar *et al.* (1968) considered to belong to *O. dubium* genetically.

The white-flowered form of *O. dubium* resembles *O. thyrsoides*, for both have a dark centre, but *O. dubium* can be identified by its fleshy, usually coloured filaments and the style which, if somewhat developed, has the same dark colouring as the ovary and the centre of the perianth. The filaments and style of *O. thyrsoides* are thin and a translucent white. But possibly some of the white-flowered plants could be hybrids. Van Niekerk & Pienaar (1968) were able to cross plants, identified by them as "*O. thyrsoides* forma nova from Rivieronderend and Swellendam" with several collections of the *O. dubium* (= *O. miniatum*) complex.



FIG. 10.—*Ornithogalum dubium*, separate flower on right side of Fig. 9, enlarged, to show filaments and ovary ( $\times 3$ ).

The isotypes of *O. perpulchrum* V. Poelln., Schlechter 9681, from near Elim, in PRE and GRA are very poor and leafless. Fortunately, there is an excellent collection by Bolus 8696, which was gathered on the same day (10.12.1896) also near Elim and which matches that of Schlechter's. No doubt they were out collecting together. Both gatherings have smaller flowers than is usual for *O. dubium*. Leighton placed Bolus 8696 under *O. fergusoniae*, but remarked that this species might prove to be only a smaller variety of *O. miniatum* (which is now *O. dubium*). Bolus, on his labels, added the information that they came from "dunis maritimis" which may explain their small size.

Marloth in his Flora of South Africa 4:107 (1915) remarks that snails and slugs regularly destroyed the plants in Cape Town gardens, but do not touch those of *O. thyrsoides*. Tests performed on animals proved it to be non-toxic.

8. *Ornithogalum maculatum* Jacq., Coll. 2:368, t. 18, f. 3 (1789); Bak. in Fl. Cap. 6:497 (1897); Leighton in JI S. Afr. Bot. 10:108 (1944); Mason, W. Cape Sandv. Flow. t. 6,4 (1972). *O. notatum* Roem. & Schult. f., Syst. Veg. 7:528 (1829), new name for *O. maculatum* Jacq., non Thunb. *Phaeocles maculata* (Jacq.) Salisb., Gen. Pl. Fragm. 35 (1866). Type: t. 18, f. 3 in Jacq., Coll. 2.

*O. maculatum* Thunb., Prodr. 62 (1794), Fl. Cap. ed. Schult. 314 (1823); Kunth, Enum. Pl. 4:352 (1843). *O. thunbergianum* Bak. in J. Linn. Soc. (Bot.) 13:269 (1873), Fl. Cap. 6:497 (1897); Phill. in Flower. Pl. S. Afr. t. 65 (1922); new name for *O. maculatum* Thunb., non Jacq. Type: Cape, Saldanha Bay, Thunberg 8289 (UPS, holo.!).

*O. thunbergianum* var. *concolor* Bak. in Fl. Cap. 6:496 (1897). Type: Cape, without locality, Forster (K, prob.).

*O. speciosum* Bak. in J. Bot., Lond. 29:72 (1891), Fl. Cap. 6:497 (1897), non Salisb. (1796), nec Rafin. (1810). *O. insigne* Leighton in JI S. Afr. Bot. 9:113 (1943), new name for *O. speciosum* Bak. *O. magnificum* V. Poelln. in Port. Acta biol. 1:214 (1946), new name for *O. speciosum* Bak. *O. maculatum* Jacq. var. *speciosum* (Bak.) Leighton in JI S. Afr. Bot. 10:110 (1944). Type: Cape, Namaqualand, Scully 175 (K, holo.!). Scully in Herb. Norm. Austr. Afr. 1390 (SAM!).

*O. splendens* L. Bol. in S. Afr. Gdng Ctry Life 21:14 (1931). *O. maculatum* Jacq. var. *splendens* (L. Bol.) Leighton in JI S. Afr. Bot. 10:110 (1944). Type: Cape, near Nieuwoudtville Buhr sub Nat. Bot. Gard. 2654/30 (BOL, holo.!).

Plants 0,08–0,5 m tall. *Bulb* obturbinate up to about 30 mm in diam. soft and juicy, with white (or brown when dry) tunics; roots many, thin, radiating from a basal disk. *Leaves* 2–5, usually synanthous, linear to oblong or narrowly ovate, up to 150 mm long, 20 mm broad, apex acute to rostrate, rarely cirrhose, bases usually clasping, folded, erect, glabrous, glaucous, somewhat fleshy. *Raceme* 1–8-flowered, sub-corymbose; peduncle up to 450 mm long, firm; bracts usually longer than, and clasping pedicels in lower half, broadly ovate-acuminate, dry, papery; pedicels 10–30 mm long, arched. *Flower* with spreading, yellow, golden orange to bright orange-red perianth segments, the outer usually with a black spot or transverse, wavy line or transparent blotch at or near apex; segments elliptic to obovate, 10–25 mm long. *Stamens* erect, about half as long as segments; filaments subulate, inner often wider. *Ovary* oblong-globose, obtusely angled, pale yellow or green, abruptly narrowed into a very short style and capitate stigma with 3 decurrent papillate lobes; ovules multiseriate. *Capsule* ellipsoid; seeds minute, 1 mm, cuneiform, somewhat tongue-shaped below, densely wrinkled, black, shiny. *Chromosomes*:  $2n=12$ . FIGS 4.3; 11.

Recorded from the western Cape, Namaqualand to Malmesbury, Montagu and Laingsburg, in shallow, sandy rock pockets. Flowering September–October.

CAPE.—Without grid reference: Little Namaqualand, *Scully* 1390; *von Schlicht* sub *E. & Z.* 4203. 2917 (Springbok): near Springbok (–DB), *Lewis* 748; near Komaggas (–DC), *Acocks* 19568. 3017 (Hondeklipbaai): Kamieskroon (–BB), *Thorne* sub *SAM* 48851. 3118 (Vanrhynsdorp): Gifberg (–DC). *Phillips*



FIG. 11.—*Ornithogalum maculatum*; Jacq., Coll. 2, t. 18, f. 3 (iconotype).

7543, *Compton* 20839. 3119 (Calvinia): top of Vanrhyns Pass (–AC), *Barker* 1925. 3218 (Clanwilliam): Zeekoeivlei W. of Clanwilliam (–BB), *Oliver* 3868; 15 km W. of Veldrif to St. Helena Bay (–CC), *Thompson* 807. 3219 (Wuppertal): near Citrusdal (–CA), *Van der Merwe* 246; Baliesgat, Ceres (–CB), *Hanekom* 696. 3318 (Cape Town): Malmesbury, Steenberg Cove (–DC), *Lewis* 1428. 3319 (Worcester): Baviaansberg (–AB), *Thompson* 1276; Tulbagh Kloof (–AC), *Grant* 2425, *Heginbotham* 43; 33 km N. of Karoo Poort (–BC), *Hall* 958. 3320 (Montagu): Whitehill Ridge (–BA), *Compton* 14846.

The varieties *speciosum*, *concolor* and *splendens* are not upheld as they are merely larger or unspotted forms.

A note on a sheet from near Laingsburg (*Wilmot* 3), reported that goats are fond of the plants and pull out the whole plant when grazing as the bulbs grow near the surface.

9. *Ornithogalum multifolium* *Bak.* in *J. Linn. Soc. (Bot.)* 13, 271 (1873); *Fl. Cap.* 6:499 (1897); *Leighton* in *Jl S. Afr. Bot.* 10:106 (1944). Type: Cape, Namaqualand, Modderfontein, *Whitehead* (TCD, holo.!: PRE, photo.).

*O. aurantiacum* *Bak.* in *Gdnrs' Chron.* 10:748 (1878). Type: Cape, Malmesbury, Groenekloof (Mamre), *Bolus* s.n. (K, holo.!: PRE, photo.).

*O. rupestre* sensu *Bak.* in *Fl. Cap.* 6:499 (1897) for specimens quoted, excluding *Thunberg* type from Witteklip; sensu *Leighton* in *Jl S. Afr. Bot.* 10:108 (1944), non L.f.

*O. ranunculoides* *L.* *Bol.* in *S. Afr. Gdnng Ctry Life* 23:61 (1933); *Leighton* in *Jl S. Afr. Bot.* 10:107 (1944). Type: Cape, Namaqualand, *Herre* in *Stell. Univ. Gdms* 3972, 3973, 3978 (BOL, holo.!).

Common name: Kliphink.

Small plants 0,03–0,25 m tall. *Bulb* ovoid, asymmetrical, c. 20 mm in diam., with thin brown scales. *Leaves* few to about 10, terete, up to 0,1 m long, soft, glabrous, glaucous, often somewhat twisted, bases tubular. *Raceme* (1)5–10(15) flowered, sub-corymbose; bracts boatshaped, acuminate; pedicels with the lower up to 20 mm. *Perianth* cupshaped to stellate, yellow or orange, scented, the segments ovate, 6–15 mm long. *Stamens* half as long as segments with the filaments narrowly ovate, inner slightly wider. *Ovary* ovoid; ovules multiseriate; style short; stigma decurrent. *Capsule* oblong-ovoid, 10 mm; seeds ovoid, pointed or comma-shaped, 0,75 mm long, reticulate. *Chromosomes*:  $2n=12$ . FIGS 12 and 13.

Distributed in the western Cape, from Swellendam and the Peninsula to the Richtersveld, in rock pockets. Flowering September–October.

CAPE.—Grid reference unknown: Namaland Minor, *Scully* 1391. 2816 (Oranjemund): Richtersveld, Umdaus (–?D), *Bayliss* 275. 2818 (Warmbad): near Henkries (–CC), *Phillips* 1634. 2917 (Springbok), *Koegas* ("Goechas" –BD). *Schlechter* 11368; *Steinkopf* (–BD), *Herre* sub *Univ. STE* 17458, *Meyer* sub *Marloth* 6557; near Springbok (–DB), *Lewis* 747. 3017 (Hondeklipbaai): Bowsdorp (–BB), *Hall* sub *NBG* 73664. 3018 (Kamiesberg) 8 km N. of Garies (–CA), *Leighton* 1051. 3118 (Vanrhynsdorp): Knersvlakte (–BC), *Bayliss* 276. 3119 (Calvinia): western edge of Bokkeveld (–AA) *Marloth* 7524; road to Rondekop, N.E. of Nieuwoudtville (–AD), *Barker* 10763. 3218 (Clanwilliam): Piketberg, mountain top (–DC), *Barker* 10310. 3219 (Wuppertal): Pakhuis Pass (–AA), *Compton* 9611. 3220 (Sutherland): Klein Roggeveld, Tanqua, *Marloth* 10387. 3318 (Cape Town): Groene Kloof (Mamre); (–CB), *Pappe* sub *SAM* 23315; Mamre Hills (–CB), *Barker* 1932, 1933. 3320 (Montagu), 5 km N. of Matjiesfontein (–BB), *Acocks* 17147; Karoo Garden, Whitehill (–BB), *Compton* 17393; Warmwaterberg (–DC), *van Niekerk* 563.

10. *Ornithogalum rupestre* *L.f.*, *Suppl.* 199 (1782); *Thunb. Fl. Cap. ed. Schult.* 313 (1823); *Willd., Sp. Plant.* 2:123 (1799); *Roem. & Schult., Syst. Veg.* 7:526 (1829); *Kunth, Enum.* 4:367 (1843); *Bak. in Fl. Cap.* 6:498 (1897). Type: Cape, Malmesbury Division, Witteklip, *Thunberg*, sheet 8302 (UPS, holo.!: PRE, photo.).



FIG. 12.—*Ornithogalum multifolium* from Namaqualand, near Springbok, Hardy sub PRE 30301.





FIG. 13.—*Ornithogalum multifolium* from Namaqualand (holotype: Whitehead, TCD).

*O. virgineum* Soland. ex Bak. in J. Linn. Soc. (Bot.) 13:271 (1873). Type: Cape, Masson (BM, holo.); fide Baker; not seen by me.

*O. witteklipense* Leighton in J. S. Afr. Bot. 11:175 (1945). Type: Cape, Malmesbury Division, Witteklip near Vredenburg, Leighton 655 (BOL, holo.).

Small glabrous geophytes 0.02–0.1 m tall, growing in small clusters. *Bulb* globose, about 5–10 mm in diam., with white tunics. *Leaves* 1–3, narrowly linear, flat or inrolled, 10–20 (40) mm long, rarely longer, 1 mm broad, erect, firm, fleshy. *Raceme* 20–50 mm tall, 1–3(6)-flowered, sub-umbellate; peduncle erect, terete; bracts enveloping, and longer than pedicels, margin membranous. *Perianth-segments* white, often flushed with pink, ovate, 5–7 mm long. *Stamens* 4–5 mm long; outer filaments narrowly ovate, inner broader. *Ovary* ovoid; stigma sessile, conical with 3 decurrent papillate ridges; ovules multiseriate. *Capsule* unknown. FIG. 14.

Only recorded from around Vredenburg and Paternoster in the southern Cape. Flowering in September.

CAPE.—3217 (Vredenburg): Witteklip about 2 km S.S.W. of Vredenburg (—DD), Thompson 65,2655; Kasteelberg E. of Paternoster (—DD), Thompson 2663.

Very small plants growing in small clumps in crevices or depressions, in humus-rich, sandy soil on granite rocks. Apparently a rare endemic, which may soon be exterminated as the granite is being quarried for roads for the Sishen-Saldanha Bay development. Miss Mary Thompson and Mr C. Boucher are sincerely thanked for their co-operation in examining this locality and for the report on their findings.

#### Discussion on typification

Linnaeus filius described *Ornithogalum rupestre* in his Suppl. 199 (1782) as “foliis filiformibus carnosis

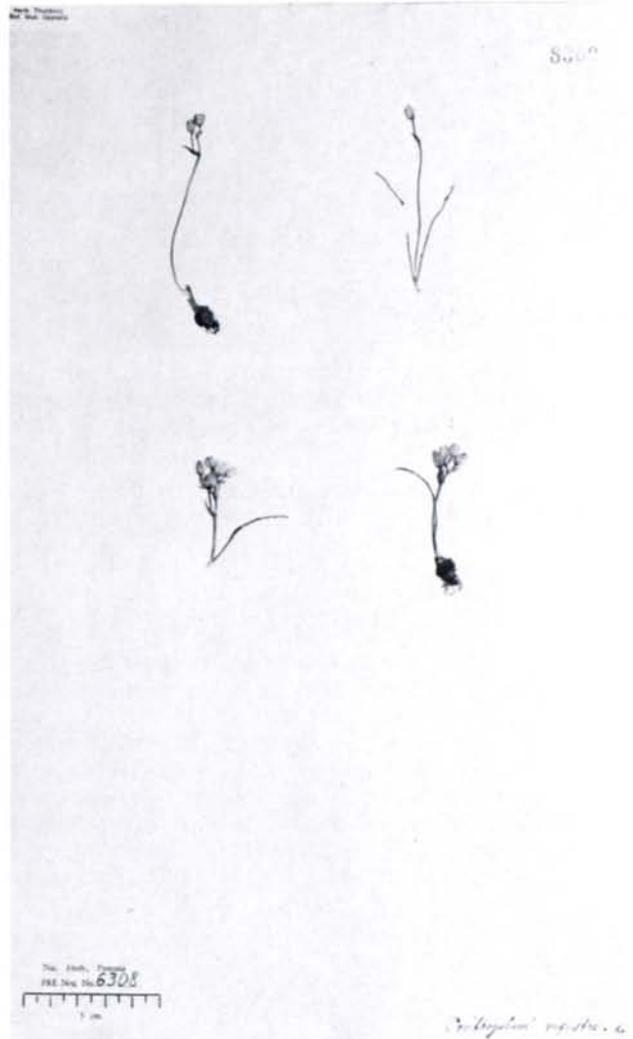


FIG. 14.—*Ornithogalum rupestre* from Witteklip in South-western Cape (holotype: Thunberg 8302, UPS).

scapo paucifloro”; Thunberg in his Prodrum 61 (1794) as “foliis filiformibus carnosis floribus reflexis” (the dried flowers are not reflexed however). In the Flora Capensis, ed. Schultes (1823) the protologue is repeated; a somewhat longer description is given and the flower colour is mentioned as white; Schultes then places two Thunberg collections under this name, stating that the gathering from Witteklip was white-flowered (*O. rupestre* A, sheet 8302) and the one from Groenekloof (*O. rupestre* B, sheet 8203) yellow-flowered. In subsequent taxonomic publications, Roemer & Schultes (Syst. Veg. 7:526. 1827), Kunth (Enum. 4:367. 1843) and Baker (J. Linn. Soc. (Bot.) 13:271. 1873, Fl. Cap. 6:498. 1897) accept the white flowered gathering as *O. rupestre*. Leighton, however, in her revision (J. S. Afr. Bot. 10:108; 1944) reversed the position and claimed that the yellow-flowered taxon represents *O. rupestre*, her reason probably being that the yellow-flowered plant is common. She afterwards visited Witteklip, where she found Thunberg’s white-flowered plant and described it as *O. witteklipense* (l.c. 11:175; 1945).

Since *O. rupestre* was always interpreted as having white flowers, I prefer to keep it that way and reverse Leighton’s decision. Thus, *O. witteklipense* Leighton becomes a synonym of *O. rupestre* L.f. and the yellow-flowered species receives Baker’s name *O. multifolium*. Incidentally Baker described Whitehead’s type-gathering as white, but this is incorrect.

Baker had apparently overlooked Schultes's observation that Thunberg's Groenekloof collection was yellow-flowered for, on the same page in the *Flora Capensis* (1897), he cites as *O. aurantiacum* a plant from Groenekloof collected by Bolus. It is regarded here as a synonym of *O. multifolium* Bak., described in 1873.

Both species possess filiform, somewhat fleshy leaves; Thunberg's yellow-flowered collection is somewhat smaller than average and also fewer flowered; his Witteklip gathering matches two subsequent collections in size and it would appear to be a rare, dwarf species, possibly a mutation of *O. multifolium*. However, dry colourless specimens of *O. multifolium* can be recognized by the short style, whereas *O. rupestre* has the stigma sessile.

11. *Ornithogalum diphyllum* Bak. in Kew Bull. 1895:153 (1895); Fl. Cap. 6:497 (1897). Type: Natal, Ntabamhlope Mountain, Evans 374 (K, holo.!, NH!; PRE, photo.).

Small montane, hygrophilous plants about 0,08 m tall. *Bulb* globose c. 10 mm in diam. *Leaves* 2-3, erect, narrowly linear, often with inrolled margins, apex obtuse, somewhat bulbous. *Raceme* subcorymbose, 2-10-flowered, compact, about as long as leaves; peduncle terete, erect; bracts narrowly ovate, long attenuated, longer than pedicels; pedicels erect, up to 10 mm. *Perianth* white, delicate, the segments narrowly ovate, c. 7 mm. *Stamens* with linear-acuminate filaments, inner slightly wider, 5 mm.

*Ovary* ovoid, 2,5 mm; ovules c. 16 per locule, biseriate; style erect, 1,5 mm; stigma apical, small. *Capsule* turbinate, 7 mm, stipitate, apex truncate, deeply grooved; seeds clubshaped, c. 2 mm, echinulate. FIG. 15.

Known only from the Drakensberg in the Estcourt district, from moist areas at high altitudes, locally frequent. Flowering in January.

NATAL.—2929 (Underberg): Ntabamhlope Research Station (-BA), West 606; Highmoor Forest Station (-AB), Killick & Vahrmeijer 3661; Giants Castle Game Reserve (-BC), Trauseld 695, Skead 58.

The species appears to be an isolated montane relic of the Cape *Ornithogalum* Group, the chinkerichees. The plain white perianth-segments and especially the small club-shaped, echinulate seeds show affinity with the Cape species.

2. Group *Hispidae*.—*Leaves* 3-5, proteranthous, forming a basal rosette, ovate to broadly linear, usually hairy; when the peduncle develops the encircling leaf-sheaths also lengthen, as well as the blades, especially upper younger ones, which become long and narrow. *Bracts* small, deltoid-aristate, with a dark midrib, auriculate, sparsely denticulate, membranous. *Flowers* stellate, white or pinkish; perianth-segments 5-10 mm. *Stamens* with the filaments variously expanded. *Style* filiform, erect, rarely deflexed during anthesis, stigma small, capitate. *Capsule* ovoid to oblong-ovoid, hidden or protruding from dry perianth; seeds minute, papillate or spiky. Western and southern Cape. Type species: *O. hispidum* Hornem. (species 12-21).

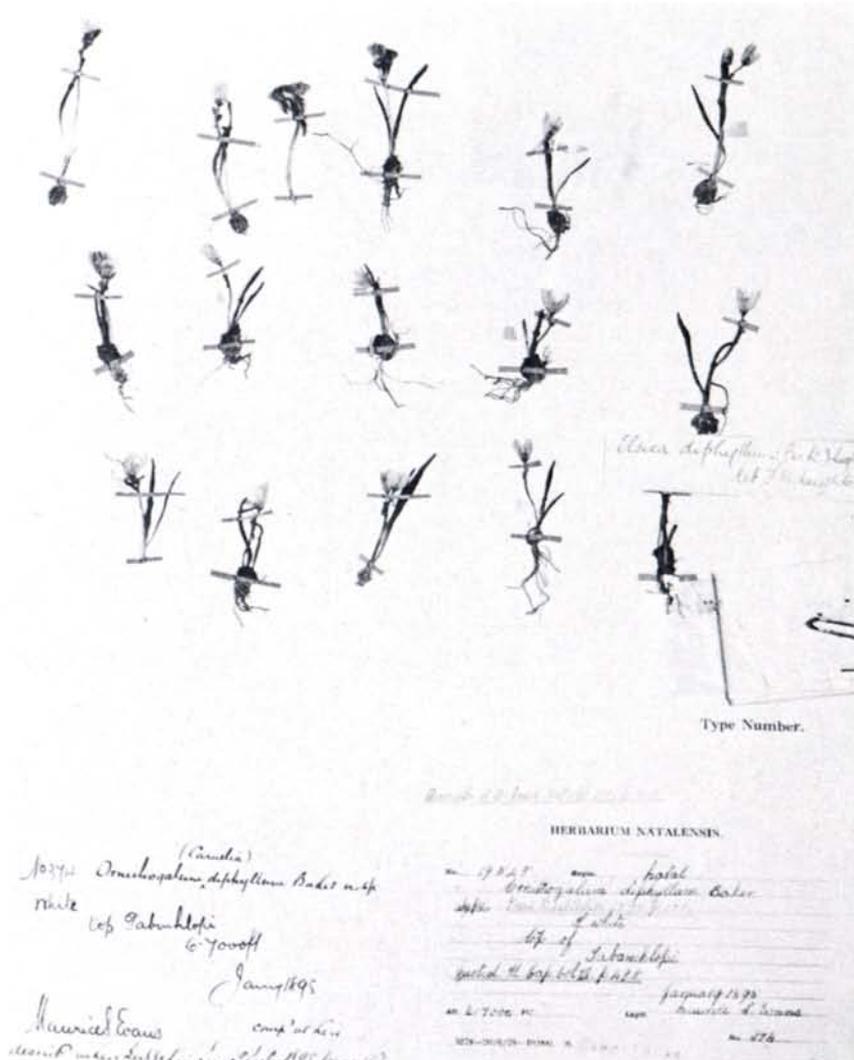


FIG. 15.—*Ornithogalum diphyllum* from Natal Drakensberg (isotype: Evans, NH)

12. *Ornithogalum pilosum* L.f., Suppl. 199 (1782); Thunb., Prodr. 61 (1794). Type: Cape of Good Hope, Thunberg sheet 8297 (UPS, holo.).

Plants (0,05) 0,15–0,3 m tall. *Bulb* globose 10–30 mm in diam., with or without a neck, covered with hard, black shiny tunics. *Leaves* often present at anthesis, c. 4, rosulate, forming a narrow sheath below; lamina erect linear up to 150 mm long, glabrous with a ciliate margin. *Racemes* 1–4, up to about 20-flowered, minutely punctate; peduncle somewhat curved where it emerges from the leaf rosette; pedicels erecto-patent, wiry, 10–20 mm; bracts deltoid-aristate, clasping, margin with some shallow teeth. *Flowers* diurnal; perianth-segments white above, pinkish, green or brown below, linear, c. 10 mm long, spreading or reflexed. *Stamens* about 7 mm, the outer filaments linear, the inner ovate-acuminate. *Ovary* ellipsoid, yellow above, contracted and pale below; ovules biseriate, c. 20, absent from lower contracted base of ovary; style short or long; stigma capitate. *Capsule* ovoid 0,7 mm; seeds minute, somewhat cuneate, with short thin spiny papillae.

Two subspecies are recognized.

#### Key to subspecies

Leaf-margin with firm cilia regularly spaced; style shorter than ovary; S.W. Cape. . . . . (a) subsp. *pilosum*  
 Leaf-margin with soft long cilia forming an untidy border; style longer than ovary; W. Cape, Calvinia to Namaqualand. . . . . (b) subsp. *pullatum*

#### (a) subsp. *pilosum*

*O. pilosum* L.f., Suppl. 199 (1782); Thunb., Prodr. 61 (1794). Fl. Cap. ed. Schult. 313 (1823); Bak. in Fl. Cap. 6:504 (1897); Leighton in Jl S. Afr. Bot. 11:152 (1945). Type: Cape of Good Hope, Thunberg 8297 (UPS, holo.).

*O. affine* Schult.f. in Roem. & Schult., Syst. Veg. 7:1700 (1830). Type: Cape of Good Hope, Lions Head, Ecklon 228

(M. holo.!; PRE, photo.); (distributed as "*Cyanella alba*", herb. Cap. Union Utin.).

*O. mundianum* Kunth, Enum. 4:351 (1843). Type: Cape of Good Hope, *Mund & Maire* (type not traced, probably destroyed at B; reduced to a synonym of *O. pilosum* by Baker which appears to be correct).

*O. minimum* Bak. in Bull. Herb. Boissier ser. 2, 4:999 (1904), non L. 1753, etc. *O. perparvum* V. Poelln. in Portug. Acta biol. ser. B, 214 (1945) nom. nov. Type: Cape, Riviersonderend, Schlechter 5648 (Z, holo.!; PRE, photo.).

This typical subspecies is very homogeneous and is characterized by the style being shorter than the ovary and the leaf margin having the cilia evenly spaced. Mature bulbs nearly always produce up to 3 or 4 racemes, whereas related species mostly have one or seldom two.

Found on the Cape Peninsula, eastwards to Riversdale and northwards to Ceres, Piketberg, Tulbagh and Worcester, on rocky hillslopes or clay flats. Flowering October–December.

CAPE.—3218 (Clanwilliam): Piketberg (–CD), *Bolus* 13655; Het Kruis kopje (–DA), *Barker* 3993. 3318 (Cape Town): Devils Peak, near blockhouse (–CD), *Pappe sub SAM* 23348, Lion's Flanks (–CD), *Penfold* 101; Roodebloem (–CD), *Zeyher* 5049; Joostenberg (–DD), *Lewis* 5908. 3319 (Worcester): Tulbagh (–AC), *Pappe sub SAM* 23349, *Acocks* 20743; Laken vlei, Ceres (–BC), *Compton* 12086; Worcester Veld Reserve (–CB), *Olivier* 140. 3320 (Montagu): Barrydale (–DC), *Galpin* 4766. 3420 (Bredasdorp): National Bontebok Park (–CA), *Marais* 58. 3421 (Riversdale): Corente River (–AB), *Muir* 5397.

(b) subsp. *pullatum* (Leighton) Oberm., stat. nov.

*O. pullatum* Leighton in Jl S. Afr. Bot. 11:153 (1945). Type: Cape, hills N. of Calvinia, *Marloth* 12780 (PRE, holo.).

This subspecies is easily recognized by its long style, which exceeds the ovary in length and the softer and longer cilia forming an untidy leaf border. FIGS 16; 17.



FIG. 16.—*Ornithogalum pilosum* subsp. *pullatum* from Studer's Pass, south-western Cape, *Stayner* sub NBG 88691. Plant in leaf, July 1969. Photo: W. F. Barker.



FIG. 17.—The same plant as Fig. 15, in flower, December 1968. Photo: W. F. Barker.

It is only known from two localities; from the hills north of Calvinia and from Studers Pass west of Garies. Flowering in December.

CAPE.—3018 (Hondeklipbaai): Studer's Pass W. of Garies (—AC), *Stayner sub NBG 88691*. 3119 (Calvinia): hills north of Calvinia town (—BD), *Marloth 12780*.

I thank Miss W. F. Barker for cultivating, photographing and preserving material of the Stayner collection from Studer's Pass. It has enabled me to describe this subspecies more fully. The flowers open in the morning and finally the perianth-segments become reflexed; towards 15h00 they start closing again. When fully open, the style is bent at right angles to the ovary, but returns to the upright position when the flower closes. The flowers appeared in December; leaves were produced during the winter months. The plant was described as a separate species by Leighton, basing her description on a Marloth collection at PRE. The differences she observed between the Marloth collection from Calvinia and *O. pilosum*, were also present in the plants from Studer's Pass. The differences, however, are of minor importance compared to the similarities found in both taxa. The bulb with its dark shiny scales, the ciliate leaves and the punctulate epidermis of the raceme are characteristic of this species.

13. *Ornithogalum geniculatum* Oberm., sp. nov., *O. hispidum* Hornem. affinis, sed pedunculo prope basi acuta curvato inflorescentia subcorymbosa paucifloribus differt.

Planta ad 0,2 m alta vel minora. *Bulbus* ovoideus succulentus. *Folia* 1–3, minore linearia vel oblonga longi vaginata. *Inflorescentia* pauciflora subcorymbosa vel racemosa. *Perianthii segmenta* alba anguste ellipsoidea. *Staminum* filamenta tria exteriora linearia tria interiora basi abrupte expansa. *Semina* colliculata.

Type: Cape, 2816 (Oranjemund), Richtersveld, Kuboos (—BD), *Marloth 13249* (PRE, holo.!: STE).

Small straggling plants varying in size. *Bulb* ovoid, c. 10 mm in diam., white, fleshy, outer tunics dry and brown. *Leaves* synanthous, 2–4, lower flaccid, lying on ground, variable in size, oblong, 40–50 mm long and 20 mm broad; upper much reduced, up to 30 mm long, and 3 mm broad, with their tubular bases up to 15 mm long, tightly enveloping stem; margin usually fimbriate. *Inflorescence* subcorymbose to racemose up to about 10-flowered; peduncle wiry, forming a sharp angle where it emerges from the upper leaf's tubular base; bracts linear-acuminate to aristate; pedicels thin, spreading, c. 10 mm long. *Perianth* with shiny white narrowly elliptical segments, 10 mm long. *Stamens* about half as long as segments, outer with filiform filaments, inner with ovate or broad and pointed to obtuse expansions. *Ovary* ovoid; ovules many, multiseriate; style about as long as ovary with a capitate stigma with 3 decurrent papillate ridges. *Capsule* oblong-ovoid, transparent; seeds 1 mm, compressed, colliculate. FIG. 18.

A rare species recorded from southern South West Africa, the Richtersveld and Namaqualand, in shady places; flowering August–October.

S.W.A.—2716 (Witpütz): farm Witpütz Nord, LUS22, police station (—DA), *Giess 13749*.

CAPE.—2816 (Oranjemund): Kloof at Kuboos (—BD), *Marloth 12349* (PRE, STE); *Lavranos 10936*; mountain range S.W. of Kuboos (—BD), *Herre sub STE 12354*; Doornpoort (—BD), *Hall 816*. 2917 (Springbok): Steinkopf (—BC), *Meyer sub STE 9107*; Breekpoort (—BC) *Herre sub STE 12400*; 16 km W.N.W. of Bulletrap School near Skaap River, S. facing shale krantzies, locally abundant (—BD), *Acocks 19526*.

The species is close to *O. hispidum*, but its small size, usually corymbose inflorescence and the peculiar acute angle of the peduncle below, separate it from

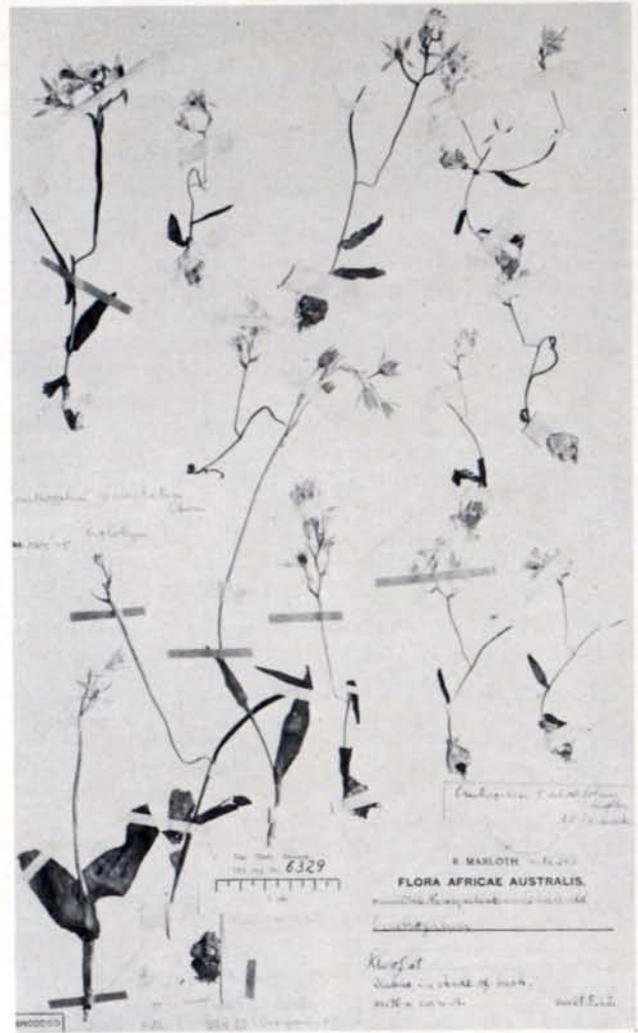


FIG. 18.—*Ornithogalum geniculatum* from Richtersveld, western Cape (holotype: *Marloth 12349* in PRE).

this species. Possibly the flowers open at night, for the majority had the perianth more or less closed.

14. *Ornithogalum bicornutum* Leighton in Jl. S. Afr. Bot. 11: 143 (1945). Type: Cape. Calvinia district, between Brandvlei and Calvinia, *Esterhuysen 4007* (BOL, holo.!: PRE).

Small plants 0,01–0,16 m tall. *Bulb* globose to ovoid up to 15 mm in diam., produced into a neck, tunics leathery brown. *Leaves* 2–4, usually withered at anthesis, superposed, with long membranous sheathing bases; lamina small, narrowly ovate to linear, c. 10 mm long; margin of leaves often thickened and shiny with retrorse setae above and below. *Raceme* (1)3(12) flowered; peduncle filiform, usually about 80 mm; bracts 2 mm, deltoid-auriculate, membranous; pedicels filiform, 4–6 mm. *Flowers* opening towards sunset, white; perianth-segments linear, obtuse, c. 5–7 mm. *Stamens* erect, about 4 mm, the filaments expanded below into 2 spreading curved horns, filiform above. *Ovary* ovoid, dark; ovules numerous; style filiform; stigma capitate. *Capsule* ovoid, apiculate, 4 mm; seeds somewhat rough, cuneate, 0,5 mm. FIG. 14.

Apparently a rare species known only from the Calvinia and Williston districts in arid, karroid, rocky habitats. Flowering October–December.

CAPE.—3119 Calvinia: Botterkloof (—CD), *Leighton 2366a*. 3120 (Williston): 80 km from Brandvlei on road to Calvinia (—AA), *Esterhuysen 4007*; 25 km W. of Williston (—BC), *Acocks 15159*; 6 km E. of Williston (—BD), *Story 4258*.

A delicate species. The primary winter leaves are probably unknown; those described surrounded the base of the peduncle in a withered state.

15. *Ornithogalum deltoideum* Bak. in J. Linn. Soc. (Bot.) 13: 281 (1873), Fl. Cap. 6: 501 (1897). Type: Cape, Silverfontein near Ookiep, Drège 2664 (K, holo.!; PRE, photo.).

*O. richardii* Leighton in S. Afr. Gdng Ctry Life 23: 61 (1933), Jl S. Afr. Bot. 11: 143 (1945). Type: Cape, Kakamas, Richard Fuller 136 (BOL, holo.!; PRE).

Plants 0,07–0,18 m tall. *Bulb* ovoid, c. 15 mm in diam. produced into a short neck, outer scales thin, wrinkled, pale brown. *Leaves* 2–4, withered at anthesis, superposed with the tubular bases up to 15 mm long; lamina linear, c. 20 mm long, 2–4 mm broad, margin hispid with long hairs and a dense short fringe. *Raceme* laxly 1–8-flowered on an erect slender peduncle up to 180 mm long; bracts small, broadly deltoid, margin denticulate; pedicels filiform, 10–15 mm long, drooping in bud, erect at anthesis and in fruit. *Perianth* "pinky cream" or pale fawn, with a faint green midrib, delicate, opening in late afternoon; segments narrowly elliptical c. 12 mm long. *Stamens* about 3/4 of the length of the segments; filaments with the expansions in lower half terminating in a deep untidy fringe, upper half of filament filiform; anthers 2 mm. *Ovary* narrowly ellipsoid with 3 nectiferous grooves opposite inner stamens; ovules many, multiseriate; style terete, about as long as ovary; stigma capitate. *Capsule* ovoid, rostrate; seeds minute, somewhat cuneate, variously compressed, colliculate. FIG. 1.5.

Recorded from southern South West Africa and the north-western Cape, in dry karroid, hilly country; rare.

S.W.A.—2718 (Grunau): Klein Karas (—CA), Dinter 4987, Jutta Dinter 3242.

CAPE.—2820 (Kakamas): Kakamas (—DC), Fuller sub herb. Marloth 13722. 2917 (Springbok); Steinkopf (—BD), Meyer sub herb. Marloth 6673, 13365; Vuurdood (—BD), Schlechter 11477.

The flowers open in the late afternoon and close during the night. The nectaries appear to be well developed. Young buds adopt a drooping position.

16. *Ornithogalum hispidum* Hornem., Hortus Hafn. 331 (1807). Type: t. 416 in Jacq., Ic. Pl. Rar.

Plants 0,1–0,4 m tall. *Bulb* globose with juicy white tunics, grey when dry. *Leaves* 3–6, present or withered at anthesis, in an elongated stem-clasping rosette; the long tubular basal sheath membranous, green or white, immaculate or spotted, glabrescent to densely puberulous; lamina variable in size and shape, lower usually smaller than upper, usually linear-acuminate, up to 0,1 m long, sparsely to densely hispid and with some scattered, reflexed, green or red setae; margin swollen, minutely and densely scabrid. *Raceme* few- to many-flowered, the peduncle straight or slightly curved near the base; bracts membranous, small, acuminate-aristate; pedicels ascending, 10–20 mm. *Flowers* delicate, stellate to reflexed with age; perianth-segments narrowly ovate, 8–18 mm long, white, dorsally green or red keeled. *Stamens* erect, with the filaments filiform, subulate or the inner expanded below. *Ovary* oblong-ovoid, yellow or green, rugose; ovules many, multiseriate; style terete to slightly clavate; stigma depressed-globose, glandular-papillate. *Capsule* ovoid, rostrate, membranous; seeds numerous, minute, 1 mm, somewhat cuneate or pearshaped, angled by pressure, smooth, papillate or echinulate. *Chromosomes*:  $2n=20, 24$ . FIGS 4.4; 19.



FIG. 19.—*Ornithogalum hispidum*; Jacq. Ic. Pl. Rar. 2, t. 416 (iconotype).

Widespread in the south-western Cape, from the Richtersveld and Namaqualand to the Cape Peninsula as far east as Hermanus; on rocky outcrops or on dry red sandy flats. Flowering August–December or even later at high altitudes.

Two subspecies are recognized.

#### Key to subspecies

- Seeds smooth, papillate or sparsely prickly; inner filaments filiform to broadly subulate or expanded below; plants flowering in spring; Richtersveld southwards to the vicinity of Worcester.....(a) subsp. *hispidum*  
 Seeds densely prickly; inner filaments with pointed expansions; plants flowering in midsummer; Peninsula and vicinity.....(b) subsp. *bergii*

#### (a) subsp. *hispidum*

*O. hispidum* Hornem., Hort. Hafn. 331 (1807). *Anthericum pilosum* Jacq., Icon. Pl. Rar. 2, t. 416 (1794); Coll. 5: 87 (1797). (The binomial *O. pilosum* L.f. (1782), necessitated a new epithet) *Phalangium pilosum* (Jacq.) Poir. in Lam., Encycl. 5. 244 (1804). Type: t. 416 in Jacq., Ic. Pl. Rar.

*O. distans* L. Bol. in J. Bot., Lond. 71: 71 (1933); Phill. in Flow. Pl. Afr. 22, t. 870 (1942); Leighton in Jl S. Afr. Bot. 11:137 (1945). Type: Cape, near Nieuwoudtville, Buhr sub BOL 19945 (BOL, holo.!).

*O. karroicum* Leighton in JI S. Afr. Bot. 9: 110 (1943), l.c. 11: 144 (1945). Type: Cape, Laingsburg, Cabidu Farm, Compton 12109 (BOL, holo.); NBG).

*O. urbanium* Schltr. ex V. Poelln. in Feddes Rep. 54: 25 (1944). Type: Cape, Oorkraal, Schlechter 10996 (Breslau, holo.; GRA!).

*O. marlothii* Leighton in JI S. Afr. Bot. 11: 138 (1945). Type: Cape, Namaqualand, between Garies and Kamieskroon, Leipoldt 3356 (BOL, holo.).

*O. ciliatifolium* Leighton in JI S. Afr. Bot. 11: 141 (1945). Type: Cape, Calvinia, Brandkop, Stokoe 8584 (BOL, holo.).

*O. salteri* Leight. in JI S. Afr. Bot. 11: 144 (1945). Type: Cape, Richtersveld, Doodkloof, L.E. Taylor sub BOL 22760.

*O. rubescens* Leighton in JI S. Afr. Bot. 11: 142 (1945). Type: Cape, Piketberg, near Redelinghuis, Pillans 7720 (BOL, holo.).

Plants variable in size, up to 0,4 m tall. Leaves often synanthous, glabrescent to densely pubescent and with scattered reflexed setae; leaf-bases immaculate or speckled, green or white. Stamens with the filaments filiform, subulate, narrowly ovate-acuminate or winged. Seeds papillate or with some of the papillae elongating to form prickles.

Recorded from the Richtersveld and Namaqualand, southwards to Ceres, Worcester and Laingsburg. Flowering in spring, August–October.

CAPE.—Without precise locality, Richtersveld, Herre sub STE 19636; Doodkloof, Taylor sub BOL 22760, 2917 (Springbok); Richtersveld, Twee-Rivier (–AA), Marloth 12209b; Anenous (–BA), Marloth 12209a, Lewis 5534; Springbok (–DB), Barker 6735; Mesklip (–DD), Barker 3702, 3017 (Hondeklipbaai); Kamieskroon (–BB), Thorne sub SAM 48849, 3018 (Kamiesberg); Studer's Pass (–AC), Thompson 1279, 3118 (Vanrhynsdorp); Knersvlakte (–BC), Barker 3646; near Varschrievier on road to Grootdrif (–BD), Hall 4422; Zandkraal (–DA), Acocks 14808, 3119 (Calvinia); Glen Lyon farm near Nieuwoudtville (–AC), Barker 10543, 3218 (Clanwilliam); Olifants Dam (–BB), Barker 4769; Het Kruis kopje (–DA), Barker 3994, 3219 (Wuppertal); Scorpionskloof, Cedarberg (–AC), Stokoe sub SAM 56009; Leeuw River, Ceres (–CD), Compton 16739, 3319 (Worcester); Karoo Garden (–CB), Barker 4791, 5931.

(b) subsp. *bergii* (Schlechtld.) Oberm., stat nov.

*O. bergii* Schlechtnd. in Linnaea 1: 253 (1826). Type: Cape Peninsula, Leeuwenstaart, Bergius (B,†); Camps Bay, Marloth 8202b (PRE, neo!).

*O. ciliatum* Eckl. ex Roem. & Schult., Syst. Veg. 7: 1697 (1830); non L.f. Type: Cape, Table Mountain, Ecklon 572 (M, holo.).

*O. miniatum* Schinz in Bull. Herb. Boissier 2: 223 (1894); non Jacq. Type: Cape, Camps Bay, Schlechter 133 (Z, holo.; BOL; PRE!).

*O. hispidum* sensu Bak. in Fl. Cap. 6: 504 (1897), sensu Leighton in JI S. Afr. Bot. 11: 139 (1945).

Plants 0,1–0,3 m tall. Leaves usually withered at anthesis, closely puberulous, the hairs short, often stellate and often intermixed with reflexed setae; leaf-bases immaculate. Perianth-segments up to 18 mm long. Stamens with the inner filaments winged. Seeds echinulate.

Recorded from the Cape Peninsula and vicinity, eastwards as far as Hermanus. Flowering December–January.

CAPE.—3318 (Cape Town): Darling Flora Reserve (–AD), Marais 2; Table Mountain, Stinkwater Ravine (–CD), Marloth 8202; Signal Hill (–CD), Marloth 9852; Berg River Hoek, Paarl (–DB), Compton 8349; Langverwach above Kuils River (–DC), Oliver 4819; Jakkalsvlei, Jonkershoek (–DC), H. C. Taylor 4496; Banhoek (–DD), Compton 10347, 3319 (Worcester); Zachariashoek Exp. catchment area (–CC), Smith 48, 3418 (Simonstown); Arends Kop (–AB), Compton 10313; Rooihooft (–AD), Leighton 375; Mcordenaarskop (–BB), Stokoe sub SAM 64712, 3419 (Caledon); Hermanus (–AC), Compton 14260; Vogelgat (–AD), Schlechter 9535.

The iconotype of *O. hispidum* Hornem., the Jacquin Plate 416 in Icones Plantarum Rariorum, Volume 2, shows a well developed cultivated plant, which resembles the Namaqualand collections described as *O. marlothii* by Leighton. It is very likely that the typical subspecies came from the northern region of

the western Cape, for Boos and Scholl did collect there and Jacquin describes the filaments of the stamens as subulate. Namaqualand has a warmer climate than the Cape Peninsula and the plants growing there are usually taller. The subspecies *hispidum* is extremely variable being glabrescent or densely hairy, the leaf-bases may be green or white, maculate or immaculate and plants from the Knersvlakte and vicinity possess a deep wine-red colour, at least when dry. The leaves may be synanthous or completely dry at anthesis. Leighton, with limited collections at her disposal, described a number of forms as separate species, but all of these could not be upheld. The shape of the filaments may be a useful character at times, but it is unstable. While all the collections from the south showed winged inner filaments, those from the northern region mostly had them subulate, but either type may be present in areas in between. Similarly, the prickly seeds occur in the south, the smooth ones in the northern districts, but in between some seeds are papillate with at times a few to many papillae lengthening to become prickly.

*Dwarf form*.—The three following collections may possibly represent paedogenic plants of *O. hispidum*: Cape.—3118 (Vanrhynsdorp): Nardouw Kloof (–DD), Stokoe sub SAM 62233, 3218 (Clanwilliam) Pakhuis Pass (–BB), Barker 9632, 3319 (Worcester): Welbedacht Kloof (–AC), Stokoe sub SAM 58191.

Plants 0,07–0,12 m high. Leaves glabrescent. Raceme 3–20 flowered. Flowers small; perianth-segments 5 mm, linear. Stamens with filaments filiform. Seeds smooth or shallowly papillate.

17. *Ornithogalum thermophilum* Leighton in JI S. Afr. Bot. 11: 145 (1945). Type: Cape: Cedarberg Mts, Nieuwoudt Pass, Esterhuysen 7163 (BOL, holo!).

Plants 0,15–0,3 m tall. Bulb 10–20 mm in diam. with white fleshy tunics, outer grey when dry. Leaves 3–4, withered at anthesis, in an elongated stem-clasping rosette, the long tubular basal sheaths membranous, minutely puberulous, with faint ferruginous ribs and spots; lamina glabrous (?) broadly linear, margin densely fimbriate and/or setose. Raceme narrow, many-flowered, on a long slender naked peduncle; bracts deltoid-auriculate, c. 3 mm, membranous with 3–5 dull orange nerves, margin toothed; pedicels erect, short, 5–10 mm long, thin. Flowers 20–40, closely arranged, small, stellate or reflexed; perianth-segments linear, c. 6 mm long, 1–1,5 mm wide, white with a dull orange midrib flanked by 2 thinner nerves (these possibly only become conspicuous in the dried state). Stamens spreading, somewhat shorter than the segments; outer filaments linear, inner narrowly ovate-acuminate; anthers comparatively large, 1,5 mm long. Ovary ovoid; ovules numerous, multiseriate; style longer than ovary, terete, widening slightly towards the swollen trisulcate papillate stigma. Capsule ovoid; seeds minute, cuneate, echinulate. FIG. 20.

Known only from the neighbourhood of Clanwilliam, flowering in December.

CAPE.—3218 (Clanwilliam): Clanwilliam (–BB), Leipoldt 1041; 8 km S. of Clanwilliam (–BB), Compton 18839, Leighton 2381, 3219 (Wuppertal); Nieuwoudt Pass (–AC), Compton 12678.

Except for the type and Compton 12678, the other collections cited by Leighton are here placed under *O. hispidum*. This dainty species is characterized by the narrow slender many-flowered raceme, filiform thin pedicels and linear perianth-segments reflexed at anthesis. This species and related ones, which flower in December, are poorly represented in herbaria, since few collectors visit these western Cape areas during the dry and hot summer months.



FIG. 20.—*Ornithogalum thermophilum* from Nieuwoudt Pass south-western Cape (holotype: Esterhuysen 7163, BOL)

18. *Ornithogalum hallii* Oberm. sp. nov. *O. thermophilo* Leighton affinis, sed filamentis staminum interioris a basi expansum ovarium tectum et margine folii setoso differt.

Planta 0,1–0,2 m alta. *Bulbus* ovoideus c. 20 mm diam. albus succulentus. *Folia* per anthesin marcida; margine setosa. *Racemus* densus multiflorus; pedunculis brevis. *Flos* minorus, *Filamentum* interiorum a basi expansum conchiformis ovarium tectum. *Testa* seminis papillata.

Type: Cape, 3118 (Vanrhynsdorp), Vredendal, farm Liebendal (–CB), Hall 3901 (PRE, holo.).

Small plants 0,1–0,2 m tall. *Bulb* globose, c. 10–20 mm in diam., succulent, the outer dried tunics brown and leathery. *Leaves* 4 in an elongated rosette, about 10 mm apart, the purple-spotted sheaths covering the peduncle up to the rhachis; 2 lower with a cordate lamina 8–10 mm long, purple, ciliate and hairy below; 2 upper broadly linear, 25–35 mm long, green with a ciliate margin, withered at anthesis. *Raceme* subspicate, with rhachis c. 60 mm long; peduncle covered by leaf-sheaths; bracts deltoid-aristate, auriculate, costate; pedicels erect, 3 mm long. *Flowers* opening towards noon, closing at about 4 o'clock, numerous, small, erect, close together. *Perianth-segments* spreading or reflexed, narrowly linear, c. 5 mm long, whitish with a broad pink and green midrib, the back suffused with pink, rusty brown when dry. *Stamens* erect, the outer with filiform filaments, the inner expanded below, conchiform, moulded over the ovary. *Ovary* globose; ovules

c. 16 in each locule, biseriate; style erect, as long as ovary, terete, with 3 deltoid, cohering stigmatic lobes, papillate along the margins. *Capsule* ovoid, 4 mm long, thin walled; seeds somewhat cuneate, c. 1 mm, testa with hard papillae. FIGS 1.6; 21 and 22.

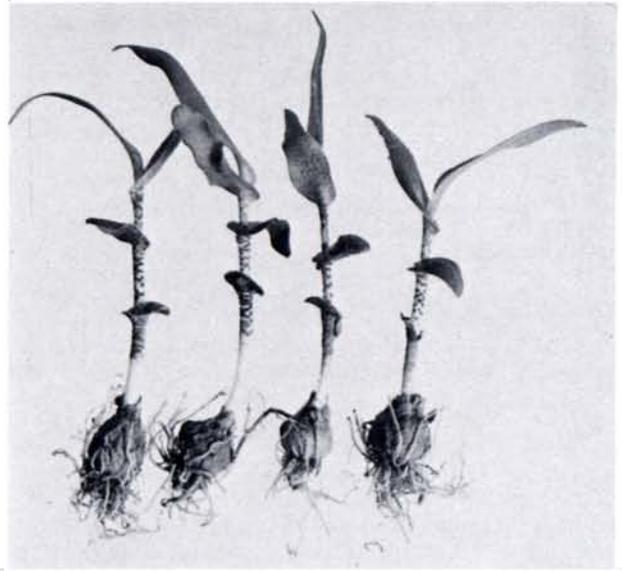


FIG. 21.—*Ornithogalum hallii* from Vredendal, south-western Cape; Hall 4618, from the same locality as the holotype; plants in leaf, July 1976.

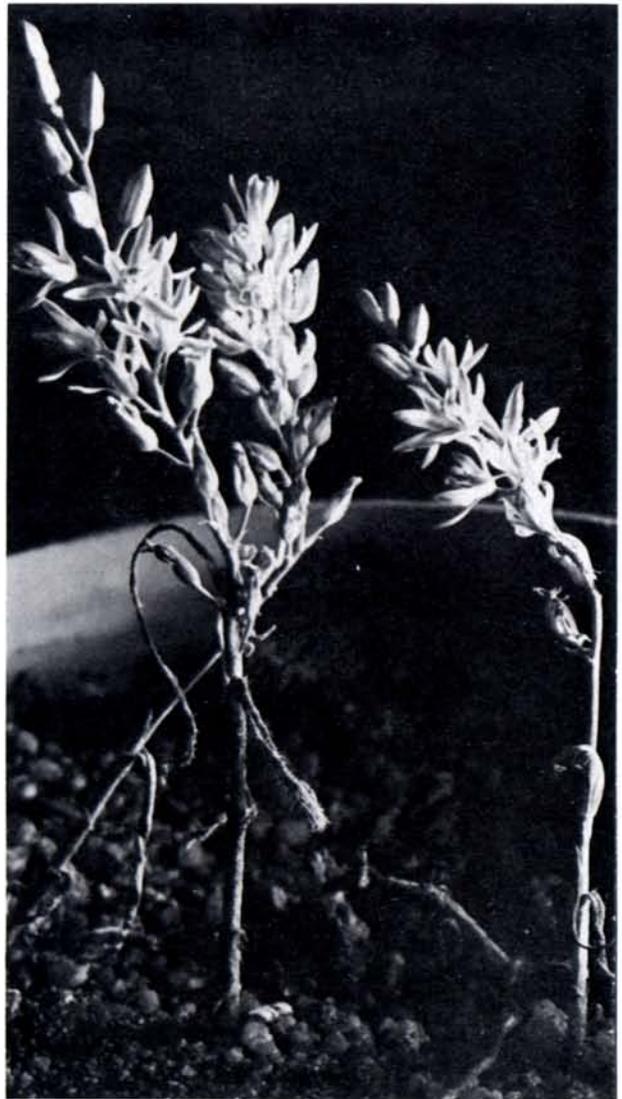


FIG. 22.—*Ornithogalum hallii* from the same locality as Fig. 21; Hall 4503, in flower, November 1975.

Recorded only from the farm Liebendal situated about 13 km N. of Vredendal, in hard undisturbed sandveld, in full sun. Flowering November.

CAPE.—3118 (Vanrhynsdorp): Farm Liebendal, 13 km N. of Vredendal (—CB), Hall 3901, 3911, 3546, 4503, 4618.

It gave me much pleasure to name this species after Mr Harry Hall, a keen collector of Cape plants. The species grew on their farm Liebendal, where he observed and collected it in its different stages of development.

In 1975 the type-area was destroyed by the construction of the Sishen—Saldanha Bay railway line but Mr Hall assures me he has observed it in another locality not far from the original site.

19. *Ornithogalum constrictum* Leighton in JI S. Afr. Bot. 11: 136 (1945). Type: Cape, on road to the Fisheries, W. bank of Gouritz River, James 1445 (BOL, holo.!).

Plants 0,2–0,4 m high. *Bulb* ovoid, up to 30 mm in diam., forming a short neck, tunics pale yellow. *Leaves* absent at anthesis, 1–3, forming a tubular, short narrow base and an oblong lamina lying flat on ground, 50–80 mm long, 20 mm broad, closely striate and minutely punctulate when dry, margin minutely fimbriate. *Raceme* up to 300(–400) mm tall; peduncle fairly stout; bracts ovate-acuminate, aristate, auriculate, membranous; pedicels short, erect in fruit, lower up to 10 mm long. *Flowers* up to 40, placed close together, forming a spike-like erect raceme. *Perianth-segments* narrowly elliptic, 10–15 mm long, 3 mm broad, erecto-patent, white with a green median stripe below. *Stamens* unequal, variable, enclosing the ovary but diverging above; the 3 outer shorter, with oblong to subulate filaments and larger anthers; the 3 inner longer, expanded from base to apex, with the upper half often wider, with crenate or smooth margins and the lower half ovate, constricted in the middle; anthers of outer stamens in some specimens up to twice as large as those of inner. *Ovary* fusiform, tapering into the style; ovules numerous, biseriate; stigma capitate. *Capsule* fusiform, 8–10 mm long, rostrate; seeds somewhat cuneiform, c. 1,5 mm, colliculate. FIG. 1.7.

Recorded from the south-eastern Cape, from Bredasdorp to Albany, in shaly coastal Rhenosterveld or karroid areas, rather rare. Flowering December–February.

CAPE.—3225 (Somerset East): Bruintjieshoogte (—CB), MacOwan 1855; Farm Kabeogo, Somerset East (—DA), Bayliss 6272. 3226 (Fort Beaufort): Naude's Hoek near Alice (—DD), Giffen 779. 3222 (Oudtshoorn): Oudtshoorn commonage (—CA), Marloth 12177; hills at Klip River (—CA), Marloth 12135. 3325 (Port Elizabeth): Redhouse (—DC), Paterson 438. 3326 (Grahamstown): near Alicedale (—AC), Dyer 3332. 3420 (Bredasdorp): Kathoek (—AD), Acocks 23167; National Bontebok Reserve (—CA), Liebenberg 7971. 3421 (Riversdale): The Fisheries, west bank of Gouritz River (—BD), James 1445.

The subspicate, usually long and dense racemes with pointed bracts and perianth-segments on sturdy peduncles are typical for the species, although the unequal stamen-whorls may vary.

20. *Ornithogalum inclusum* Leighton in S. Afr. Gdng Ctry Life 24: 50 (1934); JI S. Afr. Bot. 11: 135 (1945). Type: Cape, Calvinia Division, Doornbos, Leighton sub BOL 20808 (BOL, holo.!).

Plants about 0,3 m tall. *Bulb* c. 30 mm in diam, with soft white tunics. *Leaves* 3–4, present but withering at anthesis, in an elongated rosette, glaucous green, linear, attenuated towards the apex, up to 0,1 m

long, glabrous, margin minutely fimbriate. *Raceme* on a long (c. 0,2 m) peduncle about 2 mm thick; bracts deltoid-acuminate, 12–9 mm long, auriculate, margin minutely dentate, membranous; pedicels up to 5 mm long, stout. *Flowers* in a subspicate, dense raceme, c. 50 mm long, the flowers close together, overlapping, erecto-patent; perianth-segments spreading, narrowly elliptic, 10–12 mm long, white with a green stripe below. *Stamens* erect, the filaments enclosing the ovary; outer stamens shorter with filaments ovate-acute, 6 mm long and anthers 2 mm; inner stamens with filaments 9 mm long, constricted in the middle, linear below, expanded above, forming 2 inner involute lobes fused to 2 outer broader crenulate wings; anthers 1,5 mm long. *Ovary* narrowly ovoid, 6 mm; ovules many; style 3 mm; stigma capitate. *Capsule* oblong-globose, 10 mm long; seeds pyriform, 1,5 mm, spiky. FIG. 1.8.

Only known from the type locality, Doornbos near Clanwilliam; flowering August–September.

CAPE.—3119 (Calvinia): Doornbos (—CC), Leighton sub BOL 20808, Esterhuysen 7635, Barker 1924.

21. *Ornithogalum naviculum* Barker spec. nov., *O. hispidum* Hornem. affinis, sed foliis naviculiformis glabris et margine folii crispulato differt.

Planta c. 0,15 m alta. *Bulbus* ignotus. *Folia* 3 per anthesi marcida naviculiformia glabra margine incrassato crispo. *Racemus* 10–20 florus. *Perianthii segmenta* anguste ovoidea 7 mm longa. *Stamina* filamentis filiformis. *Ovula* multa, multiseriata. *Capsula* ignota.

Type: Cape, 3118 (Vanrhynsdorp), Hol River (—CB), Hall 2869 (NBG, holo.).

Small plants up to 0,15 m tall. *Bulb* not seen. *Leaves* withered at anthesis, about 3, succulent spreading, basal, boat-shaped, 20 mm long, hollow, glabrous, with crisped margins. *Raceme* 10–12-flowered, about 100 mm long, peduncle erect; bracts deltoid-acuminate, 3 mm; pedicels erecto-patent, up to 15 mm long. *Perianth* with spreading to reflexed segments, flesh-pink in bud, white above, narrowly ovate, 7 mm long, 2 mm broad. *Stamens* with the erect filaments filiform. *Ovary* narrowly obovoid, yellow; ovules multiseriate, many. *Capsule* not seen. FIGS 23; 24.

Recorded from the Vanrhynsdorp area; flowering in December.



FIG. 23.—*Ornithogalum naviculum* from the Hol River near Vanrhynsdorp (holotype: Hall 2869, NBG). Plant in leaf, July 1966. Photo: W. F. Barker.



FIG. 24.—*Ornithogalum naviculum*, the same plant as Fig. 22 in flower, December 1966. Photo: W. F. Barker.

CAPE.—3118 (Vanrhynsdorp): Hol River (—CB), Hall 2869, 3563.

Apparently a rare, but distinct species, because of the unusual shape of the leaves.

3. Group *Angustifoliati*.—Leaves many few or 1, normally synanthous (absent in *O. graminifolium* in winter rainfall region), filiform to linear (ensiform in *O. britteniae*), their bases often forming a neck. Bracts small, deltoid-acuminate with a dark midrib, auriculate, sparsely denticulate, membranous. Flowers small, white, stellate at anthesis but often half closed; perianth-segments 5–10 mm with the dorsal midrib darkening with age, usually withering haphazardly. Stamens with the inner filaments ovate-acuminate. Ovary with the ovules many-few, biseriate; style as long as ovary, stigma small. Capsule ovoid to oblong-ovoid; seed few and larger or numerous and minute. Summer rainfall region. Type species: *O. juncifolium* Jacq. (species 22–34).

22. *Ornithogalum graminifolium* Thunb., Prodr. 61 (1794); Fl. Cap. ed. Schult. 313 (1823); Roem & Schult. f., Syst. Veg. 7: 526 (1829); Kunth, Enum. Pl. 4: 358 (1843). Type: Thunberg 8286 (UPS, holo!; PRE, photo.).

*O. niveum* sensu Ker in Bot. Register t. 235 (1817).

*O. bolusianum* Bak. in J. Linn. Soc. (Bot.) 13: 279 (1873), Fl. Cap. 6: 509 (1897); Leighton in J. S. Afr. Bot. 11: 150 (1945). Type: Cape, hills around Graaff-Reinet, Bolus sub BOL 22951 (BOL, lecto!).

*O. pubescens* Bak. in J. Linn. Soc. (Bot.) 13: 282 (1873), Fl. Cap. 6: 501 (1897); Leighton in J. S. Afr. Bot. 11: 151 (1945). Type, Cape, Albany division, Williamson s.n. (TCD, holo!; PRE, photo.).

*O. humifusum* Bak. in Gdnrs' Chron. 1: 500 (1874), Fl. Cap. 6: 512 (1897). Type: Cape, without locality, cultivated specimen (K. holo!; PRE, photo.).

*O. trichophyllum* Bak. in Bot. Jb. 15: 7 (1892), Fl. Cap. 6: 516 (1897); Leighton in J. S. Afr. Bot. 11: 151 (1945); non Boiss. & Heldr. 1859.

*O. brevifolium* V. Poelln. in Port. Acta biol. ser. B, 1: 214 (1945) nom. nov., non Leighton 1943. Type: Cape, without locality, Ecklon & Zeyher, Asphod. 67 (B, holo!; PRE, photo.).

*O. natalense* Bak. in Kew Bull. 1893: 210 (1893), Fl. Cap. 6: 503 (1897); Leighton in J. S. Afr. Bot. 11: 152 (1945). Type: Natal, Amawahqua Mtn., Wood 4567 (K, holo!; PRE, photo; NH!).

*O. galpinii* Bak. in Fl. Cap. 6: 516 (1897); Leighton in J. S. Afr. Bot. 11: 516 (1897); non Bak. l.c. p. 536. Type: Cape, Queenstown, Galpin 1552b (K, holo!; PRE, photo.).

*O. longiscapum* Bak. in Bull. Herb. Boissier, ser. 2, 1: 854 (1901). Type: Natal, Howick, Wood 5354 (Z, holo!; PRE, photo.).

*O. stenophyllum* Bak. in Bull. Herb. Boissier ser. 2, 1: 855 (1901). Type: Cape, near Hopefield, Bachmann 1453 (Z, holo!; PRE, photo.).

*O. angustifolium* L. Bol. in S. Afr. Gdng Ctry Life 24: 50 (1934), non Bor (1857). *O. attenuatum* Leighton in J. S. Afr. Bot. 9: 112 (1943), l.c. 11: 148 (1945), nom. nov. *O. angustum* V. Poelln. in Port. Acta biol. 1: 214 (1946), nom. nov. Type: Cape, Riversdale, Still Bay, L. Bolus sub BOL 20975.

*O. crispifolium* Leighton in J. S. Afr. Bot. 11: 149 (1945). Type: Cape, Laingsburg, Whitehill Karoo Garden, Leighton 270 (BOL, holo!; NBG!; PRE!).

*O. aloiforme* Oberm. in Bothalia 12: 61 (1976). Type: Natal, Giants Castle, Vahrmeijer 1877 (PRE, holo.).

*Chlorophytum vaginatum* Bak. in Fl. Cap. 6: 397 (1897). Type: Natal, Weenen, Wood 4425 (K, holo!; NH!).

Plants 0.1–0.3 m tall, of varied appearance. Bulb globose, 15–30 mm in diam., with brown outer tunics. Leaves (2) 3 (5); in the S.W. Cape forming a basal spreading rosette during the winter months; leaf-bases forming a short neck, never fibrous, brittle and thin when dry; lamina narrowly ovate to linear-acuminate 80–250 mm long, glabrous or striate-puberulous and/or with long fine hairs, often with a purplish tinge at the base; margin entire or crisped; in the summer rainfall region the leaves envelop the peduncle, and are usually longer and erect, softly pubescent to glabrous. Raceme usually subspicate, the many flowers close together, elongating with age, terminating usually with some small sterile flowers; in weaker plants flowers few, more widely spaced; peduncle terete, straight, or with a spiral basal twist in some plants found in the eastern Cape; bracts small, deltoid-acuminate, auriculate, denticulate, membranous; pedicels 1–6 mm, erect. Flowers; a few open at a time during the day. Perianth-segments linear, acute, 5–10 mm long, white or pale dull yellow or pale pink, with or without a dark dorsal keel, delicate and thin in texture to more fleshy. Stamens with the outer filaments linear, inner ovate-acuminate. Ovary obovoid; ovules biseriate with c. 8 in each locule, or 3–4 seriate, with many; style terete, about as long as ovary; stigma apical. Capsule ovoid, c. 9 mm; seed somewhat cuneate, angled through pressure, 1.5–2 mm, with a loose testa. FIG. 4.5; 25.

Recorded from Natal, Lesotho, eastern Cape to south-western Cape, on rocky mountain slopes or rarely on flats, usually in moist habitats. Flowering December–March.

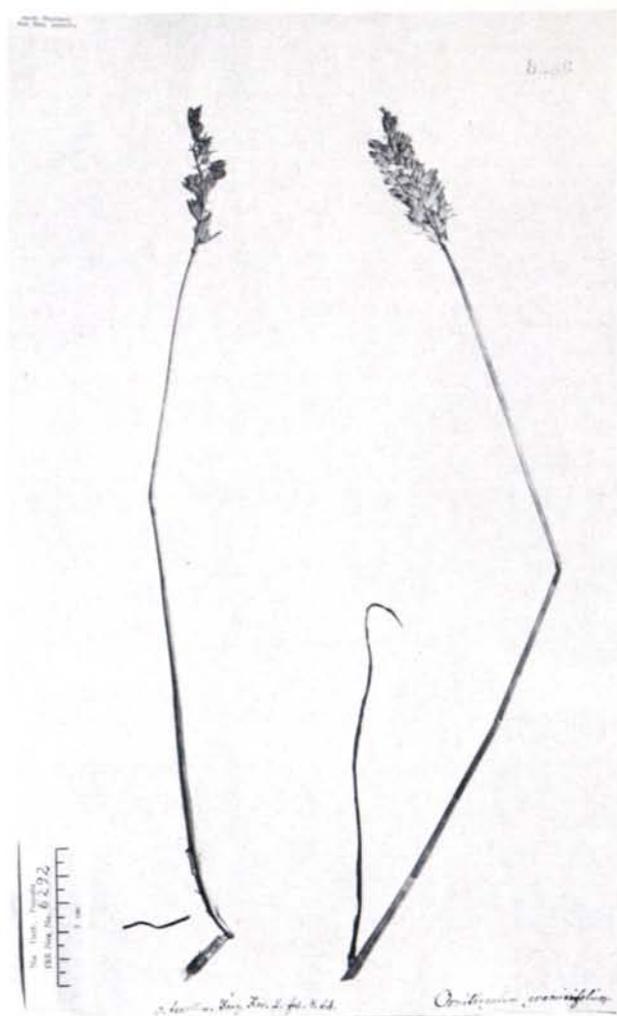


FIG. 25.—*Ornithogalum graminifolium* from the Cape of Good Hope (holotype: Thunberg 8286, UPS).

NATAL.—2730 (Vryheid): farm Donkerhoek (–AD), *Devenish* 991; Vryheid (–DD), *Galpin* 9695. 2929 (Underberg): Cathkin Park (–AB), *Galpin* 11887; Giants Castle Game Reserve (–AB), *Trauseld* 570; Tabamhlope Research Station (–BB), *West* 554, 1401, 1443. 2930 (Pietermaritzburg): Inanda (–DB), *Wood* 1168. 3029 (Kokstad): Weza, Ingeli slopes (–DA), *Strey* 6398.

LESOTHO.—2929 (Maseru): Botsabelo near Maseru (–AD), *Dieterlen* 1038; Schlabathebe Nature Reserve (–CC), *Jacot Guillarmod*, *Getliffe* & *Mzama* 3.

CAPE.—3124 (Hanover): Sneeuwberg, S. of Gordonsville (–DC), *Acocks* 16547. 3126 (Queenstown): mountain sides in moist places (–DD), *Galpin* 1552b. 3127 (Lady Frere): Cala Pass (–BC), *Acocks* 21876. 3218 (Clanwilliam): at Brackfontein near Clanwilliam (–BB), *Pappe sub SAM* 48451; Piketberg (–DC), *Van Zyl sub NBG* 2818/27. 3226 (Fort Beaufort): Endwell above Kroomie (–CB), *Acocks* 23866. 3227 (Stutterheim): Mount Coke near East London (–DD), *Compton sub NBG* 74112. 3318 (Cape Town): Langebaan, Saldanha Bay (–AA), *Taylor* 3771B; near Hopefield (–AB), *Leighton* 2448. 3319 (Worcester): Baviaansberg, Ceres district (–BA), *Compton* 12889; Bains Kloof (–CA), *Schlechter* 9121; Worcester Veld Reserve (–CB), *Olivier* 109. 3320 (Montagu): 48 km N. of Matjiesfontein (–BA), *Hall* 283; Karoo Garden, Whitehill (–BA), *Compton* 14655. 3321 (Ladismith): Ladismith (–AD), *Van Staden* 18. 3326 (Grahamstown): Hopewell, S. of Southwell (–BD), *Acocks* 16129; Kolsrand, Forest Glen Farm (–CA), *Archibald* 5191. 3418 (Simonstown): Cirkels Vlei (–AD), *Compton* 17920. 3419 (Caledon): Stanford (–AD), *Bond* 762. 3421 (Riversdale): Corente River farm (–AB), *Muir* 5399. 3423 (Knysna): Knysna, Forest Hall (–AA), *Duthie* 1106, Woodbourne House (–AA), *Duthie* 1149.

This species has the sheathing leaf-bases thin and brittle, usually breaking off horizontally and often showing some dark purplish colouring. It appears to be fairly common along the eastern escarpment, often at high altitudes, in grassland or in rock crevices. It forms a link with the first group, *Aspasiae*.

The species is treated here as polymorphic. In its wide range from the Cape to Natal one can expect this. In the winter rainfall region it behaves like the other species confined to that region by first producing the leaf-rosette which withers at anthesis and the plant becomes dormant in late summer. In the montane areas of the summer rainfall region, from the eastern Cape to Natal it forms a few, long, narrow, erect leaves, which are contemporary with the flowers and the plant dies down in winter. In the south east Cape plants may produce either leaf rosettes or long erect leaves. The perianth-segments may be up to 10 mm long in the Natal plants, but they are usually only about half that size and more translucent in the south-western Cape specimens. The spike-like raceme may be few- to many-flowered; the leaves may be hairy or smooth; the peduncle may be short or long, wiry or coarse; it may produce a spiral basal twist in some plants around the Oudtshoorn and Albany districts. But overall, the wide range of material studied showed affinities from one plant to another. Curiously, the wine-red colouring of the leaf-sheaths often helped to identify the specimen. I could not succeed in placing the plants in subspecies. Generally the western plants were mostly smaller, but a few large specimens showed that given optimum conditions, they too, could be as large as those from the eastern regions.

The plant described as *O. aloiforme* was collected on the Drakensberg at a high altitude in January 1969. It was cultivated in a glasshouse at the Botanical Research Institute where the temperature remained more or less constant at 24° C, summer and winter. When I saw it in flower in March 1975 I could not match it with anything I had seen and I therefore described it. Some time afterwards the plant was reotted and became dormant. When it produced leaves and an inflorescence once again, it had reverted to *O. graminifolium* in appearance, bearing a few basal long, soft narrow leaves. It was then realized that this was a case of paedogenesis; the plants in the wild are deciduous due to climatic conditions and the basal stem with its leaf-rosette cannot develop. The appearance of the type plant forma *aloiforme*, represents a more mature state of *O. graminifolium*. No doubt some of the other related species could also change their appearance, given a mild even climate for a period of time.

One interesting mutation was observed in some colonies in the eastern Cape. Here an occasional peduncle will form a basal spiral twist, while its neighbour remains straight.

23. *Ornithogalum paludosum* Bak. in *J. Bot.*, Lond. 12: 366 (1874), *Fl. Cap.* 6: 503 (1897). Type: Cape, Queenstown District in a marsh at Elandsberg, *Cooper* 219 (K, holo.!: PRE, photo.).

*O. gracile* Bak. in *J. Bot.*, Lond. 12: 366 (1877), *Fl. Cap.* 6: 500 (1897), *non* Hagen (1818). *O. uitenhagensis* V. Poelln. in *Ber. dt. bot. Ges.* 61: 209 (1944), nom. nov. Type: Cape, Uitenhage, at the sources of the Bulk River, *MacOwan* 1939 (K, holo.!: PRE, photo.).

*O. oostachyum* Bak. in *Fl. Cap.* 6: 502 (1897). Type: E. Cape, Zuurberg, *Tyson* 1545 (K, holo.!: PRE, photo.; PRE!; NBG!).

*O. gracilentum* Bak. in *Fl. Cap.* 6: 502 (1897). Type: E. Cape, Boschberg in Somerset East district, *McOwan* 2216 (K, holo.!: PRE, photo.).

*O. lineare* Bak. in *Fl. Cap.* 6: 503 (1897). Type: Natal, Liddesdale, *Wood* 4267a (K, holo.!: PRE, photo.).

*O. flanaganii* Bak. in *Fl. Cap.* 6: 535 (1897). *Elsiea flanaganii* (Bak.) Leighton in *Jl S. Afr. Bot.* 10: 57 (1944). Type: Orange Free State, summit of Mont aux Sources, *Flanagan* 2028 (K, holo.!: PRE, photo.; NH!).

*O. ebulbe* Schltr. in *Bot. Jb.* 40: 90 (1908). Type: Natal, Dumisa, Fairfield, *Rudatis* 136 (B, holo.!: PRE, photo.).

*Anthericum carnosum* Bak. in J. Linn. Soc. (Bot.) 15: 296 (1876). *Bulbinella carnosus* (Bak.) Bak. in Fl. Cap. 6: 358 (1896). cf. Oberm. in Bothalia 9: 345 (1967). Type: Natal, Gerrard & McKen 1890 (K, holo.!; NH!; PRE, photo.).

*A. quadrifidum* V. Poelln. in Bol. Soc. broteriana 16, 2: 47 (1942). Type: E. Cape, Pondoland, Cape Grosvenor, Bachmann 276 (B, holo.!; PRE, photo.).

Solitary slender hygrophilous plants up to 0,6 m tall with a few narrow leaves and a small-flowered, subspicate raceme. *Bulb* usually poorly developed, cylindrical, consisting of long tubular leaf-sheaths arising from a small caudex, rarely ovoid; roots many, spongy. *Leaves* 2-6(9) the 2 to few primary leaves mostly shorter and broader, linear to broadly linear, 80-200 mm long, 10-20 mm wide; later leaves narrowly linear, margins often inrolled, up to 300 mm long, 1-2 mm wide, shorter than raceme, glabrous (or rarely hispid in some plants from Lesotho). *Raceme* subspicate, many-flowered; peduncle up to 600 mm, somewhat sinuous; bracts small, c. 5 mm long, auriculate, abruptly acute above, membranous; pedicels 2-4 mm, erect. *Flowers* small, close together, white. *Perianth-segments* spreading when fully open, linear, obtuse, 6-12 mm long, usually untidily twisted or spreading or reflexed when withered. *Stamens* with linear-acuminate filaments, inner broader. *Ovary* obovoid, contracted below initially; ovules 4-7 per locule; style terete, as long as ovary, terminating in 3 short triangular lobes with papillate stigmatic margins. *Capsule* ovoid, c. 10 mm; seeds c. 5 mm, somewhat compressed-ovoid, wrinkled, papillate.

Recorded from the eastern Transvaal, Natal, Lesotho and eastern Cape, montane, in moist alpine grassland or marshy depressions, often growing inside grass tussocks; flowering September-February.

TRANSVAAL.—2430 (Pilgrimsrest): Mariespok (-DB), Killick & Strey 2395, 2698, Van der Schijff 6244, 2530 (Lydenburg): 22 km W. of Sabie (-BA), Codd 5650, 2730 (Vryheid): farm Oshock (-AD), Devenish 690.

NATAL.—2829 (Harrismith): Cathedral Peak Forest Reserve (-CC), Killick 1008; Edwards 1184, 2929 (Underberg): Giants Castle (-AB), Symons 13; Ntabamhlope Research Station (-BA), West 829, 2930 (Pietermaritzburg): Greytown (-BA), Wylie sub TRV 34296; Nagle Dam area (-DA), Ward 4696, 3030 (Port Shepstone): Mbizane River (-CB), Marais 1153.

LESOTHO.—2828 (Bethlehem): Leribe (-CC), Dieterlen 729, 2829 (Harrismith): Cleft Peak area (-CC), Killick & Marais 2181, 2929 (Underberg): Sehlabathebe Nature Reserve (-CC), Bayliss 7800.

CAPE.—3029 (Kokstad): Kokstad (-CB), Govt. Veterinary Officer 7412, 3225 (Somerset East): Bosberg near Somerset East (-DA), MacOwan 2216, 3227 (Stutterheim): Hogsback (-CA), Batten, 3322 (Oudtshoorn): Kammanassie Mountain (-DB), Stokoe sub SAM 54659; Stormberg (-DD), Taylor 1137, 3323 (Willowmore): Helpmekaar (-CA), Compton 10508; Tsitsikama (-DC), Barker 685, 3419 (Caledon): Baardscheerdersbosch (-DA), Barker 5296.

*O. paludosum* and *O. esterhuyseniae* are two related hygrophilous montane species, which Leighton separated in the genus *Elsiea*. The withering of the perianth-segments is somewhat unusual, but the segments, although cohering around the capsule, are not fused basally. The bulb is usually poorly developed as a result of the moist habitat.

#### 24. *Ornithogalum esterhuyseniae* Oberm., comb. et nom. nov.

*Elsiea corymbosa* Leighton in Jl S. Afr. Bot. 10: 57 (1944). Type: Cape, Stellenbosch Division, swamps S.W. of Victoria Peak, Esterhuysen 9783 (BOL, holo.!; NBG.!; PRE.!). The binomial *Ornithogalum corymbosum* Ruiz & Pavon, 1802, necessitated a new epithet.

Plants 0,5-0,7 m tall with corymbose racemes on long peduncles. *Bulb* often poorly developed, consisting of tubular leaf-sheaths arising from an underground rhizomatous or swollen stem. *Leaves* 3-5, linear, up to 400 mm long and about 10 mm broad,

erect, glabrous; at the apex the smooth inrolled margins are fused into a terete point. *Raceme* corymbose; peduncle erect, up to 600 mm tall; bracts linear-acuminate, auriculate, membranous; pedicels 10-50 mm long, ascending. *Flowers* small, white. *Perianth-segments* linear, c. 12 mm long, 2 mm broad, apex obtuse, cucullate, papillate, withering untidily. *Stamens* with the filaments linear-acute, inner somewhat broader. *Ovary* obovoid, triangular, stipitate; ovules 3-5 in each locule; style terete with a small 3-lobed, papillate stigma. *Capsule* ovoid, triangular, c. 10 mm, black; seed c. 5 mm long, flattened.

A rarely collected species growing in wet places on upper slopes of mountains in the southern Cape.

CAPE.—3319 (Worcester): summit of Mosterts Hoek Twins (-AD), Wasserfall 790, Esterhuysen 14941, 3419 (Caledon): Nuweberg Estate Forest near Emerald Dome (-AA), Kruger & Haynes 728; Victoria Peak (-AA), Esterhuysen 9783.

#### 25. *Ornithogalum ornithogaloides* (Kunth) Oberm. in Bothalia 9: 344 (1967). Type: Cape, Aliwal North, banks of Orange River, Drège 8695 (G, holo.!; PRE, photo.).

*Bulbinella? ornithogaloides* Kunth, Enum. 4: 693 (1843).

*Anthericum ornithogaloides* (Kunth) Bak. in J. Linn. Soc. (Bot.) 15: 294 (1877).

*Ornithogalum? bulbinelloides* Bak. in Fl. Cap. 6: 509 (1897), nom. illegit.

*Ornithogalum zeyheri* Bak. in J. Linn. Soc. (Bot.) 13: 281 (1873); Fl. Cap. 6: 502 (1897); Leighton in Jl S. Afr. Bot. 11: 163 (1945). Type: Cape, near Uitenhage in marshes at Swartkops River, Zeyher 1686 (K, holo.!; SAM!; PRE!).

*Anthericum pauper* V. Poelln. in Bol. Soc. broteriana 16, 2: 47 (1942). Type: Transvaal, Heidelberg, Wilms 1542 (B, holo.!; PRE, photo.).

*A. longipedicellatum* V. Poelln. in Feddes Repert. 53: 128 (1944). Type: Riversdale, Rust 14 (B, holo.!; PRE photo.).

Hygrophytic, gregarious, glabrous plants 0,2-0,45 m tall. *Bulb* comparatively small, globose to cylindrical, forming a long wide neck, the outer tunics brown, firm. *Leaves* 4-8, terete to semiterete and canaliculate, up to 0,45 mm long, c. 2 mm in diam., soft, succulent, long sheathing at the base. *Racemes* often 2-3 per bulb, subcorymbose when young, lengthening with age, becoming lax and cylindrical, shorter to as long as leaves; peduncle slightly curved; bracts small, narrowly ovate-aristate, membranous; pedicels patent, filiform, becoming firmer and longer in fruit, 20-60 mm long. *Perianth-segments* narrowly ovate, 6-7 mm long, white. *Stamens* linear-acuminate, 4-5 mm long. *Ovary* obovoid, stipitate, on a small disk formed by the hardened perianth-base; ovules 2-4, basal; style terete, stigma, small. *Capsule* obovoid, 6-9 mm, with thin walls which recurve when fully opened; seeds narrowly obovoid, compressed, 5-6 mm long, smooth. *Chromosomes*: 2n=12 (Neves); 12, 14 (De Wet).

Widespread in the summer rainfall region as far south-west as Riversdale, extending to South West Africa, Rhodesia, Zambia and Malawi, along river-banks and in vleis. Flowering in summer.

S.W.A.—2218 (Gobabis): Okatjirute, West-Witvlei (-AD), Mason & Boshoff 2530, 2416 (Maltahöhe): 16 km S. of Gamis (-BC), Rusch & Wiss 2399.

TRANSVAAL.—2428 (Nylstroom): Mosdene, 6 km E. of Naboomspruit (-DA), Galpin M 368, 2528 (Pretoria): Rust de Winter Dam (-AB), Codd 3477, 2629 (Bethal): 16 km E. of Bethal (-AD), Codd 8073.

O.F.S.—Without precise locality, S.E. region: Caledon River, Burke, 2627 (Potchefstroom): Parys (-CD), Obermeyer sub TRV 31685.

SWAZILAND.—Evelyn Baring Bridge, Mbabane (-AC), Compton 30598.

NATAL.—2730 (Vryheid): farm Donkerhoek (—AD), *Devenish* 548. 2829 (Harrismith): Van Reenen (—AD), *Wood* 4532. 2831 (Nkandla): Middeldrift, Hot Springs (—CD), *Edwards* 2079.

LESOTHO.—2927 (Maseru): Likhoele (—CD), *Dieterlen* 1264.

CAPE.—2923 (Douglas): De Hoek near Hopetown (—BA), *Leistner* 1301. 3227 (Stutterheim): Mt. Coke near King Williamstown (—CD), *Compton* 17011; Bridle Drift near East London (—DD), *Pamphlett* 8. 3325 (Port Elizabeth): Zwartkops River, marsh (—DC), *Zeyher* 1686. 3326 (Grahamstown): Grahamstown commonage off Cradock road (—BC), *Dyer* 2193.

Suspected of being poisonous. However, one test conducted on a rabbit at Onderstepoort in 1965 showed negative results.

*Literature*.—De Barros Neves in *Bol. Soc. Broteriana* 27 (2a series): 203–216 (1953). Research on chromosomes.

26. *Ornithogalum britteniae* Leighton, sp. nov. distincta.

*Bulbus* ovoideus 15–25 mm diam. tunicis chartaceis. *Folia* 4–7 bifaria ensiformia conduplicata 50 mm longa 10 mm lata crassa dura glauca; margine fimbriato apice sensim recurvato. *Inflorescentia* elongata gracilis c. 20-flora; pedunculus tenuis curvatus; bractea minutae membranaceae. *Perianthii segmenta* crema et cinnamomea anguste ovata 6–8 mm longa. *Filamenta* anguste ovato-acuminata. *Ovarium* oblongo-globosum stylo cum stigmatibus longius.

Type: Eastern Cape, Grahamstown, L. L. Britten sub BOL 23902 (BOL, holo.!, PRE, photo.).

Bulb ovoid with papery or somewhat fibrous tunics, 15–25 mm in diam. *Leaves* 5–7, distichous, ensiform, conduplicate, 50 mm long, 10 mm broad hard, glaucous, apex curving outwards, obtuse, the base clasping, tubular, margin sclerotic, densely and shortly fimbriate, especially towards the apex. *Raceme* slender, much exerted, c. 250 mm long; peduncle thin laxly curved; bracts minute, auriculate, abruptly aristate, membranous; pedicels filiform, c. 5 mm. *Perianth-segments* narrowly ovate, 6–8 mm long, cream and cinnamon. *Stamens* with the filaments narrowly ovate-acuminate, about 4 mm long. *Ovary* oblong-globose, trigonous, 3 mm; style terete, 3 mm, shortly 3-lobed apically with stigmatic papillate margins. *Capsule* unknown.

Only known from the type collection consisting of 2 bulbs received from Miss L. L. Britten from Grahamstown, which flowered at the Bolus Herbarium in October–November 1947. The exact locality is not given.

A unique species because of its xerophytic distichous leaves with fimbriate margins. The raceme and flowers are typical of *Ornithogalum*, and it is placed here near the *O. juncifolium* group of species, because of its primitive flowers. One could speculate that a common ancestor of the tribe *Aloineae* might have looked somewhat similar to this species; it could possibly be a relic.

27. *Ornithogalum nanodes* Leighton in *Jl S. Afr. Bot.* 9: 113 (1943), as *nannodes*; l. c. 10: 119 (1944); Merxm. et al. in *Fl. S.W. Afr.* 147: 59 (1970); nom. nov. for *O. pygmaeum* Duthie in *Annale Univ. Stielbosch* 6,3: 2, t. 1 (1928), non Willd. 1809. *O. duthiae* V. Poelln. in *Port. Acta Biol.* 1: 214 (1946) nom. nov. for *O. pygmaeum* Duthie, as *pygmaeum*. Type: Cape, Stellenbosch flats, *Duthie* 1505 (BOL, holo.!).

Small slender plants up to 0,2 m tall. *Bulb* deep seated ovoid, 20–30 mm in diam. with light brown leathery tunics breaking up into many pointed pieces. *Leaves* proteranthous, numerous (up to 40) forming a dense basal tuft annually; old leafbases sheathed

inside a long tubular neck with the remains protruding as a short brush at ground level; leaf-bases broadly sheathing, abruptly narrowed into a filiform sub-triangular lamina, 10–60 mm long, minutely reticulate when dry, glaucous, laxly contorted, margin smooth or minutely denticulate. *Raceme* up to 0,15 m long, 6–20 flowered; bracts auriculate-aristate, c. 3 mm long, membranous; pedicels erecto-patent, thin, up to 15 (–30) mm long. *Perianth* small, the segments broadly linear, c. 5 mm long, pale orange-pink or white with a distinct green to brown, striate midrib. *Stamens* with the filaments narrowly ovate-acuminate. *Ovary* ovoid, 2 mm; style terete, 2 mm, stigma apical, papillate. *Capsule* oblong-ovoid, c. 7 mm; seed minute c. 0,5 mm, comma-shaped, papillate. FIGS 27 and 28.

Southern South West Africa, northwestern Cape to southern Cape, in shale, sand or limestone pockets, usually in dry areas. Flowering September–December.

S.W.A.—2718 (Grunau): Klein Karas (—CA), *Dinter* 5070.

CAPE.—2821 (Upington): Klipkoppies (—CD), *Lewis* 250. 2824 (Kimberley): 14 km N.W. of Schmidtsdrift (—CA), *Leistner* 1524. 2917 (Springbok): Steinkopf (—BC), *Meyer sub Herb. Marloth* 6674, 13356. 2922 (Prieska): Seekoibaartsnek (—AB), *Acocks* 2447. 3118 (Vanrhynsdorp): Hol River 27 km N. of Vredendal (—AD), *Bayliss* 4603. 3119 (Calvinia): Lokenburg (—CA), *Acocks* 19757. 3123 (Victoria West): Leeuwpoot (—BD), *Acocks in Herb. Hafström* 875. 3219 (Wuppertal): West foot of Nieuwoudt Pass (—AC), *Esterhuysen* 17959. 3318 (Cape Town): Cape Peninsula, N'Dabeni (—CD), *Salter* 8700. 3319 (Worcester): Cold Bokkeveld, Ceres (—AD), *Compton* 12506.

A very distinct species not closely related to any other species.

The aerenchymatous tissues of the bulb tunics are very typical for the species. They no doubt are able to absorb moisture. In plants from the northern areas the leaf tuft may be present at flowering time, although apparently on the verge of withering. (Fig. 27).

28. *Ornithogalum juncifolium* Jacq., Hort. Schoenbr. 1: 46, t. 90 (1797); Bak. in *Fl. Cap.* 6: 512 (1897); Leighton in *Jl S. Afr. Bot.* 11: 160 (1945). Type: t. 90 in Hort. Schoenbr. 1.

*O. setifolium* Kunth, Enum. 4: 35 (1843); Bak. in *Fl. Cap.* 6: 510 (1897). Type: Cape, *Drège* 8674 (G, holo.!, PRE, photo.).

*O. comptum* Bak. in *J. Linn. Soc. (Bot.)* 13: 274 (1873), *Fl. Cap.* 6: 511 (1897); Leighton in *Jl S. Afr. Bot.* 11: 154 (1945). Type: Cape, Uitenhage, Swartkops River, *Zeyher* 942 (K, lecto.!, PRE, photo.; SAM!.).

*O. griseum* Bak. in *J. Linn. Soc. (Bot.)* 13: 281 (1873); *Fl. Cap.* 6: 501 (1897). Type: a drawing of a plant grown at Kew in 1823, introduced by Bowie; copy of drawing at PRE.

*O. subulatum* Bak. in *Gdnrs' Chron.* 1874, 1: 723 (1874), *Fl. Cap.* 6: 510 (1897); Leighton in *Jl S. Afr. Bot.* 11: 154 (1945). Type: Cape, cultivated plant, probably not preserved.

*O. leptophyllum* Bak. in *Fl. Cap.* 6: 502 (1897); Leighton in *Jl S. Afr. Bot.* 11: 159 (1945); Verdoorn & Leighton in *Flower Pl. Afr.* 26, t. 1038 (1947). Type: Natal, near Botha's railway station (Botha's Hill) *Wood* 4774 (K, holo.!, PRE!).

*O. oliganthum* Bak. in *Fl. Cap.* 6: 510 (1897); Leighton in *Jl S. Afr. Bot.* 11: 157 (1945). Type: Natal, Fields Hill, *Wood* 1973 (K, holo.!, SAM!; PRE!).

*O. tortuosum* Bak. in *Fl. Cap.* 6: 510 (1897); Leighton in *Jl S. Afr. Bot.* 10: 118 (1944). Type: Cape, Tulbagh, *Pappe* s.n. (K, holo.!, PRE, photo.; SAM!).

*O. stenostachyum* Bak. in *Bull. Herb. Boissier* ser. 2, 1: 855 (1901). Type: Natal, Umsindusi River, *Rehmann* 7636 (Z, holo.!, PRE, photo.).

*O. tenuipes* C. H. Wright in *Kew Bull.* 1901: 136 (1901). Type: E. Cape, Grahamstown, *Schonland* 246; a plant that flowered at Kew in July 1899; apparently not preserved.

*O. capillifolium* Fourc. in *Trans. Roy. Soc. S. Afr.* 21: 80 (1934). Type: Cape, Uniondale district, Headwaters of the Wagenbooms River, *Fourcade* 2396 (BOL, holo.!).

*O. limosum* Fourc. l.c. Type: E. Cape, Witte Elsboos, marshy ground *Fourcade* 1011 (BOL, holo.!).

*O. petraeum* Fourc. l.c.: 81. Type: E. Cape, Kromme River E. of Assegaibos, *Fourcade* 3940 (BOL, holo.!).

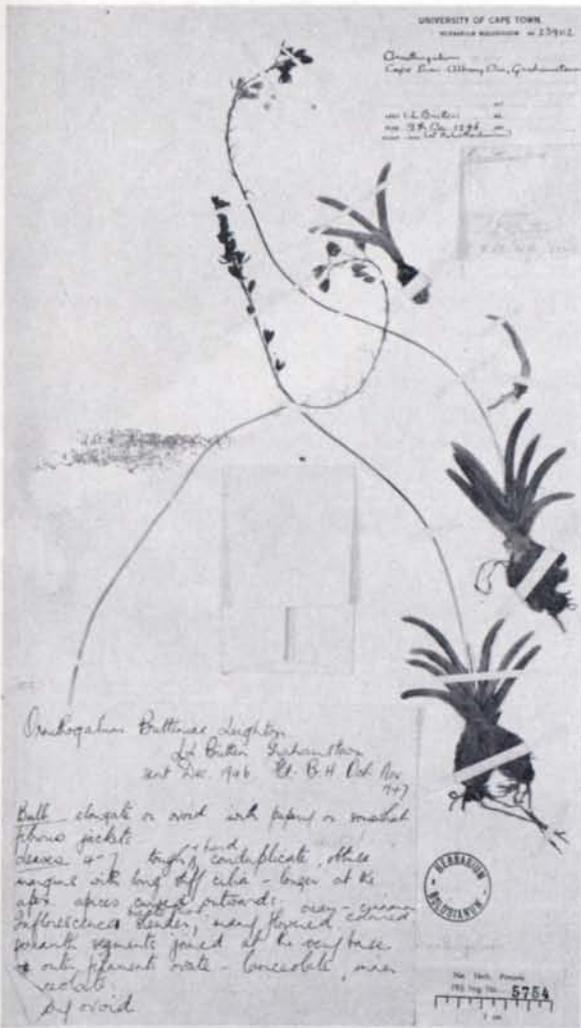


FIG. 26.—*Ornithogalum britteniae* from Grahamstown (holotype: L. L. Britten sub BOL 23902, BOL).

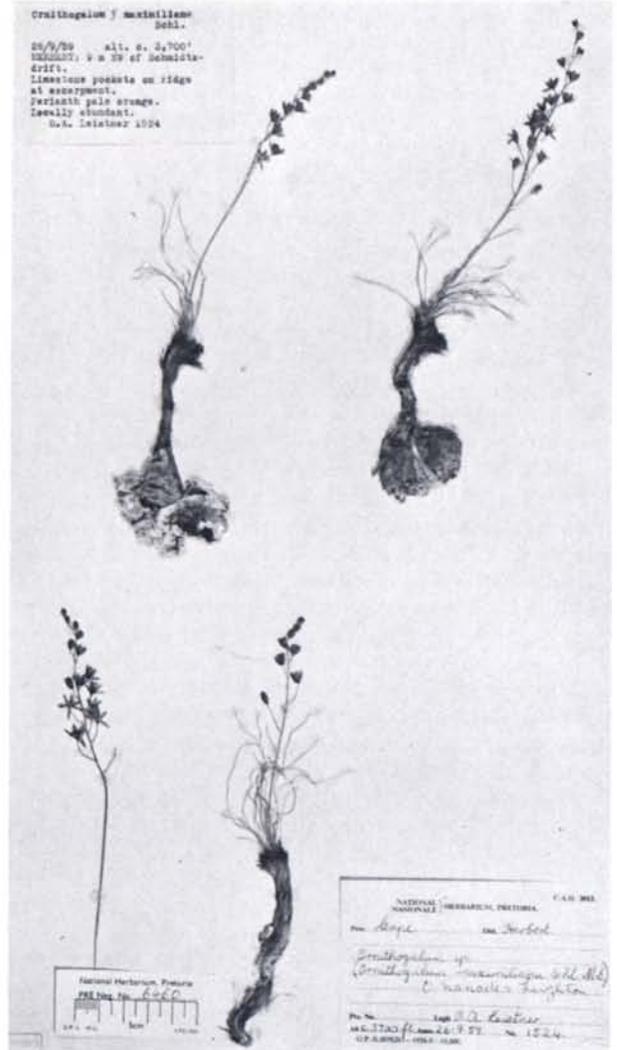


FIG. 27.—*Ornithogalum nanodes* from the northern Cape in the Herbert District, Leistner 1524.



FIG. 28.—*Ornithogalum nanodes*, tissue of leafsheath,  $\times 80$ .

*O. brevifolium* Leighton in JI S. Afr. Bot. 9: 109 (1943); l.c. 11: 160 (1945). Type: Cape, Patrysvlei, Salter 8602 (BOL, holo.), non *O. brevifolium* V. Poelln. (1945).

*O. epigeum* Leighton in JI S. Afr. Bot. 9: 110 (1943), l.c. 11: 120 (1945). Type: Cape, Laingsburg, Whitehill Karoo Garden, Compton 12629 (BOL, holo.; NGB!).

*O. comptonii* Leighton in JI S. Afr. Bot. 10: 119 (1944). Type: Cape, Whitehill Karoo Garden near Laingsburg, Leighton 269 (BOL, holo.; NGB!; PRE!).

*O. langebergense* Leighton in JI S. Afr. Bot. 11: 158 (1945). Type: Cape, Mosselbay District, Langeberge, Muir 1314 (BOL, holo.; PRE!).

Plants mesophytic or xerophytic, very adaptable and variable. *Bulb* globose to elongate-ovoid, 10–40 mm in diam., asymmetrical with a bulge on one side, subterranean with a long neck or epigeal; occasionally bulbiferous and forming clumps; tunics membranous, white, becoming leathery and grey or brown on the outside. *Leaves* normally numerous, contemporary with the flowers but often few or absent due to adverse conditions, fewer in young plants; the bases tubular, sheathing, forming a membranous neck, their strong ribs persisting as dark brown fibres (fibres sometimes absent in new growth or in a wet habitat); lamina filiform to linear, 0,1–0,2 m long, 1–3 mm broad, involute or flat, usually strongly ribbed, firm or soft, straight or spirally contorted, margin (and occasionally ribs) closely strigose at least below, the bristles often small, retrorse, or suppressed to form a beaded margin. *Raceme* 0,1–0,4 m tall, subspicate, many-flowered, 1–3 per bulb, rarely subcorymbose and few-flowered; peduncle erect; bracts small, deltoid-cuspidate, auriculate, membranous; pedicels short c. 2 mm, up to 7 mm in fruit, or rarely patent, up to 20 mm. *Perianth* small, usually closed in herbarium specimens, probably a few open at a time for a few hours during the day, for a few days; segments linear, obtuse, 7–10 mm long, white, the midrib darkening with age, green, red or brown. *Stamens* with linear to ovate-acuminate filaments, the outer slightly shorter and narrower. *Ovary* ovoid or obovoid, c. 3 mm, occasionally substipitate; ovules 6–9 per locule; style terete, 2,5 mm, with 3 minute deltoid lobes with papillate stigmatic margins. *Capsule* ovoid, 5 mm; somewhat cuneate to D-shaped, 1–2 mm, reticulate, *Chromosomes*.  $2n=12,10$ . FIGS 4.6; 29 and 30.

Widely distributed, predominantly in the south-eastern Cape, to Natal, Lesotho, Swaziland and Transvaal, rare in the western Cape; common on wooded slopes, rock crevices, sandstone ledges or karroid veld, rarely in wet surroundings. Flowering during the summer months.

TRANSVAAL.—2528 (Pretoria): Wonderboompoort (–CA), Mogg sub PRE 36484. 2627 (Potchefstroom): Boskop (–CA), Louw 442. 2629 (Bethal): Ermelo (–DB), *Scholars* 49.

O.F.S.—2727 (Kroonstad): Kroonstad (–CA), Pont 674. 2826 (Brandfort): Glen Agricultural College (–CD), Mostert 639. 2827 (Senekal): Kleindoringkop (–BD), *Goossens* 8; farm Strathcoma (–DD), *Galpin* 13837.

SWAZILAND.—2631 (Mbabane): Hill N.E. of Mbabane (–AC), *Compton* 28174.

NATAL.—2929 (Uderberg): Giants Castle Game Reserve (–AB), *Trauseld* 1007. 2930 (Pietermaritzburg): Howick (–AC), *Moll* 1091; Foxhill (–CB) *Warren* 11; Inanda (–DB), *Wood* 658; Gillitts Kloof (–DC), *Haygarth* sub STE 269; Mid-illovo (–DCA), *Thode* 3378. 3030 (Port Shepstone): Dumisa (–AD) *Rudatis* 1447; Gibraltar (–CB), *Strey* 10345.

LESOTHO.—2828 (Bethlehem): Leribe (–CC), *Dieterlen* 651. 2927 (Maseru): Mamas (–BB), *Jacot-Guillarmod* 1423.

CAPE.—3123 (Victoria West): Murraysburg (–DD), *Tyson* 53. 3125 (Steynsburg): 18 km E. of Rosmead (–AC), *Acocks* 17531. 3126 (Molteno): Loopeerberg, Molteno (–AD), *Mogg* 2804. 3128 (Umtata): Umtata (–DB), *Dyer* sub PRE 45930. *Marais* 1024. 3224 (Graaff-Reinet): 12 km S. of Graaff-Reinet (–BC), *Acocks* 20065; Swart River near Graaff-Reinet (–BC),

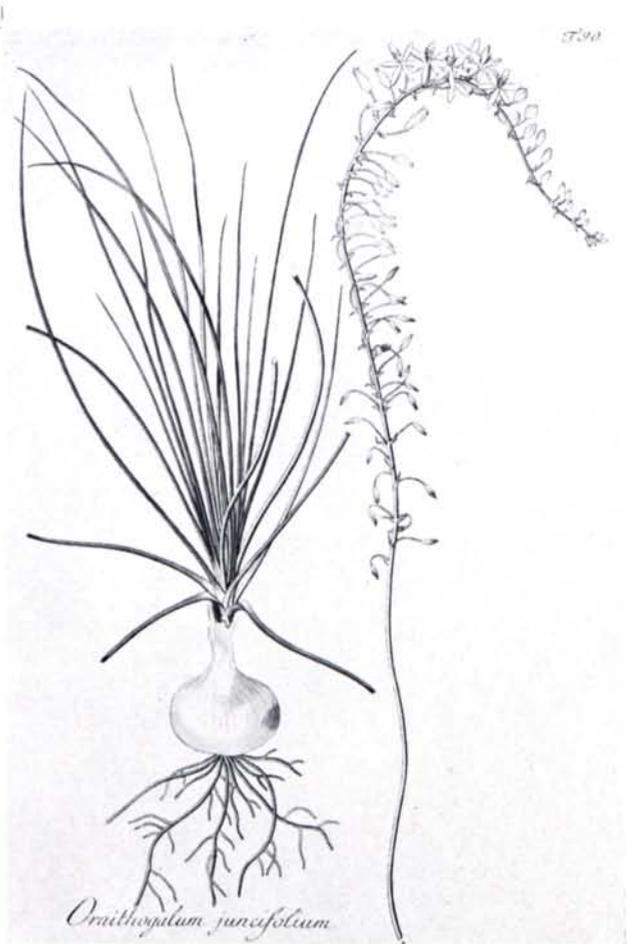


FIG. 30.—*Ornithogalum juncifolium*; Jacq., Hort. Schoenbr. 1, t. 90 (iconotype).

*Barker* 7102. 3225 (Somerset East): near Cradock (–BA), *Hall* 256; Somerset East (–DA), *Bayliss* 2489. 3226 (Fort Beaufort): Kromo Mouth Trig. Beacon (–DC), *Acocks* 20103. 3227 (Stutterheim): near Komga (–DB), *Flanagan* 2252. 3322 (Oudtshoorn): near Prince Albert (–AA), *Acocks* 20446; Ebb & Flow near George (–CD), *Compton* 14359; Doornkraal (–DA), *Dahlstrand* 2187. 3323 (Willowmore): near Avontuur (–CA), *Marais* 712. 3325 (Port Elizabeth): Enon (–BC), *Thode* A1136; by the Zwartkops River, district Uitenhage (–CD), *Ecklon & Zeyher* 1066; Redhouse (–DC), *Paterson* 2630. 3326 (Grahamstown): Vaalvlei (–BC), *Bayliss* 2493. 3418 (Simonstown): Moordenaarskop, Hottentotsholland Mts (–BB), *Stokoe* sub SAM 64714. 3419 (Caledon): Highlands Forest Reserve near Kogelberg (–BD), *Stokoe* sub SAM 68616. 3420 (Heidelberg): Grootvadersbosch (–BB), *Willems* 97a; Bontbok Park (–CA), *Barker* 7231; The Poort (–CA), *Barker* 7771. 3423 (Knysna): Plettenberg Bay (–AB), *Pappe* sub SAM 23374.

*O. juncifolium* appears to be a primitive polymorphous species, which has adapted itself in the eastern Cape to various habitats, the leaves showing diversity but not the flower, which has remained simple. There is also variation in the length of the pedicel; the type of *O. epigeum* and a few other collections possess a somewhat longer pedicel (10–15 mm). The difference however, is very marked in two collections from the western Cape, *Hall* 3494 from Strandfontein and *Hanekom* 2338 from Calvinia, which both possess patent thin pedicels up to 20 mm long. However, both collections were cultivated and before concluding that they might belong to a different taxon, one would like to examine flowering material from natural surroundings. *O. comptonii* Leighton, like *O. epigeum* also occurs in the Whitehill Karoo Garden. The former is here regarded as a paedogenic form of *O. juncifolium*, flowering while still small. These juvenile plants flowering at an early age will produce fewer leaves and flowers.



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FIG. 29.—*Ornithogalum juncifolium*, Cape, near Somerset East, Bayliss 2489.



29. *Ornithogalum dregeanum* Kunth, Enum. 4: 351 (1843). Type: Cape, Paarl Division, Klein Drakenstein, Drège 1508 (G; K, iso.!: PRE, photo.).

*O. graminifolium* sensu Bak. in J. Linn. Soc. (Bot.) 13: 274 (1873). Fl. Cap. 6: 511 (1897); sensu Leighton in J. S. Afr. Bot. 11: 156 (1945).

Plants with long (up to 0,5 m), subspicate 10–30-flowered racemes, the peduncles often curved or twisted below. *Bulb* deep seated, small, 10–30 mm in diam. *Leaves* 3–7, their bases forming a long narrow tubular neck; the tissues characteristic for the species, decaying into flat long thin grey or brown reticulated strips, often faintly orange-spotted when young; lamina subterete, wiry, ribbed, with a central groove, 0,2–0,6 m long, glabrous, often with a loose twist, apex obtuse. *Raceme* subspicate, up to 30-flowered rhachis lengthening with age; peduncle wiry, thin 0,2–0,5 m long; bracts auriculate, abruptly awned, membranous; pedicels c. 5 mm, erect. *Perianth-segments* linear, c. 9 mm long, obtuse, creamy white. *Stamens* c. 6 mm, subulate, inner slightly wider, *Ovary* obovoid; ovules c. 7 per locule; style terete, about as long as ovary with 3 short stigmatic lobes, *Capsule* ovoid, c. 10 mm; seeds narrowly semilunar flattened, c. 5 mm, colliculate. FIGS 31 and 32.

Confined to the Cape Peninsula and neighbouring districts as far as Caledon and Tulbagh; usually in moist, peaty or sandy localities on rocky slopes or amongst tussocks of Restionaceae or grasses. Flowering December and January.

CAPE.—3318 (Cape Town): Modderdam (–DC), Salter 8601; Paarl (–DD), Wasserfall 756; Jonkershoek (–DD), Esterhuysen 8378. 3319 (Worcester): Tulbagh (–AC), Pappe sub SAM 23376. 3418 (Simonstown): Kenilworth Race Course (–AB), Salter 8606; Sugar Loaf Mtn. near Sir Lowry's Pass (–AB), Stokoe 8856; Kleinmond (–AC), Davis sub SAM 62221; Hermanus Golf Course (–AC), Walters 54; Cape Flats (–BA), Zeyher 1681; mountains above Gordon's Bay (–BB), Bayliss 4099; Helderberg (–BB), Esterhuysen 7673; flats E. of Klein Hangklip Range (–BD), Boucher 1108; near Palmiet River Mouth (–BD), Esterhuysen 13665. 3419 (Caledon): S.E. side of French Hoek mts. (–AA), Stokoe sub SAM 64715.

A well defined species easily recognized by the characteristic tissues of the tubular leaf bases.

30. *Ornithogalum capillare* Wood & Evans in J. Bot., Lond. 35: 490 (1897); Leighton in J. S. Afr. Bot. 11: 160 (1945). Type: Natal, near Newcastle, Wood 6511 (NH, holo.!: GRA!: PRE!).

Small, soft plants 0,1–0,15 m long. *Bulb* globose, 10 mm in diam. with dark tunics. *Leaves* 3–8, narrowly linear, up to 70 mm long, 0,5 mm broad, glabrous, the sheaths forming a thin neck below. *Racemes* 2–3 per bulb, up to 15-flowered, lax; peduncle wiry, 40–90 mm long; bracts deltoid-aristate; pedicels, erecto-patent, firm, the lowest longest, up to 15 mm, *Perianth* small, white, the segments fused at the very base, narrowly oblong, 4 mm. *Stamens* 2 mm, narrowly ovate. *Ovary* globose, obtuse; ovules 3–4 per locule; style terete with 3 short apical stigmatic lobes. *Capsule* obovoid, triangular, retuse; seeds 1,5 mm, angled, colliculate.

Recorded from Natal and the south-eastern Transvaal, apparently rare. Flowering November–January.

TRANSSVAAL.—2629 (Bethal): 8 km W. of Ermelo on road to Bethal (–DB), Codd 8070.

NATAL.—2729 (Volksrust): near Newcastle (–DD), Wood 6502.

Very close to *O. juncifolium* Jacq., but with glabrous leaves, longer erecto-patent pedicels and smaller flowers which produce only 3–4 ovules in each locule. *O. gracillimum* R. E. Fries, described from Kenya, appears to be closely related to this species. This requires further research.

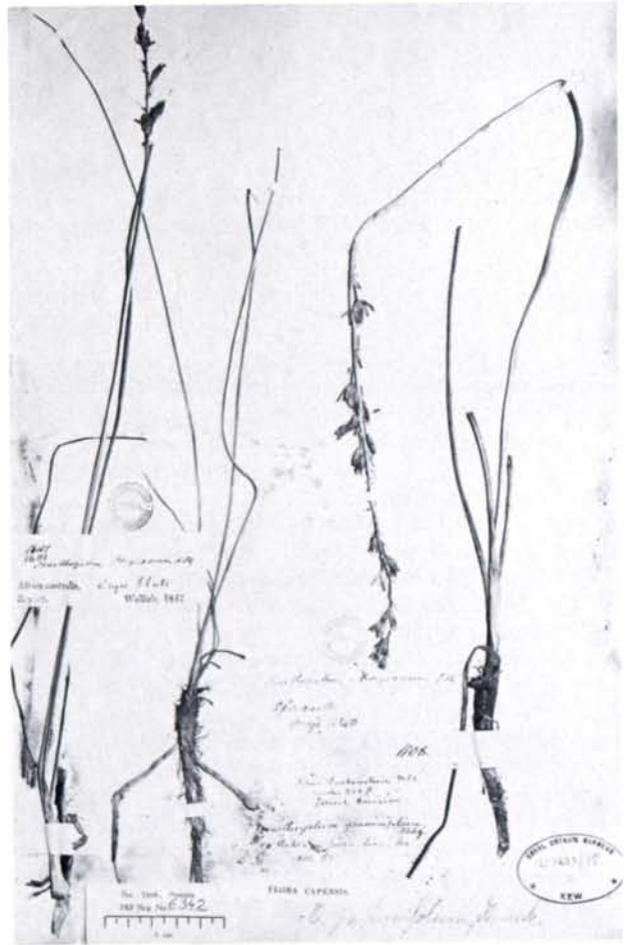


FIG. 31.—*Ornithogalum dregeanum* from Klein Drakenstein near Paarl (isotype: Drège 1508, K.)



FIG. 32.—*Ornithogalum dregeanum*, tissue of leaf-sheath,  $\times 80$ .

31. *Ornithogalum niveum* Ait., Hort. Kew. 1: 440 (1789), ed. 2, 2: 257 (1811); Bak. in Fl. Cap. 6: 509 (1897). Type: Cape, Masson (BM, holo.; PRE, photo.).

*O. pauciflorum* Bak. in Fl. Cap. 6: 498 (1897), non Raf. nec Turcz. 1834. *O. bergusianum* V. Poelln. in Port. Acta biol. ser. B, 1: 214 (1945) nom. nov. Type: Cape, Bergius (B, prob. destroyed).

*O. schlechterianum* Schinz in Bull. Herb. Boissier 2: 223 (1894); Bak. in Fl. Cap. 6: 500 (1897), Leighton in Jl. S. Afr. Bot. 11: 161 (1945). Type: Cape, Table Mountain, Schlechter 138 (Z, holo.!; PRE, photo.; BOL.!).

*O. oreogenes* V. Poelln. in Feddes Repert. 54: 24 (1944). Type: Cape, Genadendal, Schlechter 9877 (Breslau, holo.; GRA!; PRE!).

*O. vallis-gratiae* Schltr. ex V. Poelln. in Feddes Repert. 54: 26 (1944). Type: Cape, Genadendal, Schlechter 9883 (Breslau, holo.; GRA!; PRE!).

Weak straggling plants 0,1–0,3 m tall. *Bulb* narrowly ovoid, c. 10 mm in diam., oblique, attenuated into a neck; outer tunics black, bulbiferous. *Leaves* 3–10, filiform, flat or involute, up to 0,3 m long, c. 1 mm broad, sheathing at the base, glabrous, margin smooth, beaded or ciliate. *Raceme* shorter than leaves, laxly subcorymbose, up to 16-flowered; peduncle often with a lax curve; bracts deltoid-cuspidate, small, membranous; pedicels filiform up to 30 mm, firmer in fruit, spreading. *Perianth-segments* narrowly ovate, 5–7 mm long, white, translucent, with a faint green to red midrib, spreading to reflexed. *Stamens* with the filaments narrowly ovate-acuminate, c. 5 mm long, outer somewhat narrower. *Ovary* obovoid to globose, situated on a small disk; ovules biseriate, c. 8; style terete, as long as ovary; stigma small. *Capsule* globose, dark (visible through perianth in pressed specimens), 6 mm, apiculate; seeds angled through pressure, somewhat cuneiform, rugose, 1 mm long.

A montane species recorded from the southern Cape, on rocky ledges, usually at high altitudes. Flowering December–February.

CAPE.—3220 (Sutherland): farm Driefontein, Jakkalsvallei near Sutherland (–BC), Marloth 9762. 3318 (Cape Town): Table Mountain, Window Gorge (–CD), Compton 10384; Swartboskloof, Jonkershoek (–DD), van der Merwe 2137. 3319 (Worcester): Wemmershoek (–cc), Esterhuysen 11282. 3320 (Montagu): Strawberry Hill (–DD), Stokoe sub SAM 68223. 3321 (Ladismith): Sevenweeks Poort (–AD), Andree 1345. 3420 (Bredasdorp): Grootvadersbosch (–BB), Barker 8836.

*O. niveum* can usually be recognized by its small flowers with dark ovary, its weak habit and loose subcorymbose racemes. Specimens of *O. vallisgratiae* V. Poelln. (*Schlechter* 9883a from Genadendal), were placed under *O. niveum* (syn. *O. schlechterianum*) by Leighton as forma *b*. This poor collection and some others from around Paarl and Stellenbosch are atypical, small and compact and have leaf margins strongly ciliate. This will need further research. Marloth noted that the bulbs were edible, sweetish to the taste and called “gumgumpies” (Marloth 9762 from Sutherland).

32. *Ornithogalum rogersii* Bak. in Fl. Cap. 6: 50 (1897); Leighton in Jl. S. Afr. Bot. 11: 162 (1945). Type: Cape, George Mtn. *W. M. Rogers* 1/80 (K, holo.!; PRE, photo.).

Small soft erect plants 0,2–0,3 m tall. *Bulbs* ovoid, 10 mm in diam., with soft dark tunics, bulbiferous, forming small clumps. *Leaves* synanthous, erect, about 3 per bulb, linear, 60–100 mm long, 1–2 mm broad, apex, acuminate, without a visible basal sheath, soft, thin, glabrous, rarely margin ciliate. *Raceme* 0,2–0,3 m tall, up to 20-flowered; peduncle wiry, erect or sinuous; bracts small, deltoid-cuspidate, membranous; pedicels 10–20 mm long, erecto-patent. *Perianth* white, delicate; segments narrowly ovate, 7 mm long. *Stamens* with filaments c. 4 mm, narrowly

ovate-acuminate, outer somewhat shorter and narrower; anthers small. *Ovary* obovoid, obtusely triangular; ovules c. 8 in each locule, situated in upper half; style terete, half as long as ovary; stigma small. *Capsule* oblong-globose, 5 mm, rostrate; seeds somewhat cuneate, c. 1 mm, shortly spiky.

Apparently a rare species recorded from around George, in moist or marshy rock crevices. Flowering December.

CAPE.—3322 (Oudtshoorn): Jonkersberg (–CC), Compton 23096; George mountain (–CD), Searle sub PRE 13092; Touw River, district George, Martin 55.

Nearest *O. graminifolium* Thunb., but no neck of sheathing leaf-bases is formed above the bulb. The species appears to be adapted to wet habitats. Further research is needed.

33. *Ornithogalum anguinum* Leighton sp. nov. *O. monophyllo* Bak. affinis, sed planta robustiore perianthii segmentis liberis ovario sessili differt.

Planta ad 0,3 m alta. *Bulbus* globosus; tunicis coriaceis in collo productis. *Folium* unum anguste linearis a basi cataphyllo membranaceo transverse striato cingens. *Racemus* 3–6 floriferus. *Perianthii segmenta* albida c. 8 mm longa. *Ovarium* globosum sessile. *Capsula* globosa 7 mm longa; semina cuneata pluri angulata 2–3 mm colliculata.

Type: E. Cape, near Grahamstown, MacOwan 379 (GRA, holo.!; PRE, photo.).

Plants 0,1–0,3 m tall. *Bulb* globose, 20–30 mm in diam. with brown tunics forming a short neck. *Leaf* 1, narrowly linear, up 0,3 m long, 2–6 mm wide, smooth, flaccid, surrounded at the base by tubular bladeless cataphylls with transverse dark ridges, apex acute. *Raceme* on a long thin sinuous peduncle; bracts small auriculate, acute, membranous; pedicels 1,5–2 mm. *Perianth-segments* free, narrowly ovate, c. 8 mm, white. *Stamens* with outer filaments slightly widened below, inner ovate-acuminate. *Ovary* globose, sessile; ovules c. 8 in each locule; style terete, longer than ovary, with 3 triangular papillate stigmatic lobes. *Capsule* globose, 8 mm, with thin walls; seeds cuneate, many-angled, 2–3 mm, colliculate. FIG. 33.

Occasional around Grahamstown to Alexandria, growing in dense shade in rock crevices. Flowering September–November.

CAPE.—3325 (Port Elizabeth): farm Viewlands, Suurberg (–BA), Bayliss 2976; south side of Suurberg Pass (–BC), Johnson 718, Archibald 5922; 3326 (Grahamstown): near Sidbury (–AC), Daly 796; bottom of Howisons Poort (–AD), Schonland 632; near Grahamstown (–BC), McOwan 379; 12–16 km N.E. of Grahamstown, under Fish River Valley scrub (–BB), Dyer 602; Bloukrans (–BC), Hilner 85.

34. *Ornithogalum monophyllum* Bak. in Fl. Cap. 6: 502 (1897). Type: Transvaal, Barberton, Saddleback Range, Galpin 1051 (K, lecto.!; PRE!; GRA!; SAM!).

Delicate plants up to 0,25 m tall. *Bulb* globose 10–20 mm in diam., brown, forming a neck up to 100 mm long. *Leaves* 1–few, filiform, up to 0,3 m long, soft, glabrous, each surrounded basally by a cataphyll banded with transverse dark thick ridges, soon disintegrating; cataphylls absent in young plants. *Raceme* pseudo-spicate, up to 0,25 m tall, few- to 20-flowered, the flowers close together; peduncle terete, filiform, somewhat sinuous; bracts small, auriculate, obtuse to acute, membranous; pedicels 1–8 mm, erect. *Perianth* delicate, white, up to 8 mm; segments fused in lower third, forming a short funnel-shaped tube, spreading above at anthesis. *Stamens* with ovate-acuminate filaments, the inner wider, fused to the perianth-tube below. *Ovary* globose but attenuated into a 2–3 mm long stipe below; ovules

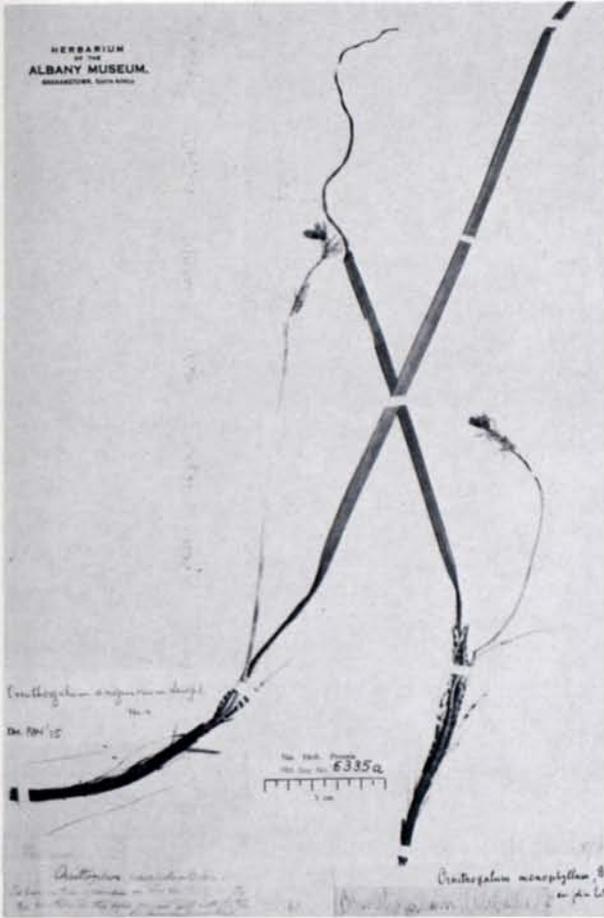


FIG. 33.—*Ornithogalum anguinum* from near Grahamstown (holotype: MacOwan 379, GRA).

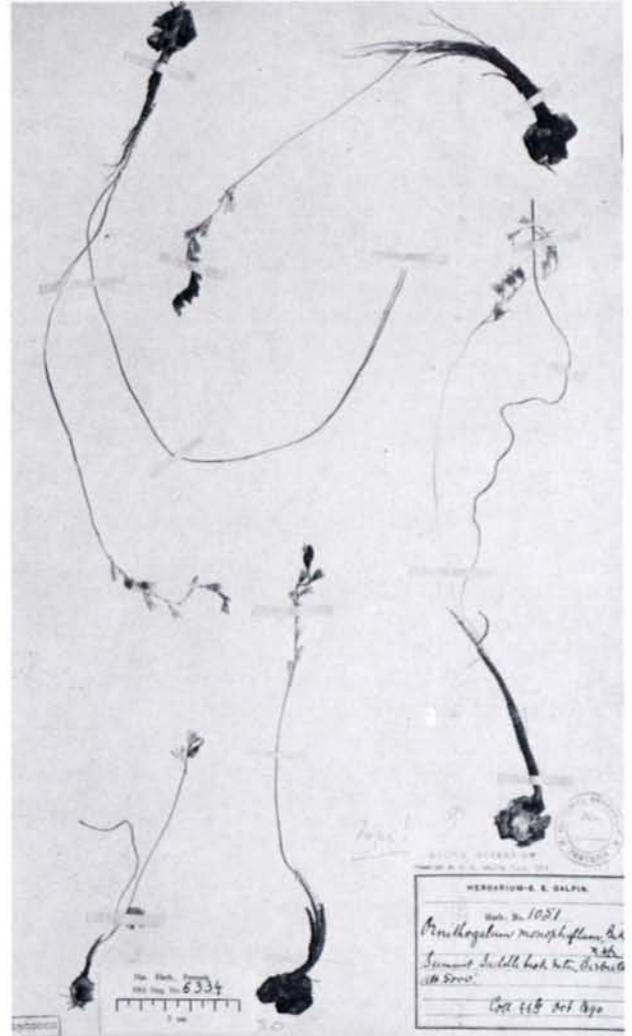


FIG. 34.—*Ornithogalum monophyllum* from Saddleback Mountain near Barberton. [holotype: Galpin 1051 (PRE, iso.).]

few; style terete, 1.5 mm, with a small stigma. Capsule oblong-ovoid, 7 mm, shortly stipitate; seed 1.5 mm, rounded and ridged with one straight side, minutely colliculate. FIG. 34.

Recorded from Swaziland and eastern Transvaal, on mountain slopes in shady crevices, filled with damp fibrous peaty soil. Flowering September to November.

TRANSVAAL.—2531 (Komatipoort): Saddleback Mountain, Barberton (—CC), Galpin 1051.

SWAZILAND.—3631 (Mbabane): Mountains surrounding Mbabane (—AC), Compton 24562, 26113, 27210, 28047, 28174, 30334, Bayliss 3730.

II. Subgenus *Urophyllon* (Salisb.) Bak. in Saund., Ref. Bot. 3, sub t. 177 (1870).

*Urophyllon* Salisb., Gen. Pl. 35, 40 (1866).

*Ardernia* Salisb., l. c. 35, 40.

Perianth-segments white, green or cream with a dark or green, 3–7-nerved midrib (indistinct in *O. saundersiae* and *O. tubiforme*). Stamens with the filaments terete, or inner ovate-acuminate, rarely winged. Ovary with the ovules biseriate, 2–20 in each locule; style about as long as ovary. Capsule tricostate, rounded, often wider than long, not transparent, the ribs sharp or broad and flat, coriaceous; the perianth shrivelling haphazardly, tardily deciduous. Seeds 1–10 mm, oblong in outline, angled to discoid, smooth. Predominantly summer rainfall species. Type species: *O. longibracteatum* Jacq. (species 35–46).

35. *O. unifolium* Retz\*, Obs. 2: 17 (1781). Type: Cape, Thunberg (LD, holo!; PRE, photo.).

*O. crenulatum* L.f., Suppl. 198 (1782); Thunb., Prodr. 62 (1794), Fl. Cap. ed. Schult. 315 (1823); Bak. in Fl. Cap. 6: 515 (1897); Leighton in JI S. Afr. Bot. 10: 121 (1944). Type: Cape, Thunberg 8283 (UPS, holo!; PRE, photo.).

*O. ovatum* Thunb., Prodr. 62 (1794), Fl. Cap. ed. Schult. 315 (1823); Bak. in Fl. Cap. 6: 515 (1897). Type: Cape, Thunberg 8296 (UPS, holo!; PRE, photo.).

*O. fuscatum* Jacq., Ic. Pl. Rar. 2: 19, t.429 (1795); Coll. Suppl. 80 (1796). *Ardernia fuscata* (Jacq.) Salisb., Gen. Pl. Fragm. 35, 40 (1866). Type: t.429 in Jacq., Ic. Pl. Rar.

*O. unifolium* Dyer in Rec. Albany Mus. 4: 111 (1930). *O. dyeri* V. Poelln. in Feddes Rep. 54: 22 (Sept. 1944), nom. nov. *O. solitarium* Leighton in JI S. Afr. Bot. 10: 120 (Oct. 1944), nom. nov. Type: Albany District, 9 km from Grahamstown on Cradock Road, Dyer 2196 (GRA, holo!).

*O. watermeyeri* L. Bol. in S. Afr. Gdng Ctry Life 21: 13 (1931); Leighton in JI S. Afr. Bot. 11: 171 (1945). Type: Cape, Richmond Division, Sneecuberge, Watermeyer sub BOL 19340 (BOL, holo!).

*O. cinnamomeum* Leighton in JI S. Afr. Bot. 10: 122 (1944). Type: Cape, Clanwilliam District, 4 km S. of Clanwilliam, Pillans 9852 (BOL, holo!).

Plants 60–300 mm tall. Bulb ovoid, up to 30 mm in diam. forming a broad neck, with tough pale grey-brown tunics. Leaves 1–2 (3), developing during the winter months, rarely synanthous (e.g. in cultivation), narrowly oblong, (50) 70–120 mm long, 10–30 mm broad, variable in size, apex obtuse, base contracted, tubular, margin smooth, sometimes minutely to

\*Not to be confused with *O. unifolium* Ker (1806) from the Mediterranean.

distinctly papillate, lamina firm, smooth or striate, green, flat on ground or spreading. *Raceme* pyramidal at first, lengthening with age, few-many flowered; peduncle slender; bracts deltoid-aristate, auriculate, keel striate, sides membranous, margin and dorsal face glandular-papillate; pedicels 5–15 mm long, thin, patent-erect, firm in fruit. *Perianth* with spreading oblong, obtuse segments c. 10 mm long, pale yellow or buff, with a broad dark green keel. *Stamens* with the filaments narrowly ovate, 5 mm long, erect, encircling ovary. *Ovary* ovoid to obovoid, each locule with a prominently grooved keel; ovules c. 14, in each locule, biseriate; style terete, longer than ovary; stigma capitate with 3 papillate decurrent ridges. *Capsule* globose, with prominent keels, c. 8 mm long; seeds semi-discoïd with one straight side and the other curved, double-ribbed, 3 mm long, surface black, minutely and densely papillate. FIGS 35, 36 and 37.

Southern South West Africa, south-western Orange Free State, Cape; in dry karroid areas from Grahamstown to Kimberley, southern South West Africa, to Vredendal in the south-western Cape. Flowering September–November.

S.W.A.—2716 (Witpütz): Farm Namuskluft: W88, (-DD), *Giess* 12903.

O.F.S.—2925 (Jagersfontein): Brakpan and Driefontein (-AC), *Kies* 283.

CAPE.—2816 (Oranjemund): Kuboos (-BD), *Herre sub STE* 12356. 2820 (Kakamas): sandy plain N. of Aughrabies (-CB), *Marloth* 12462. 2824 (Kimberley): Kimberley area (-DA), *Carver sub Marloth* 13414. 2917 (Springbok): Steinkopf (-BD), *Schlechter* 11478. 2921 (Kenhardt): 3 km W. of Kenhardt (-AC), *Acocks* 16504. 2922 (Prieska): Prieska (-DA), *Bryant*



FIG. 36.—*Ornithogalum unifolium* from Sutherland in the Cape, *Stayner* (NBG); plant with one leaf, July 1969. Photo: W. F. Barker.

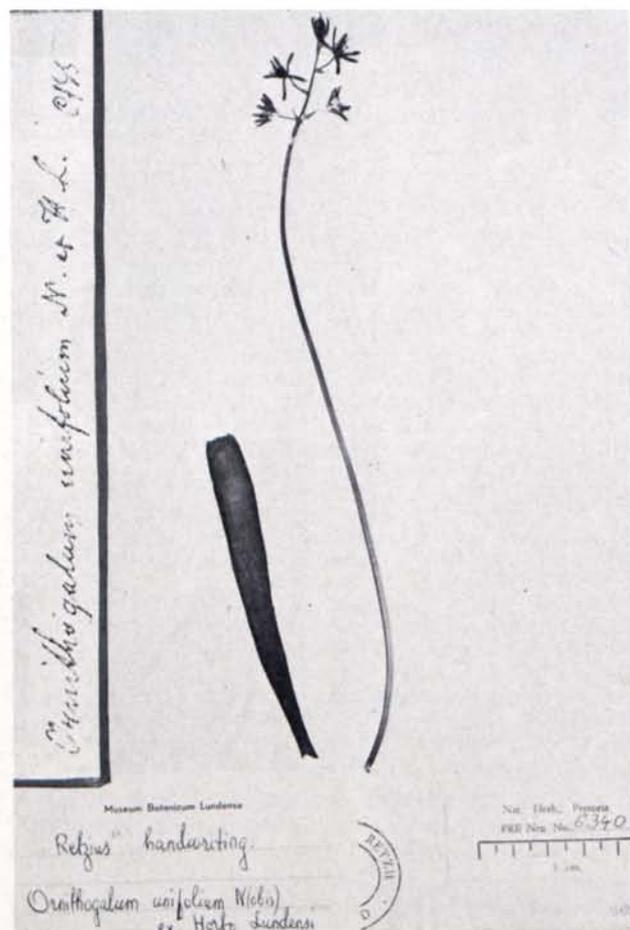


FIG. 35.—*Ornithogalum unifolium* from the Cape of Good Hope [holotype: *Thunberg* (LD).] Inset: *Retzius*'s handwriting on back of sheet.



FIG. 37.—*Ornithogalum unifolium* from farm Voëlfontein near Sutherland Hall 3245 (NBG); plant in flower, probably November 1968. Photo: W. F. Barker.

831. 2923 (Douglas): Mazelsfontein (-BA), *Anderson sub BOL 18644*. 3017 (Hondeklip Bay): Kharkams (-BD), *Hall 4173*. 3018 (Kamiesberg): Loerkop (-CA), *Leistner 738*. 3118 (Vanrhynsdorp): 4 km S.W. of Vredendal (-DA), *Hall 3601*. 3119 (Calvinia): near Bloukrans (-AB), *Lewis 2528*. 3220 (Sutherland): farm Voëlfontein (-AB), *Hall 3245*. 3319 (Worcester): Robertson (-DD), *de Villiers sub NBG 489139*; 3320 (Montagu): Matjiesfontein (-BA), *Marloth 10760*.

This small species, adapted to harsh conditions, has a solitary dark green leaf, but in cultivation 2 or 3 leaves may be developed, which may become bigger as well. The leaf of *O. watermeyeri* was seen to be filiform, but as it was found growing at a high altitude, this may be an adaptation to its cold habitat, or an atypical replacement. The glandular-papillate bracts are very characteristic of this species.

According to Prof. dr. F. Stafleu it is now accepted that Linnaeus f.'s Supplementum appeared between January and April 1782. As Retzius's Obs. fasc. 2, bears the date 1781 on the title page, it must be regarded as the older publication and therefore the name *O. unifolium* Retz. has preference.

36. *Ornithogalum tubiforme* (Oberm.) Oberm., stat. nov.

*O. candidum* var. *tubiforme* Oberm. in *Bothalia* 10: 355 (1971); Merxm. et al. in *Prodr. Fl. S.W.Afr.* 147: 59 (1970). Type: S.W.A.—2416 (Maltahöhe): farm Büllsport, *Strey 2624* (PRE, holo!; NBG!).

Plants up to 0,3 m tall. *Bulb* ovoid, attenuated into an up to 0,1 m long thick neck below ground with grey-brown, thin tunics. *Leaves* 2–3 per shoot, spreading, usually folded, linear to oblong, 90–150 mm long, 4–15 mm broad, apex acute, base attenuated into a membranous tubular sheath, margin entire, straight or wavy, glaucous-green, shiny, often striate. *Raceme* 1–2, simple, subcorymbose at first, lengthening with age, 20–30-flowered; peduncle firm 10–60 mm long, erect; bracts minute, membranous, deltoid; pedicels patent to erecto-patent, 10–15 mm long, thin, straight, firmer in fruit. *Perianth* white, shiny, delicate, forming a short tube 3–5 mm long and with spreading oblong lobes about 10 mm long, with a broad 5-nerved midrib and transparent sides, persisting as a fused terete appendage above the developing ovary. *Stamens* attached to the throat of the short tube; filaments filiform, c. 8 mm long, but often of variable length. *Ovary* globose, trigonous; ovules few; style terete, overtopping stamens; stigma apical, small, papillate. *Capsule* deeply trigonous, c. 10 mm high, slightly inflated; seeds cuneate-attenuate, c. 6 mm long, smooth.

Common in the southern and central parts of South West Africa, usually on flats of quartzite, gravel or limestone. Flowering in January–February after good rains, and then covering vast areas.

S.W.A.—2215 (Trekkoepje): farm Ubib, KAR 76 (-BA), *Giess 10836*; farm Nudis (-BC), *Seydel 245*. 2315 (Rostock): Namib Desert Park, quartzite flats at Ganab (-BA), *Giess 13274*; Namib Desert Park (-BD), *Giess, Müller & Hübsch 11613*. 2317 (Rehoboth): farm Vrede, REH 433 (-CD), *Giess 9110*. 2416 (Maltahöhe): farm Büllsport, REH 172, (-AB), *Giess, Müller & Hübsch 11559*; Maltahöhe townlands (-DD), *Giess, Müller & Hübsch 11561*. 2417 (Mariental): farm Dickdorn, GIB 98 (-DC), *Coetzee sub Herb. Giess 10872*; Swartrand, 48 km W. of Mariental (-DD), *Basson 146*. 2418 (Stampriet): farm Witvley near Mariental (-AC), *Giess 3878*. 2516 (Helmeringhausen): farm Kleinfontein, MAL 81 (-BB), *Giess & Robinson 13249*.

This "Schneelilie" is a most attractive species which flowers in masses after good rains, covering large tracts of land which then appear as if covered by snow. Giess observed them on quartzite gravel with underlying limestone, but never in pure red sand or in pure limestone. The typical form has narrow straight-edged leaves, but there is also a common

form with wider leaves in which the margins may be laxly undulate. The species is grazed by animals according to Seydel.

Reasons for considering *O. tubiforme* a good species are given under *O. candidum*.

37. *Ornithogalum candidum* Oberm. in *Bothalia* 10: 255 (1971); Merxm. et al., *Prodr. Fl. S.W.Afr.* 147: 59 (1970). Type: S.W.A. Rehoboth: Büllsporter Fläche, *Giess 3880* (PRE, holo!; M).

Plants up to 0,22 m tall. *Bulb* narrowly ovoid, up to 40 mm in diam., attenuated into a neck c. 100 mm long, tunics white inside, pale greyish brown outside. *Leaves* 2, linear, c. 70 mm long and 10 mm broad, yellowish green, apex acute, base attenuated into a membranous tubular sheath, margin narrowly white-cartilaginous, not wavy. *Raceme* c. 130 mm tall, 10–25 flowered; peduncle 20–40 mm long; bracts minute 3 mm, membranous; pedicels with the lowest up to 40 mm long, spreading with the thin apex deflexed, especially in the bud-stage with the perianth slightly nodding. *Perianth-segments* free, spreading white, oblong, obtuse, c. 12–14 mm long, with a broad dark 5-nerved midrib when dry. *Stamens* c. 9 mm long, the filaments linear. *Ovary* globose, 3 mm; ovules c. 8 per locule; style terete, 7 mm, with an apical papillate stigma. *Capsule* not seen.

South West Africa, Büllsporter flats in the Rehoboth district, apparently rare.

S.W.A.—2317 (Rehoboth): farm Vrede, REH 433 (-CD), *Giess 9110*. 2416 (Maltahöhe): farm Büllsport, REH 172 (-AB), *Giess, Müller & Hübsch 11558*; Büllsporter flats, Rehoboth area, *Giess 3880*.

During the last five years *O. tubiforme* has been often collected, but not so *O. candidum*. A closer investigation of the type of *O. candidum* and that of the variety *tubiforme*, convinced me that *O. tubiforme* represents a good species, which can be separated from *O. candidum* by its short (up to 20 mm) thin, straight pedicels and the free perianth-segments. It is in fact the common species which covers vast tracts of land after good summer rains. The collections cited under the description of *O. candidum* on p. 355 in *Bothalia* 10 (1971), with the exception of the type, should all be placed under *O. tubiforme*.

At present only one other recent collection matching the type of *O. candidum*, viz. *Giess, Müller & Hübsch 1158* from the same area, Büllsport, has come to light. It was seen to be growing there amidst *O. tubiforme* (*Giess, Müller & Hübsch 11559*). There is also a sheet at PRE, *Strey 2691*, from the farm Marienhof (2316BB, Nauchas), collected in January 1949, in which one of three racemes belongs to *O. candidum*, the other two being *O. tubiforme*.

When reading the copious notes on the collector's labels of Giess and colleagues, one is struck by the mention of *Cyanella amboensis* Schinz growing together with *O. tubiforme* in some areas. *Cyanella amboensis* produces the same unusual type of pedicel in which the tip curves downwards. To suggest that *O. candidum* could be a hybrid of *Cyanella amboensis* × *O. tubiforme* seems preposterous but it would be interesting to study the situation *in situ* when the opportunity presents itself.

38. *Ornithogalum rautanenii* Schinz in *Bull. Herb. Boissier*, ser. 2, 2: 937 (1902); Merxm. et al. *Prodr. Fl. S.W.Afr.* 147: 60 (1970). Type: S.W.A., Otjovazandu, *Rautanen 355* (Z, holo!; PRE, photo.)

*O. coniochylum* Krause in *Bot. Jb.* 48: 358 (1912). Type: S.W.A., Otavi, *Dinter 717* (B, holo!; PRE, photo.).

*O. disciferum* Leighton in *Jl S. Afr. Bot.* 11: 164 (1945). Type: S.W.A., Otavi, *Dinter 5273* (BOL, holo!; PRE!).

*O. karibibense* Dinter ex Sölch, Beitr. Fl. Südwest-Afr., Diss. Univ. München: (1960), in syn. Type: S.W.A., Karibib, Dinter 6787 (M; PRE!).

Small plants up to 0,2 m. *Bulb* narrowly ovoid, c. 15 mm in diam., forming a long neck with the outer tunics rough, light to dark brown. *Leaves* 2(-4), filiform to linear, 60-140 mm long, 2-4 mm broad, usually folded, occasionally spirally twisted, apex acute, base sheathing, margin smooth. *Raceme* shorter than the leaves, 10-25 flowered, subcorymbose, elongating with age; peduncle wiry, up to about 50 mm long; bracts small, deltoid-acuminate, membranous; pedicels spreading, thin, up to 16 mm long. *Perianth* small, white, with a broad brown or green midrib, the segments ovate, c. 5 mm, obtuse, spreading, shortly fused at the base. *Stamens* with the filaments expanded below with pointed apices, attached to the base of the perianth. *Ovary* stipitate, widened below to form a 6-lobed base, upper part attenuate, 6-grooved; ovules c. 8; style erect, terete, about as long as ovary; stigma apical. *Capsule* not seen. FIG. 38.

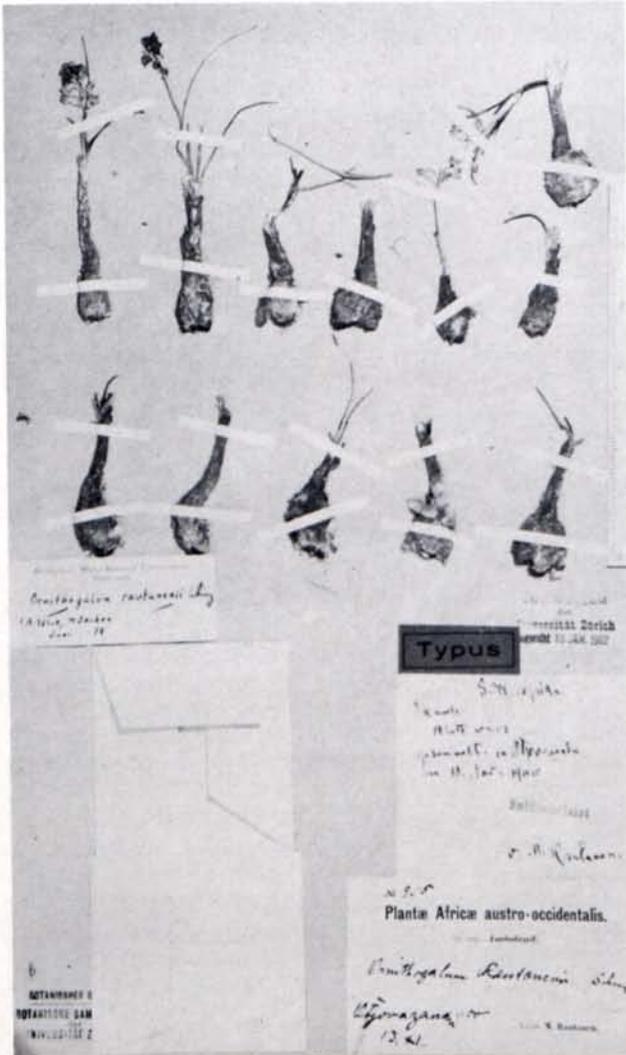


FIG. 38.—*Ornithogalum rautanenii* from South West Africa at Otjovazandu (holotype: Rautanen 355, Z).

Apparently confined to northern South West Africa, usually growing in clay and lime-rich soils. Flowering December-January.

S.W.A.—1915 (Okaukuejo): Etosha National Park, Ozontjimbari (-B), *le Roux* 599; Xamazeb Waterhole, *Tinley* 1110. 1917 (Tsumeb): Otavi (-CB), *Dinter* 5273. 1918 (Grootfontein): farm Malta (-AD), *Giess* 11225. 2115 (Karibib): Karibib (-DD), *Dinter* 6787.

39. *Ornithogalum stapffii* Schinz in Bull. Herb. Boissier 4, App. 3: 42 (1896); Bak. in Fl. Trop. Afr. 7: 546 (1898); Leighton in JI S. Afr. Bot. 11: 164 (1945) sub *O. karasbergense* Glover; Merxm. et al., Prodr. Fl. S.W.Afr. 147: 61 (1970). Type: S.W.A., Namib, Hope Mine, *Stapff* 28 (Z, lecto.!; PRE, photo.).

*O. spirale* Schinz in Bull. Herb. Boissier 4, App. 3: 42 (1896); Bak. in Fl. Trop. Afr. 547 (1898), non Wimmer 1842. *O. schinzii* Poelln. in Ber. dt. bot. Ges. 61: 209 (1944), nom. nov. Type: S.W.A. Rehoboth, *Fleck* 890 (Z, holo.!; PRE, photo.).

*O. dinteri* Bak. in Bull. Herb. Boissier sér. 2, 1: 854 (1901). Type: S.W.A., Seeis, near Windhoek, *Dinter* 1267 (Z, holo.!; PRE, photo.).

*O. juttae* Krause in Bot. Jb. 48: 359 (1912). Type: S.W.A., Kameelboom, *Dinter* 2073 (B, holo.!; PRE photo.).

*O. karasbergense* Glover in Ann. Bolus Herb. 1: 106, (1915); Leighton in JI S. Afr. Bot. 11: 164 (1945). Type: S.W.A., Great Karasberg, Narudas Süd, *Pearson* 8144 (BOL, lecto.).

*O. melanopus* Dinter ex Sölch, Beitr. Fl. S.W. Afr., Diss. Univ. München: 70 (1960) in syn.

*O. recurvum* Oberm. in Bothalia 10: 357 (1971); Prodr. Fl. S.W. Afr. 147: 60 (1970). Type: S.W.A., Kaokoveld, banks of Kunene River, *Stony* 5848 (PRE, holo.).

Plants 0, 1-0, 4 (-0, 5) m tall, variable in size, often gregarious. *Bulb* narrowly to broadly ovoid, with or without a neck, up to 100 mm long and 50 mm broad; outer tunics greyish brown, rough, the old inner persistent leaf-bases forming a short broad neck, membranous, yellowish with dark transverse ridges. *Leaves* 5-12, very variable in size and width, narrowly to broadly linear, 0,15-0,35 m long, -20 mm wide, flat or folded, glaucous, apex attenuated, occasionally with a lax spiral twist, sheathing at the base, faintly striate. *Racemes* 1-3, shorter than leaves, 60-180 mm long, many flowered, fairly compact; peduncle c. 90 mm, curved outwards firm; bracts small, deltoid-filiform, membranous; pedicels 10-25 mm long, filiform, spreading, firm in fruit. *Perianth* white the keel becoming green and distinct with age, spreading to recurved; segments linear, obtuse, 7-10 mm long. *Stamens* with the filaments quadrately expanded below. *Ovary* ovoid, trigonous, expanded below into a 6-lobed disk, contracted into a stipe at the base. *Capsule* broadly obtriangular, 15-20 mm in diam., apex retuse, walls thin, green; seeds discoid, 7 mm in diam.

At present only recorded from northern and central regions of South West Africa, as far south as Mariental, on clay or sandy flats, locally common; flowering (November) January-May.

S.W.A.—1712 (Posto Velho): Kunene River bank (-AB), *Stony* 5848. 1812 (Sanitatas): flats near waterhole at Orupembe (-BA), *de Winter & Leistner* 5732. 1816 (Namutoni): Etosha Game Park, near Twee Palms (-D), *le Roux* 617. 2013 (Unjab Mouth): 5 km W. of farm Wereldend, OU 715 (-BB), *Giess, Volk & Bleissner* 6204. 2017 (Waterberg): Okaputa (-AA), *Dinter* 896. 2114 (Uis): Brandberg, Oritsaub (-AB), *Merxmüller & Giess* 1687. 2115 (Karibib): Kalkbuschsteppe (-DD), *Dinter* 6796. 2116 (Okahandja): Farm Omatako-Sicht, OK 256 (-BA), *Woortman* 66. 2117 (Otjosondu): Waterberg, Quickborn (-AA), *Bradfield* 124. 2214 (Swakopmund): farm Greylingshof, SW 107 (-DA), *Giess, Volk, & Bleissner* 5160. 2215 (Trekopje): Swakop River, Welwitschia flats, near "Tswichab", (-CA), *Kers* 33. 2217 (Windhoek): 42 km S. of Windhoek on road to Rehoboth (-CA), *Giess & van Vuuren* 963. 2315 (Rostock): Namib Desert Park (-AD), *Giess* 13296. 2317 (Rehoboth): farm Vrede, REH 433 (-CD), *Giess* 9111. 2415 (Sossusvlei): Farm Geluk; MAL 138 (-DB), *Giess* 11581. 2417 (Mariental): 64 km W. of Swartrand (-DD), *Basson* 163, 174.

From the many collections it appears to be one of the commonest and most variable species. The leaves may be large and broad but fewer or shorter and narrower and then more numerous. Cultivated plants have the peduncle much exserted and the perianth-segments completely recurved, but this must be due to unnatural conditions. Very typical of the

species are the quadrate basal expansions of the filaments and the crenate saucer-shaped disk of the lower part of the ovary.

A collection by Comins 1790 from the Great Fish River Canyon, South West Africa, which flowered at the Botanical Research Institute in November 1958, cannot be placed here with certainty. The filaments are not squarely expanded, but ovate-acuminate and minutely tuberculate; the ovary is triangular with broad ridges, which are umbonate below where the ovary becomes abruptly stipitate. The tallness of the plant is no doubt due to cultivation. It otherwise resembles *O. stapffii*.

40. *Ornithogalum tenuifolium* Delaroché in Red., Lil. 6, t. 312 (1811, before November)\*. Type: t. 312 in Red., Lil. 6, a plant of unknown origin, which flowered at Malmaison. The holotype could possibly be at P.

Plants glabrous, 0.1–0.6 m tall, very variable. Bulb globose to ovoid, 20–30 mm in diam., with the outer tunics thin and brownish grey; in ssp. *aridum* extended into a neck; occasionally epigeal, green and bulbiferous; roots many, thin. Leaves usually about 5 per flowering shoot, linear-acuminate, up to about 0.35 m long and 2–8 mm broad, or many and filiform, broadly sheathing at the base, erect, glossy bright green to glaucous. Racemes 1–3 per shoot, usually about as long as the leaves; peduncle firm, slightly sinuous; bracts narrowly ovate-acuminate, membranous, often with a filiform apex, overtopping buds; pedicels short, erect, 2–5 mm long. Flowers small, close together in few to many-flowered subspicate racemes or sometimes few-flowered, subcorymbose. Perianth-segments oblong, 6–10 mm, with a broad green (turning to red when dry in some plants) central band and white membranous sides, apices obtuse. Stamens with ovate-acuminate filaments, occasionally inner forming a shallow lobe or tooth. Ovary ovoid, trigonous; ovules biseriate, 4–8 per locule; style terete; stigma apical papillate. Capsule ovoid-acute, deeply 3-lobed, membranous; seeds flattened, semilunar, c. 3–4 mm, ridged, colliculate. Chromosomes:  $2n=6; 8; 10; 12$ . FIGS 2.2; 4.7; 39.

Widely distributed and common in southern Africa to tropical Africa. Flowering in summer.

Toxicity.—Experiments undertaken at Onderstepoort proved it to be non-poisonous.

Two subspecies are recognized.

#### Key to subspecies

- Bulb not extended into a neck; leaves about 5 per flowering shoot, usually linear-acuminate, 4–8 mm wide towards the middle.....(a) subsp. *tenuifolium*  
 Bulb in older plants extended into a neck, often with transverse ridges; leaves many, filiform, 2–4 mm wide towards the middle.....(b) subsp. *aridum*

#### (a) subsp. *tenuifolium*

*O. tenuifolium* Delaroché in Red., Lil. 6, t. 312 (1811, before November). Type: t.312 in Red., Lil. 6., a plant of unknown origin, which flowered at Malmaison.

*O. rupestre* sensu Rudolphi, Bemer. in Schrad. Journ. 2: 281 (1799); non L.f. *O. rudolphii* Jacq. f., Eclog. 1: 31, 151, t. 20 (1811, December). Type: t.20 in Eclog., a plant of unknown origin, which flowered in Vienna.

*O. juncifolium* sensu Ker in Curtis's bot. Mag.t.972 (1807); sensu Poir. et in Lam., Encycl. Suppl. 4: 197 (1816) in synonymy; as *juncum*; non Jacq.

*O. virens* Lindl. in Bot. Register t.814 (1824); Bak. in Fl. Cap. 6: 514 (1897); Leighton in JI S. Afr. Bot. 11: 165 (1945); Merxm. et al., Fl. S.W.Afr. 147; 61 (1970). Type: Mozambique, Delagoa Bay, Forbes, (K, holo.).

\* Not to be confused with *O. tenuifolium* Guss., Fl. Sicul. Prodr. 1: 413 (1827), a homonym, used in Coste, Fl. France, etc.

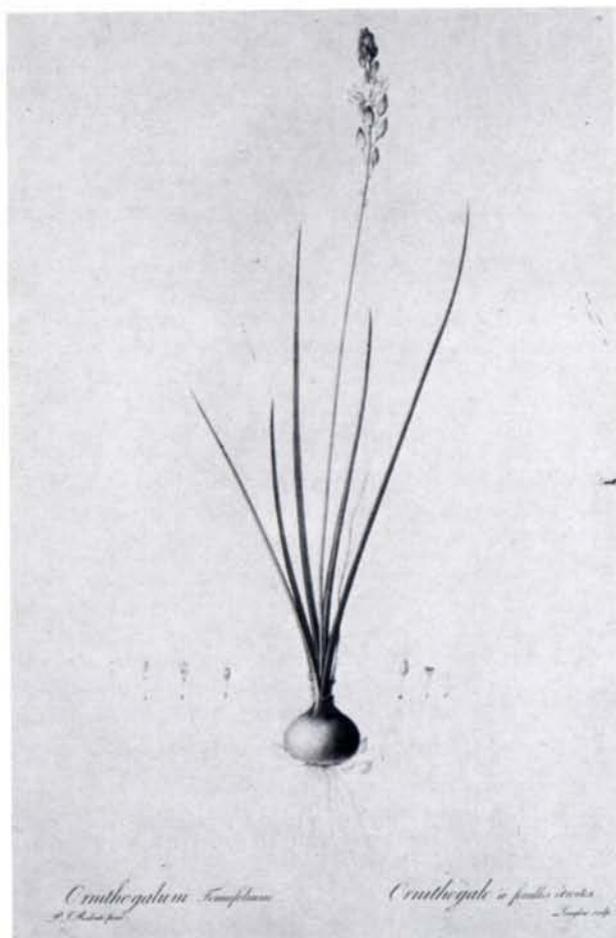


FIG. 39.—*Ornithogalum tenuifolium*; Redouté, Lil. 6, t. 312 (iconotype).

*O. ecklonii* Fisch. & Mey. in Index Sem. Hort. Petrop. 6: 62 (1835–42). Type: Prom. bonae Spei, *Ecklon* (LE?).

*O. ecklonii* Schlechtndl. in Linnæa 25: 177 (1852); Bak. in Fl. Cap. 6: 513 (1897); Leighton in JI S. Afr. Bot. 11: 171 (1945), non Fisch. & Mey. *Urginea ecklonii* (Schlechtndl) Weim. in Bot. Notiser 1937: 440 (1937). Type: Eastern Cape, *Ecklon* (B, †).

*O. acuminatum* Bak. in Saund., Ref. Bot.t.177 (1870); in Fl. Cap. 6: 513 (1897). Type: Cape, Algoa Bay, *Cooper* (K, holo.); PRE, photo.); as *O. canaliculatum* in caption below plate, non Schur.

*O. aciphyllum* Bak. in J. Bot., Lond. 12: 365 (1874), in Fl. Cap. 6: 511 (1897). Type: Cape, Colesberg, *Shaw* (K, holo.); PRE, photo.).

*O. flavovirens* Bak. in J. Bot. 12: 366 (1874); Fl. Cap. 6: 507 (1897); Leighton in JI S. Afr. Bot. 11: 170 (1945). *Urginea flavovirens* (Bak.) Weim. in Bot. Notiser 1937: 442 (1937). Type: Eastern Cape, near Somerset East, *MacOwan 1852* (K, lecto.); PRE, photo.; BOL!).

*O. chloranthum* Bak. in Gdnrs' Chron. 4: 323 (1875), non Saut. ex Koch; nec Bieber. *O. viriduliflorum* V. Poelln., Ber. dt. bot. Ges. 61: 209 (1944), nom. nov. Type: Ex nursery Wilson Saunders (K, holo.).

*O. cepaeifolium* Bak. in Trans. Linn. Soc. Lond. ser. 2, Bot. 1: 248 (1878); in Fl. Trop. Afr. 7: 546 (1898). *Urginea cepaeifolia* (Bak.) Rendle in Cat. Afr. Pl. Coll. Welw. 2,1: 60 (1899), Type: Angola, Pungo Andonga and Huilla, *Welwitsch 3816*.

*O. albovirens* Bak. in Gdnrs' Chron. 10: 364 (1878); in Fl. Cap. 6: 513 (1897). Type: Natal, received from Mr Cordukes, flowered at Kew (BM?).

*O. inconspicuum* Bak. in Fl. Cap. 6: 498 (1897); Leighton in JI S. Afr. Bot. 11: 170 (1945). Type: Transvaal, Barberton, Lomati Valley, *Galpin 1361* (K, holo.); PRE, photo; PRE!).

*O. saltmarshei* Bak. in Fl. Cap. 6: 513 (1897); Leighton in JI S. Afr. Bot. 11: 170 (1945) sub. *O. inconspicuum* Bak. Type: Swaziland, Komassan Range, Havelock Concession, *Saltmarsh* in Herb. *Galpin 1057* (K, holo.; PRE!).

*O. galpinii* Bak. in Fl. Cap. 6: 536 (1897), non Bak., Fl. Cap. 6: 516 (1897). *O. subspicatum* Bak. in Kew Bull. 1898: 164 (1898), nom. nov. Type: Cape, Queenstown, summit of Andriesberg, *Galpin 2272* (K, holo.; PRE!).

*O. pretoriense* Bak. in Bull. Herb. Boissier 2, 1: 855 (1901); Leighton in J. S. Afr. Bot. 11: 167 (1945). Type: Transvaal, Pretoria, Apies River, *Rehmann 4308* (Z, holo.!; PRE, photo).

*O. umgenense* Bak. in Bull. Herb. Boissier 2, 1: 856 (1901). Type: Natal, Umgeni, *Rehmann 8553* (Z, holo.!; PRE, photo).

*O. otavense* Krause in Bot. Jb. 48: 358 (1912). Type: S.W.A. near Otavi, *Dinter 760* (B, holo., prob. destroyed).

*O. longivaginatatum* N.E. Br. in Kew Bull. 1921: 300 (1921). Type: Transvaal, Palala River, *Breyer* in herb. *Rogers 24011* (K, holo.!; PRE, photo).

This more mesophytic subspecies has the bulb near the surface and does not form a neck. Its leaves are wider. It is common and widespread in the summer-rainfall region, usually growing in grassveld. It is an inconspicuous species and very variable, some plants producing long many-flowered, subspicate racemes, while others tend to form fewer-flowered, somewhat lax subcorymbose racemes but most collections fall in between these two extremes. There is variation in the number of chromosomes which may account for the differences.

The species appears to have been in cultivation in the botanical gardens of Paris, Vienna, Kew and Berlin early in the nineteenth century for it is figured in Curtis' Botanical Magazine in 1807 (t. 972 as "*O. juncifolium*") and by Redouté and Jacquin in 1811. For literature on cytology, see p. 330.

S.W.A.—1720 (Sambio): 8 km E. of Masari Exp. Farm on the Okavango River (—CD), *De Winter 4112*, 2118 (Steinhausen); farm Sturmveld, *GO 252* (—DB), *Tölken 187*.

TRANSVAAL.—2329 (Pietersburg): Sand River near Mara (—AB), *Schlieben & Strey 8286*, 2330 (Tzaneen): Westfalia Estate, Tzaneen (—CA), *Scheepers 815*, 2430 (Pilgrims Rest): Ohrigstad Nature Reserve (—DC), *Jacobsen 1472*, 2528 (Pretoria): Meintjes Kop (—CA), *Dyer 2517*, 2530 (Lydenburg): Machadodorp (—CB), *Galpin 13012*, 2629 (Bethal): Nooitgedacht Exp. Station near Ermelo (D—B), *Henrici 1499*, 2726 (Odendaalsrus): Las Vadas, Maquassi (—AC), *Morris & Boucher 421*.

SWAZILAND.—2631 (Mbabane): Forbes Reef Road (—AA), *Compton 30264*, 29550, 26899.

O.F.S.—2829 (Harrismith): Harrismith Botanic Garden (—AC), *Van der Zeyde sub NBG 94036*, 2926 (Bloemfontein): O.F.S. Botanic Garden (—AA), *Kriegl sub NBG 100526*.

NATAL.—2730 (Vryheid): Donkerhoek (—AD), *Devenish 965*, 2731 (Louwsburg): Ingwavuma (—BB), *Strey 4738*, 2732 (Ubombo): Mpangazi (—DA), *Strey 5144*, 2829 (Harrismith): Cathedral Peak Forest Research Station (—CC), *Killick 1560*, 2930 (Pietermaritzburg): Balgowan (—AC), *Bond 1295*, 2931 (Stanger): Durban, Berea (—CC), *Wood 1012*, 3030 (Port Shepstone): Isipingo (—BB), *Ward 598*.

LESOTHO.—2927 (Maseru): Mamathes (—BB), *Jacot Guillarmod 1407*; Likhoele (—CD), *Dieterlen 420b*.

CAPE.—2724 (Taung): Armoedsvlakte Experimental Station (—AB), *Foley sub PRE 2780*, 2824 (Kimberley): Kimberley (—DB), *Acoccks 1511*, 3025 (Colesberg): Plewman Siding (—CA), *Acoccks 16308*, 3126 (Queenstown): Jamestown Koppie (—BB), *Barker 2437*, 3227 (Stutterheim): Hogsback (—CA), *Barker 1915*, 3326 (Grahamstown): Committee's Drift (—BB), *Taylor 4983*, 3424 (Humansdorp): near Humansdorp (—BB), *Fourcade 5989*.

(b) subsp. *aridum* Oberm. subsp. nov., a subsp. *tenuifolium* tunicis in collum elongatum productum et foliis angustioribus multioribus differt.

Type: Cape, near Kimberley (2824DB), *Acoccks & Hafström, H 1014* (PRE, holo.!).

*O. setifolium* sensu Leighton in J. S. Afr. Bot. 11: 173 (1945); non Kunth.

This subspecies has many filiform leaves and a deep-seated bulb; the old membranous leafbases form a neck up to 80 mm long and 15 mm broad and show characteristic transverse ridges. They protect the young shoots in summer from the extremely hot and arid conditions prevailing around Kimberley and neighbouring regions. *Chromosomes*:  $2n=8$ .

S.W.A.—2417 (Mariental): Voigtgrund (—CD), *Pearson 9360*.

TRANSVAAL.—2726 (Odendaalsrus): Greylingrus, Maquassi (—AC), *Morris & Engelbrecht 1145*.

O.F.S.—2925 (Jagersfontein): Fauresmith (—CB), *Henrici 4245*.

CAPE.—2824 (Kimberley): near Gong-Gong (—AD), *Acoccks in herb. Hafström 845*; Warrenton (—BB), *Adams 213*; Nooitgedacht (—DA), *Leistner 2941*, 2922 (Prieska): Prieska (—DA), *Bryant 881 3024* (De Aar): Petrusville (—BA), *Botha in herb. Marloth 9489*; 42 km S.W. of Colesberg (—DD), *Acoccks 16312*, 3026 (Aliwal North): 16 km beyond Bethulie on road to Aliwal North (—AC), *Wenger 299*, 3123 (Victoria West): Biesjespoort (—CA), *Broom in herb. Marloth 6337*, 3224 (Graaff-Reinet): S.W. of Aberdeen (—AC), *Barker 7122*.

Leighton in her revision placed these collections under *O. setifolium* Kunth but after examining the type (G), it was seen that Kunth's name was a synonym of *O. juncifolium* Jacq. This latter species has smaller more delicate flowers, smaller membranous deltoid-auriculate bracts and minute seeds.

The following collections from the Transvaal Highveld are very close to subspecies *aridum* but are much smaller in size and do not produce a distinct neck. They appear to be paedogenic forms not yet deeply embedded in the soil.

TRANSVAAL.—2528 (Pretoria): Rust de Winter, sandy loam flats (—AB), *Codd 6226*, 2627 (Potchefstroom): Vereeniging (—DB), *Leslie sub TRV 6402*, 2628 (Johannesburg): Brakpan (—AB), *Murray 405*; 48 km S.S.E. Kalkspruit flats (—DA), *Acoccks 20827*.

41. *Ornithogalum longibracteatum* Jacq., Hort. Vind. 3, t. 29 (1776); Red., Lil. 2, t. 120 (1805); Lodd., Bot. Cab. 18, t. 1789 (1831); Bak. in Fl. Cap. 6: 514 (1897). Type: t. 29 in Hort. Vind.; a cultivated plant originally from the Cape.

*O. caudatum* Ait., Hort. Kew. 1: 442 (1789); Jacq. Coll. 2: 315 (1789); Ic. 2: 19, t. 423 (1792); Ker-Gawl. in Curtis's bot. Mag. 21, t. 805 (1805); Bak. in Saund., Ref. Bot. 4, t. 262 (1871); Bak. in Fl. Cap. 6: 515 (1897); Leighton in J. S. Afr. Bot. 11: 166 (1945) attributed to Jacquin. *Urophyllon caudatum* ("Jacq.") Salisb., Gen. Pl. Fragm. 35 (1866). *O. massonii* Gmelin, Syst. 1: 551 (1791), as *malsonii*. Type: Cult. Hort. Kew, ex C.B.S., *Masson s.n.* (BM, holo.).

*O. bracteatum* Thunb., Prodr. 62 (1794). Type: Cape, *Thunberg 8277* (UPS, identified as *O. caudatum*).

*O. scilloides* Jacq., Hort. Schoenbr. 1: 46, t. 88 (1797); Bak. in Fl. Cap. 6: 514 (1897). Type: t. 88 in Hort. Schoenbr. 1; a cultivated plant originally from the Cape.

*Urginea mouretii* Batt. & Trab. in Bull. Soc. bot. Fr. (1921) 68: 437–440 (1922). Type: Morocco, *Mouret*.

*Xosa name*: Masxabana.

*Literature*.—1971. Samson, M. A. H. & Karstens, W. K. H. in Acta bot. neerl. 20: 600. Bulbs and bulbils of *O. caudatum* Ait.

Large plants up to 1–1.5 m tall. *Bulbs* up to 80 mm in diam., often loosely placed near the surface, becoming green, with succulent tunics and long ramifying roots; strongly bulbiferous. *Leaves* 8–12, rosulate, linear, 0.4–1 m long, 20–50 mm broad, often flaccid, succulent, sheathing basally. *Racemes* 1–3 per bulb, about as long as leaves but elongating at anthesis; peduncle erect; bracts filiform, up to 40 mm long, thin, sprawling, developing and withering early on, much exceeding flowers and buds in length but sometimes suppressed; pedicels 5 mm, up to 15 mm in fruit. *Flowers* small, up to 300 per raceme, closely arranged. *Perianth-segments* narrowly elliptic, c. 9 mm long, with a dark green 3–5 nerved central band and thin white margins. *Stamens* with the filaments narrowly ovate-acuminate or rarely with short lateral extensions. *Ovary* globose, obtuse, trigonous, rarely shortly stipitate; ovules c. 12, biseriate; style short, attenuated into a small stigmatic apex. *Capsule* globose, obtuse, c. 10 mm tall with 3 distinctly grooved angles; seeds variable in shape, 5–7 mm, flattish, rounded or angled, minutely papillate. *Chromosomes*:  $2n=18$ ; 32; 36; 54. FIGS 40 and 41.

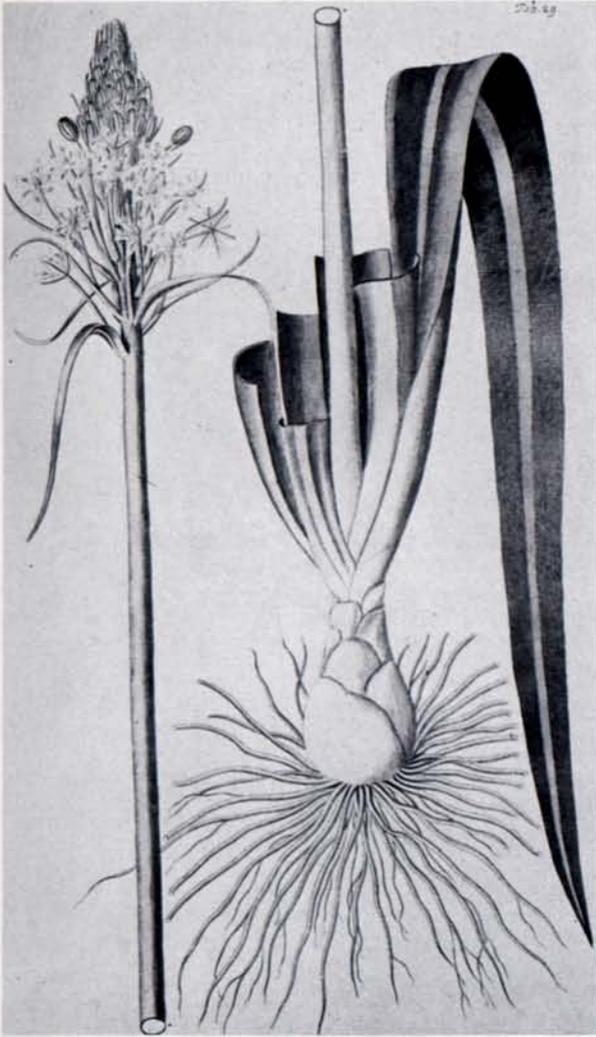


FIG. 40.—*Ornithogalum longibracteatum*; Jacq., Hort. Vind. 3, t. 29 (iconotype).



FIG. 41.—*Ornithogalum longibracteatum* showing formation of bulbils.

Distributed along the south-eastern Cape coastal region to Natal and tropical eastern Africa, preferring warm and moist habitats; gregarious as a result of profuse bulbil proliferation. Flowering intermittently throughout the year.

NATAL.—2730 (Ubombo): 40 km E. of Jozini Dam on road to Sordwana Bay (—AD), *Mauve* 4795. 2832 (Mtubatuba): St. Lucia Lake system (—AD), *Feely & Ward* 39. 2929 (Underberg): Giant's Castle Game Reserve (—AB), *Trauseld* 1022. 2930 (Pietermaritzburg): Pietermaritzburg (—CB), *Barker* 4369. 3030 (Port Shepstone): Gibraltar (—CB), *Strey* 9672.

CAPE.—3227 (Stutterheim): near Komga (—DB), *Flanagan* 1709. 3324 (Steytlerville): Groot River forest (—DA), *Barker* 6039. 3326 (Grahamstown): Zuurburg Pass (—BC), *Archibald* 5198. 3422 (Mossel Bay): Great Brak River (—AA), *Godfrey SVH-1323*; Victoria Bay (—BA), *Compton* 15767.

Tests conducted at the Veterinary Research Institute at Onderstepoort proved it to be non-toxic. Nyala forage on this species according to Pooley (*Pooley* 535, Ndumu Game Reserve; NH).

42. *Ornithogalum pulchrum* Schinz in Verh. bot. Ver. Brandenb. 31: 221 (1890); Oberm. in Bothalia 7: 482 (1961); Merxm. et al., Prodr. Fl. S.W.Afr. 147: 60 (1970). Type: S.W.A., Okasima Ka Namutenya in East Ondongua, *Schinz* 415 (Z, lecto.!; PRE, photo.).

*U. pulchra* (Schinz) Sölch in Mitt. bot. StSamml. Münch. 4: 73 (1961).

*U. longibracteatum* sensu Bak. in Fl. Trop. Afr. 7: 545 (1898), non Jacq.

*Urginea comosa* Welw. ex Bak. in Trans. Linn. Soc. Lond. ser. 2, Bot. 1: 247 (1878). Type: Angola, Mossamedes and Huilla in wooded pastures, *Welwitsch* 3814, 3815 (BM, holo.; PRE, photo.).

*U. dimorphantha* Bak. in Bull. Herb. Boissier, ser. 2, 3: 663 (1903). Type: S.W.A., Ovamboland, Ondongua, *Rautanen* 772 (Z, holo.!; PRE, photo.).

Tall plants up to 1,5 m tall when in flower. *Bulb* ovoid, c. 80 mm in diam., not forming a neck. *Leaves* c. 13, in an erect rosette, folded, linear-acuminate, up to 0,9 m long and 0,06 m broad, base tubular, glaucous, often with dark green speckles below, soft, the apex often drooping. *Inflorescences* 1–2 per bulb, up to 1,5 m, pyramidal at first, elongating during anthesis, the heavy plumose apical part pendulous; peduncle firm, erect, terete; bracts filiform, 40–80 mm long, rarely short, developed before anthesis and protruding far beyond the buds and flowers; pedicels up to 40 mm long, erecto-patent, thin at first, thickening after fertilization. *Flowers* with an unpleasant scent (*Giess*); perianth-segments oblong, c. 13 mm long and 4 mm broad, patent, with a broad green 5–3-nerved midrib and a white or yellow margin. *Stamens* ovate-acuminate, the outer slightly narrower. *Ovary* oblong-globose, 3-lobed, 8 mm long, yellow; ovules c. 12 in each locule; style green, terete, deflexed to one side with an apical small penicillate stigma. *Capsule* broadly cordate in outline, broader than long, deeply 3-lobed, c. 15 mm broad, emarginate; seeds discoid, 8 mm in diam. FIG. 42.

Recorded from northern South West Africa, Botswana, Angola, Rhodesia to tropical eastern Africa, often in rock crevices. It flowers after the rains, February–June, mostly in March.

S.W.A.—1719 (Runtu): Okavango Native Territory, Okavango River at Mupini (—DC), *De Winter & Marais* 4497. 1813 (Ohopoho): Kaoko Otavi (—BC), *De Winter & Leistner* 5573. 1915 (Okaukuejo): farm Ohere-Ost, OM 52 (—CC), *Giess* 3958. 1916 (Gobaub): Etosha Pan Nature Reserve, hill at Halali (—BA), *Giess & Smook* 10578. 1917 (Tsumeb): Tsumeb (—BA), *Nägelsbach* 9. 2115 (Karibib), farm Ameib (—DB), *Giess, Volk & Bleissner* 5923. 2217 (Windhoek): Klein-Windhoek (—CA), *Giess* 7706.

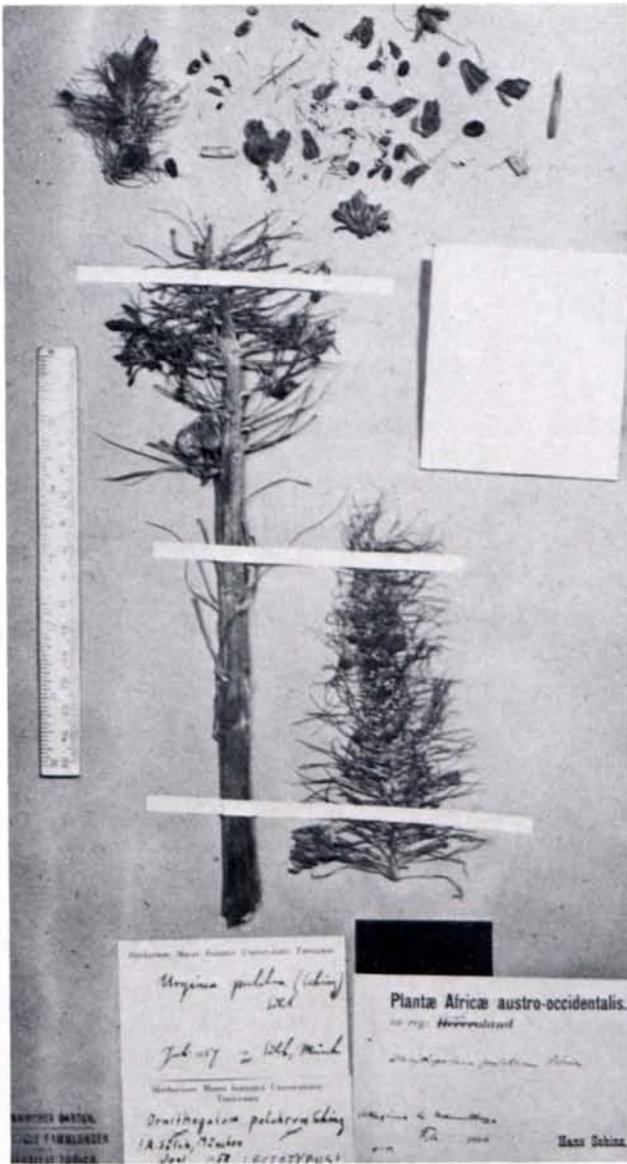


FIG. 42.—*Ornithogalum pulchrum* from northern South West Africa near Ondongua (lectotype: Schinz 415, Z).

The species can be distinguished from *O. longibracteatum* Jacq. by the longer pedicels, the larger, cordate and retuse capsule and larger seeds. The very long bracts suggested the name *Urginea comosa* Welw. ex Bak. but, as there is an *Ornithogalum comosum* L. this epithet was not available.

43. *Ornithogalum prasinum* Lindl. in Bot. Register t. 158 (1816); Bak. in Fl. Cap. 6: 508 (1897); Leighton in Jl. S. Afr. Bot. 11: 173 (1945). Type: Bot. Register t. 158; collected by Burchell near Graaff-Reinet. At Kew there is a specimen without flowers from Hondeblaf River, Burchell bulb 49, which flowered 19.6.1816. It may represent the original from which the plate was made and is considered to be a lectotype.

*O. polyplebium* Bak. in Fl. Cap. 6: 507 (1897). Type: Botswana, Batlapin Country, Holub (K, holo.!; PRE, photo.).

*Albuca gageoides* Krause in Bot. Jb. 51: 446 (1914); Merxm. et al. in Prodr. Fl. S.W.Afr. 147: 58 (1970), tentatively placed under *O. breviscopum* Leighton. Type: S.W.A. Gobabis, Dinter 2785 (B, holo.!; SAM, iso.!).

Plants solitary or gregarious, 0.15–0.3 m tall. Bulb ovoid, c. 50 mm in diam., firm with thin outer tunics. Leaves often hysteranthous, 6–10, erect, linear, canaliculate, up to 300 mm tall and (3) 10–16 mm broad, apex acute, base folded, glaucous, somewhat

succulent, occasionally mottled below. Raceme about as long as fully developed leaves, somewhat pyramidal at first, becoming cylindrical, 15–30 flowered; peduncle erect, firm; bracts linear-acuminate, 15 mm long, membranous, occasionally with a few empty ones below; pedicels spreading, firm, 20 mm. Perianth green or white and green; segments narrowly oblong, c. 8 mm, obtuse, firm. Stamens with ovate-acuminate filaments. Ovary oblong-ovoid; ovules biseriate, 10–16; style erect, shorter than ovary, the stigmatic apex shortly 3-lobed. Capsule obovate in outline, c. 12 mm high, deeply trigonous; seeds ovate with 1–2 ridges, c. 8 mm long, minutely striate. Chromosomes:  $2n=16$ .

South-West Africa, Botswana, Transvaal, Orange Free State and Cape; fairly widespread on dry sandy or alluvial grassy flats, especially plentiful in some over-grazed areas; flowering October–January.

S.W.A.—2616 (Aus): 40 km W. of Aus (–CA), Hardy & De Winter 1291; 48 km S. of Aus (–CD), Hall 1858.

BOTSWANA.—Batlapin Country, Holub.

TRANSVAAL.—2428 (Nylstroom): Mosdene, 6 km E. of Naboomspruit (–DA), Galpin M 367. 2528 (Pretoria): near Makapanstad, 38 km N.W. of Hammanskraal (–AC), Codd 8012; Pienaars River (–AD), Heap sub PRE 36520. 2626 (Klerksdorp): Lichtenburg district (–AA), Codd sub P 2996; Coligny (–AD), Verdoorn sub PRE 36533. 2628 (Johannesburg): Meyer-ton, Momberg sub O.P. 6726. 2725 (Bloemhof): Leeuwfontein 10 km W. of Wolmaransstad (–BB), van Wyk 596.

O.F.S.—2925 (Jagersfontein): Boskop (363) beside road Petrusburg–Boshof (–AB), Muller 1311; Fauresmith Veld Reserve (–CB), Henrici 3574, 4416. 2926 (Bloemfontein): Mosterts Hoek (–CA), Acocks sub PRE 36515.

CAPE.—2721 (Telly Pan): Kuruman River, 26 km W. of Kuruman–Gordonia Boundary, Leistner 2896. 2824 (Kimberley): Rooipoort 50 km W. of Kimberley (–CA), Leistner 1214. 3022 (Carnarvon): Rhenosterkolk, Carnarvon district (–CC), Acocks 1784. 3024 (De Aar): Petrusville (–BA), Botha sub Marloth 9487. 3123 (Victoria West): 25 km W.S.W. of Richmond (–BD), Acocks 16343. 3124 (Hanover): Dwaal Station (–BA), Acocks 16314. 3125 (Steynsburg): Middelburg (–AC), Theron 1183. 3224 (Graaff Reinet): Aberdeen (–CD), Barker 7116

The species is close to *O. seineri*, but is smaller in all respects. The flowers are often green. The early inflorescences often appear before the leaves have developed fully.

The type of *Albuca gageoides* has a number of very narrow leaves, unlike the normal ones. Similar leaves also occur in other species, e.g. in *O. staffii*, *O. tenuifolium*, etc. It seems likely that the first formed leaves were destroyed and that these narrow ones replaced them.

*Toxicity*.—According to feeding tests undertaken at Onderstepoort in October, 1935, the species proved to be poisonous to a sheep; cf. voucher specimen at PRE, collected by J. Heap in the Pretoria district, Rhenosterpoort and cultivated at Prinshof.

44. *Ornithogalum seineri* (Engl. & Kr.) Oberm. in Bothalia 7: 481 (1961); Merxm. et al. in Prodr. Fl. S.W.Afr. 147: 60 (1970). Type: Botswana, Litauani, Seiner II, 98 (B, holo.!; PRE, photo.).

*Bulbine seineri* Engl. & Kr. in Bot. Jb. 45: 124 (1910). *Anthericum seineri* (Engl. & Kr.) V. Poelln. in Feddes Repert. 53: 136 (1944).

*O. filibracteatum* Oberm. in Ann. Transv. Mus. 17: 194 (1937). Type: Transvaal, Kruger National Park, S.W. of Punda Milia, Lang sub TRV 31099 (PRE, holo.!).

*O. wilmaniae* Leighton in Jl. S. Afr. Bot. 11: 168 (1945). Type: S.W.A., Gobabis district, Sandfontien, Wilman sub BOL 15280 (BOL, holo.!).

*Urginea langii* Brem. in Ann. Transv. Mus. 15: 237 (1933). Type: Transvaal, Pietersburg, Brak River, vlei, Bremekamp & Schweickerdt 25 (PRE, holo.!).

Plants up 0.4 m tall, usually gregarious. Bulb ovoid, up to 0.1 m in diam., with firm, dark outer tunics, forming a short neck. Leaves about 7, erect or

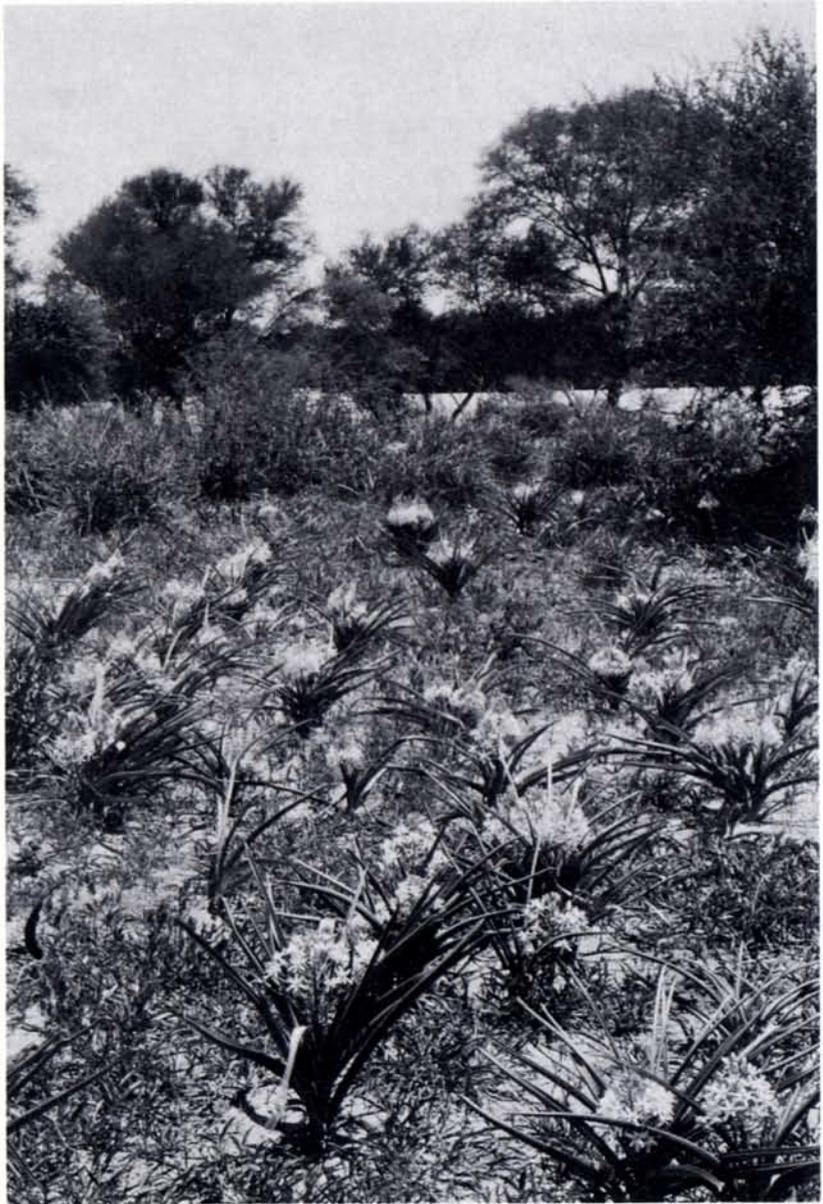


FIG. 43.—*Ornithogalum seineri* from Botswana on the banks of the Sashi River. Photo: H. Lang.

spreading, linear-acuminate, canaliculate, up to 400 mm long, 30 mm broad, mostly smaller, glaucous, dark-speckled below. *Racemes* 1 or 2 from a bulb, subpyramidal, lengthening with age, the uppermost flowers often sterile, surrounded by filiform bracts; peduncle up to 300 mm long; bracts developing early, exerted, filiform 10–20 mm; pedicels spreading, up to 50 mm long. *Flowers* faintly scented, diurnal. *Perianth* with spreading oblong segments, 12–20 mm long, 5 mm broad, white with a broad green keel. *Stamens* with the filaments broadly linear-acuminate; anthers 5 mm long. *Ovary* cylindrical, 3-angled, apically obtuse; ovules c. 12 in each locule; style terete, about as long as ovary; stigma apical, somewhat 3-lobed, papillate. *Capsule* broadly 3-lobed, about 12 mm high and 20 mm broad; seeds discoid, 8–12 mm in diam.

Widely distributed in northern South West Africa, Botswana, Transvaal Bushveld, western Orange Free State and northern Cape, commonly growing socially on sandy overgrazed flats or on red loam. They flower after the first rains usually November–February.

BOTSWANA.—2221 (Okwa): Takatshwane (–DB), *De Winter 7411a*. 2426 (Mochudi): Derdepoort (–CB), *Codd 8875*.

S.W.A.—1920 (Tsumkwe): 13 km E. of Tsumkwe (–DA), *Giess, Watt & Snyman 11079*. 2017 (Waterberg): Waterberg Plateau (–AD), *Boss sub TRV 35126*. 2217 (Windhoek): Farm Brackwater: WIN 48 (–AC), *Giess 10854, 10873*.

TRANSVAAL.—2231 (Pafuri): Kruger National Park, Punda Milia (–CA), *Rowland Jones 26*. 2327 (Ellisras): farm Kromhoek N.W. of Zoutpan (–CC), *Obermeyer, Schweickerdt & Verdoorn 80*; Rietspruit (–DC), *Smuts 358A*. 2328 (Baltimore): Glen Alpine Dam (–BA), *Dahlstrand 1900*. 2330 (Tzaneen): Hans Merensky Nature Reserve (–DA), *Oates 91*. 2331 (Phalaborwa): Kruger National Park, Letaba Bridge (–BC), *Van Wyk 4807*. 2427 (Thabazimbi): near Thabazimbi (–CB), *D'Ewes sub NBG 85511*. 2431 (Acornhoek): Klaserie (–AD), *Zambatis 326*. 2526 (Zeerust): 26 km N. of Mabi's kraal (–BB), *Codd 8849*. 2528 (Pretoria): Rust de Winter (–BA), *Smith sub PRE 36511*, *Pole Evans 3881*, *Codd 3487*. 2531 (Komatiipoort): Matamiri River near Sabie River (–AB), *Van der Schijff 3272*.

O.F.S.—2925 (Jagersfontein): Fauresmith (–CB), *Dyer & Kies 366*.

CAPE.—2622 (Tsabong): 41 km E.N.E. of Vanzylsrus (–CB), *Leistner 2951*. 2722 (Olifantshoek): 16 km W. of Winton (–BC), *Leistner 2093*. 2922 (Prieska): Prieska (–DA), *Bryant 870*. 2924 (Hopetown): Vanderkloof Dam (–DC), *Werger 268*.

The plants are very fertile and can colonize an area in a short time. (An observation made by W. G. Barnard in Sekukuniland). The bracts found on plants from the Transvaal were about 20 mm long, elsewhere about 10 mm.

*Toxicity*.—The species is suspected of being poisonous.

45. *Ornithogalum saundersiae* Bak. in Gdners' Chron. 10: 452 (1891); Fl. Cap. 6: 499 (1897); Leighton in JI S. Afr. Bot. 11: 175 (1945); Oberm. in Flower. Pl. Afr. 41, t. 1619 (1970). Type: exact locality unknown. Transvaal, Swaziland or Zululand; bulbs sent to Kew by Mrs K. Saunders, where they flowered in 1891. (K, holo.!; PRE, photo.).

*O. excelsum* Diels ex Engl. in Veg. der Erde 9: 302, t. 206 (1908) in obs. Type: Transvaal, near Lydenburg, Wilms 1472 (B, holo.!; PRE, photo.).

Plants up to 1,5 m tall, usually gregarious. *Bulb* globose, c. 60 mm in diam. with soft tunics. *Leaves* 6–8, forming an erect rosette, broadly linear, canaliculate, up to 500 mm long, 30–70 mm broad, dark green, soft, shiny. *Raceme* erect, much exserted from leaf rosette, subcorymbose, lengthening with age, many-flowered; peduncle stiff, somewhat woody when dry; bracts broadly linear-acuminate, membranous, 20–45 mm long, soon withering; pedicels erecto-patent, wiry, 30–60 mm long, firm and hard in fruit. *Perianth* spreading, reflexed in fruit; segments ovate, 10–15 mm long, up to 5 mm broad, white to cream, fairly firm. *Stamens* erect, with short deltoid-acuminate filaments 5 mm long, anthers 5 mm, the locules diverging below. *Ovary* oblong, trigonous, c. 6 mm long, dark green to black; ovules biseriate, c. 14; style terete, short, with a small, 3-lobed, minutely papillate apical stigma. *Capsule* ovoid-triangular, with 3 sharp ribs, up to 16 mm long, hard, brown; seed 6–8 mm long, varying in shape through pressure, irregularly 3–4 sided, contracted at the base, smooth. *Chromosomes*:  $2n=14$ . FIG. 44.



FIG. 44.—*Ornithogalum saundersiae* from near Manzini, Swaziland; copy of Flowering Plants of Africa 41, t. 1619 (1970).

Eastern Transvaal, Swaziland to Zululand on rocky outcrops. Flowering January–April. Often referred to as the Transvaal Chinkerichee.

TRANSVAAL.—2529 (Witbank): Tonteldoos (–BB), *Otto* sub PRE 36577, 2530 (Lydenburg): farm Sterkspruit near Lydenburg (–AB), *Galpin* 13594, 2531 (Komatipoort): Rimers Creek, Barberton (–CC), *Galpin* 1205.

SWAZILAND.—2631 (Mbabane): Mbabane (–AC), *Nicholson* sub PRE 22829, 2731 (Louwsburg), Cecil Mack's Pass (–BB), *Leach & Bayliss* 10631.

NATAL.—2632 (Bella Vista): near Gwalaweni forest on E. slopes of Lebombo Mts. (–CC), *Vahrmeijer* 2337, 2732 (Ubombo): Jzini Dam area (–BD), *Strey* 5130, *Wearne* 81, 2832 (Mtubatuba): Hluhluwe Game Reserve (–AA), *Ward* 2085.

The species, being extremely fertile, has increased to an alarming extent in the last 20 years in the eastern Transvaal and Swaziland. Being very poisonous it has caused large cattle losses. As it is an attractive plant, it is occasionally cultivated. The karyotype of this species has the longest chromosomes of all the species of *Ornithogalum* examined by Pienaar. [JI S. Afr. Bot. 29: 119 (1963)].

46. *Ornithogalum xanthochlorum* Bak. in Fl. Cap. 6: 508 (1897), Leighton in JI S. Afr. Bot. 11: 174 (1945). Oberm. in Flower. Pl. Afr. 37, t. 1463 (1966). Type: Cape, Namaqualand, near Steyher's Kraal, Kaus Mtn, *Bolus* 6598 (K, holo.!; PRE, photo.; BOL.!).

Coarse plants up to 0,6 m high. *Bulb* ovoid c. 70 mm in diam., with a small broad caudex and dark outer tunics. *Leaves* 9–14, lorate, 0,2–0,5 m long, flat, somewhat fleshy, spreading or erect, margin smooth. *Inflorescence* up to c. 0,5 m tall, overtopping leaves, with a long, dense, many-flowered, cylindrical raceme; peduncle erect, stout, up to 0,3 m long; bracts linear-acuminate, the lower up to 50 mm long; pedicels arcuate, lengthening and hardening in fruit, up to 30 mm long, forming an obtuse callus above. *Perianth* green, fleshy, sweet-scented; segments narrowly ovate, obtuse, c. 15 mm long. *Stamens* with ovate-acuminate, white filaments 9 mm long; anthers small, 3 mm. *Ovary* oblong-globose, triangular, 8 mm, green; ovules biseriate, c. 20 in each locule; style terete; stigma shortly 3-lobed with papillate margins. *Capsule* broadly globose, 10 mm long and 15 mm wide, tricostate; seeds discoid, c. 6 mm.

Western Cape; from the Richtersveld to near Ceres, on sandy exposed flats. Flowering August–September.

CAPE.—2816 (Oranjemund): Richtersveld, Kuboos (–BD) *Lavranos* 10842, 2817 (Vioolsdrif): Lekkersing (–CC), *Marloth* 12284, 2818 (Warmbad): near Henkries, between Steinkopf and the Orange River (–CC), *Phillips* 1632, 2917 (Springbok): Okiep (–DB), *Kitto* sub *Marloth* 6586; Komaggas (–DC), *Barker* 6733, 3017 (Hondeklip Bay): near Soebatsfontein (–BA), *Lewis* 1422; Kamieskroon (–BB), *Thorne* sub *SAM* 48848, 3018 (Kamiesberg) near Garies (–CA), *Gill* sub *SAM* 54334, *Hardy* 550, 3019 (Loeriesfontein): Jakhalsput (–AC), *Hall* sub *NBG* 766]53, 3119 (Calvinia): Koringhuis turn-off on Loeriesfontein road N.E. of Nieuwoudtville (–AB), *Barker* 9488, 3219 (Wupper-tal): Elands Vlei, lower Tanqua (–BC), *Marloth* 10465; Nuwerus (–CB), *Barker* 3725, 3220 (Sutherland): Gansfontein (–DA), *Compton* 5991, 3319 (Worcester): Karooport (–BC), *Hafström & Acocks* 231.

The species forms a link with the subgenus *Osmyne*.

III. Subgenus *Osmyne* (*Salisb.*) Bak. in J. Linn. Soc. (Bot.) 13: 278 (1873).

*Osmyne* Salisb., Gen. Pl. 35, 40 (1866).

*Monotassa* Salisb. l. c. 36, 41.

*Taeniola* Salisb. l. c. 35, 40.

*Perianth*-segments narrowly elliptic, white or yellow with a broad dark or green striate central band. *Stamens* with the filaments subulate or inner expanded below. *Ovary* with the ovules biseriate, many; style longer than ovary and exserted above stamens, deflexed at anthesis; stigma globose, with stipitate glands. *Capsule* ovoid to oblong-globose, obtuse, thinly coriaceous, the perianth shrivelled, not hiding capsule. *Seeds* semi-discoid with one side more or less straight, forming a thickened ridge,

c. 4 mm in diam. (where known). South-western Cape to southern South West Africa; winter rainfall region. Type species: *O. secundum* Jacq. (species 47-54).

47. *Ornithogalum suaveolens* Jacq., Ic. Pl. Rar. 2: 19, t. 431 (1788 or early 1789); Coll. 2: 316 (1789); Bak. in Fl. Cap. 6: 507 (1897); Leighton in JI S. Afr. Bot. 10: 112 (1944); Dyer in Flower. Pl. Afr. 26, t. 1030 (1947); Merxm. et al., Fl. S.W.Afr. 147: 61 (1970); Mason, W. Cape Sandv. Flowers t. 6, 3 (1972). Type t. 431 in Jacq., Ic. Pl. Rar.

*O. barbatum* Jacq., Hort. Schoenbr. 1: 47, t. 91 (1797); Bak. in Fl. Cap. 6: 506 (1897). Type: Cape, Hort. Schoenbr. 1, t. 91.

*Anthericum albucoides* Ait., Hort. Kew. 1: 449 (1789, Oct.). *Phalangium albucoides* (Ait.) Poir. in Lam., Encycl. 5: 249 1804. *O. albucoides* (Ait.) Thunb., Fl. Cap. ed. Schultes 314 (1823). Type: Cape of Good Hope, Masson.

*Albica vittata* Ker-Gawl. in Curtis's bot. Mag. 33, t. 1329 (1811). *O. vittatum* (Ker-Gawl.) Kunth, Enum. 4: 367 (1843). *Taeniola vittata* (Ker-Gawl.) Salisb., Gen. Pl. Fragm. 35 (1866). Type: Cultivated plant of unknown origin.

*O. pentheri* Zahlbr. in Ann. Hofm. Wien 15: 23 (1900). Type: Cape, Olifants River, *Penther* 543 (W.†).

*O. roodeae* Phill. in Flower. Pl. Afr. 2, 6, 75 (1922). Type: Cape, Vanrhynsdorp, *Rood* s.n. (PRE, holo.!).

*O. pearsonii* Leighton in JI S. Afr. Bot. 10: 112 (1944). Type: S.W.A., Great Karasberg, Naruda Süd, *Pearson* 8225 (BOL, holo.!).

*O. muirii* Leighton in JI S. Afr. Bot. 10: 115 (1944). Type: Cape, Laingsburg, Whitehill ridge, *Leighton* 234 (BOL, holo.!).

*O. breviscapum* Leighton in JI S. Afr. Bot. 11: 167 (1945); Merxm. et al., Prodr. Fl. S.W.Afr. 147: 58 (1970). Type: S.W.A., district Warmbad, between Modderdrift and Sjambok River, *Pillans* 6461 (BOL, holo.!).

Plants 0,1-0,5 m tall, glabrous or sometimes somewhat minutely glandular-scabrid. *Bulb* small, globose, c. 20 mm in diam., tunics thin, rough. *Leaves* 2-5 (7), sub-opposite, synanthous or absent at anthesis, linear-acuminate, 100-400 mm long, 20-30 mm wide, canalliculate, finely striate, clasping basally, dying down from the tip downwards; young plants bearing a subterete lamina which coils up when dying back. *Raceme* many- to few-flowered, exerted from leaves; peduncle firm, curved where emerging from sheathing leaf-bases; bracts auriculate-aristate, straggling and withering early; pedicels erecto-patent, up to 30 mm and firm in fruit. *Perianth-segments* linear-oblong, 12-20 mm long, obtuse, with a broad firm green (fading to reddish brown) central striate band and thin yellow (fading to white) sides. *Stamens* with the filaments subulate or the inner with obtuse to pointed expansions below. *Ovary* oblong-ovoid, green with numerous biseriolate ovules; style and stigma typical for the subgenus. *Capsule* ovoid, trigonous, 10-20 mm, obtuse; seeds semi-discooid, 3-4 mm, minutely papillate; epidermal cells ( $\times 1250$ ) resemble interlocking pieces of a jig-saw puzzle. FIGS 2.3; 4.8a, b; 45.

Frequently collected in the western Cape, as far as southern South West Africa but apparently rare in the south-eastern Cape, on gravelly slopes or sandy flats. Flowering September-November.

S.W.A.—2616 (Aus): N. of Aus on quartzite ridges (-CB), *Giess* 12826; 8 km S. of Aus, *Giess & van Vuuren* 799. 2716 (Witpütz): Farm Namuskluft: LU 88 (-DD), *Giess* 12918. 2816 (Oranjemund): Diamond area I (-BA), *Giess* 13016. 2817 (Vioolsdrif): Kuboos (-AC), *Marloth* 12346. 2917 (Springbok): Klipfontein near Steinkopf (-BD), *Marloth* 12479. 3017 (Hondeklip bay): 32 km N.N.W. of Garies (-BD), *Acocks* 19521. 3018 (Kamiesberg): Garies Hills (-CA), *Barker* 3648. 3118 (Vanrhynsdorp): Knersvlakte (-BC), *Barker* 4044; Nardouw Kloof (-DC), *Lewis* 2618. 3119 (Calvinia): Klipkoppies near Nieuwoudtville (-AC), *Barker* 9534. 3217 (Vredenburg): Stompneus (-DB), *Hall* 755. 3218 (Clanwilliam): Clanwilliam (-BB), *Leipoldt* 545. 3318 (Cape Town): Darling Reserve (AD-), *Thompson* 78; Lions Head (-CD), *Compton* 15360. 3319 (Worcester): near Tulbagh Kloof (-AC), *Davis* sub SAM 64700.

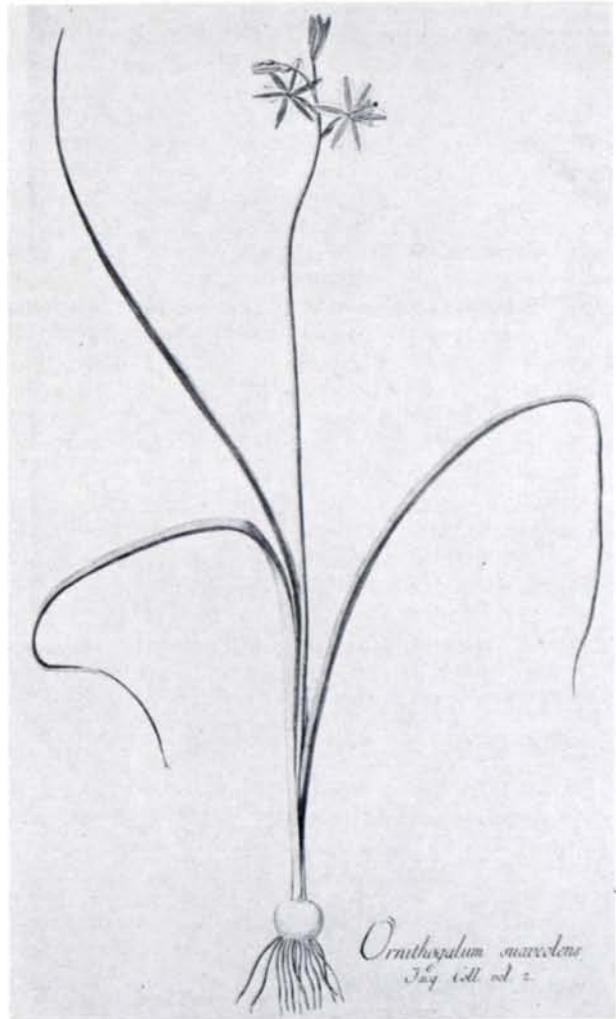


FIG. 45.—*Ornithogalum suaveolens*; Jacq., Ic. Pl. Rar. 2, t. 431 (iconotype).

3325 (Port Elizabeth): Loerie plantation (-CC), *Dix* sub NBG 2769/31. 3419 (Caledon): Happy Valley Farm (-AB), *Barker* 10837. 3421 (Riversdale): Melkhoutfontein (-AD), *Muir* 5395.

The species is treated here as variable. Specimens referred to *Albica vittata* Gawl. and *O. muirii* Leighton possess inner filaments which have quadrate to winged basal expansions, but this character varies from a slight bulge to being more pronounced; by itself it cannot be considered a specific distinction.

*O. pentheri* Zahlbr., which is described as possessing two leaves and glandular pubescent, has been placed here under this species, for other collections from the same area also show the same glandular pubescence to a varying degree. The more northern species *O. glandulosum* is also glandular-pubescent, but it produces a rosette with many leaves. This will need further investigation.

48. *Ornithogalum secundum* Jacq., Ic. Pl. Rar. 2: 20, t. 433 (1795); Coll. 5: 79 (1797); Bak. in Fl. Cap. 6: 506 (1897); Leighton in JI S. Afr. Bot. 10: 117 (1944); Oberm. in Flower. Pl. Afr. 37, t. 1464 (1966). Type: t. 433 in Jacq., Ic. Pl. Rar.

*O. odoratum* Jacq., Ic. Pl. Rar. 2: 20, t. 432 (1795); Coll. 5: 78 (1797); Andr., Bot. Rep. t. 260 (1802). Type: Cape, Ic. t. 433. *Monotassa secunda* (Jacq.) Salisb., Gen. Pl. Fragm. 37 (1866). *Osmyne odorata* (Jacq.) Salisb., Gen. Pl. Fragm. 35 (1866).

*Urginea* (?) *secunda* (Jacq.) Bak. in J. Linn. Soc. (Bot.) 13: 222 (1873).

*Ornithogalum secundum* Jacq. var. *latifolium* Bol. in S. Afr. Gdng Ctry Life 24: 50 (1950). Type: Cape, Clanwilliam, *L. Bolus* sub BOL 20097.

Plants about 0,35 m tall, often with a reddish colouring. *Bulb* globose, 30–60 mm in diam., with tough, dark outer tunics. *Leaves* developed early in winter, withered or absent at anthesis, forming a rosette of c. 10 suberect or spreading, broadly linear leaves, 50–150 mm long, olive green, margin hyaline, fimbriate or rarely entire (e.g. in cultivation). *Raceme* erect, up to 0,35–0,5 m tall, many-flowered; peduncle firm, erect; bracts linear-acuminate, membranous; pedicels spreading, wiry, straight, up to 50 mm in fruit. *Perianth-segments* spreading to recurved, yellow with a broad green 3–5 nerved midrib, oblong, about 12–15 mm long. *Stamens* with subulate greenish filaments. *Ovary* narrowly ovoid, ovules sub-uniseriate, numerous; style and stigma typical for the subgenus. *Capsule* ovoid, apiculate, c. 12 mm in diam., chartaceous; seeds sub-discoid c. 4 mm in diam.

Recorded from the western Cape; flowering August–November.

CAPE.—2917 (Springbok): Eenriet, near Steinkopf (–BB), *Hall 4185*; about 15 km S. of Steinkopf (–BC), *Hiemstra 475*; Nigramoep (–DA), *Wikner sub SAM 65731*; N. of Springbok on road to Steinkopf (–DB), *Mauve 4183*; near Springbok (–DB), *Lewis 771. 3118* (Vanhynsdorp): Vredendal farm Liebendal (–CB), *Hall 4455*; Klawer (–DC), *Marloth 12549. 3219* (Wupper-tal): Klipfonteinrand (–AA), *Compton 19988. 3318* (Cape Town): Vredenburg (–DC), *Leighton sub NBG 275/44. 3320* (Montagu): Hillandale (–BA), *Marloth 9840*; Whitehill Karoo (–BA), *Compton 16299*.

*O. odoratum* Jacq., was described as having a leaf with a smooth margin, whereas in *O. secundum* it is hyaline and fimbriate. The smooth margin may be due to cultivation.

49. *Ornithogalum apertum* (Verdoorn) Oberm., comb. nov.

*Albica aperta* Verdoorn in *Flower. Pl. Afr.* 33: t. 1314 (1959); Merxm. et al., *Prodr. Fl. S.W.A.* fr. 147: 7 (1970). Type: Cape, Calvinia district, Akkerendam, *Acocks 17753* (PRE, holo.!).

*A. pruinosa* Dinter in *Feddes Repert.* (Beih.) 53: 74 (1928) nom. subnud.

Plants 0,05–0,2 m tall, becoming elongated in cultivation. *Bulb* globose, 20–40 mm in diam., wide at the apex, with loose tunics, brownish, inner white membranous, soft, mucilaginous. *Leaves* 10–20, narrowly linear, very variable in size, (30) 50–70 (200) mm long, spirally coiled like a corkscrew, arranged in a loose cluster at ground level, synanthous, glaucous. *Raceme* projected above the leaves, 100–200 mm long, 8–14-flowered: peduncle fairly short; bracts ovate-acuminate, longer than the pedicels, which are c. 10 mm long. *Perianth-segments* linear, c. 10 mm long, spreading to reflexed, yellow with a broad central dark green band. *Stamens* with green subulate filaments. *Ovary* oblong-globose, 4 mm; style and stigma typical for subgenus. *Capsule* oblong-globose, c. 20 mm; seeds 4 mm, semi-discoid with a straight ridge on one side, minutely papillate. FIG. 47.

Recorded from southern South West Africa and the western Cape, on stony loam or sand flats or on old lands; flowering August–September.

S.W.A.—2818 (Warmbad): Vahldorn, *Dinter 5188*.

CAPE.—3119 (Calvinia): Calvinia (–BD), *Marloth 10245. 10248. Maguire 1987. Schmidt 284*; Kareeboomfontein W. of Rebnic (–DB), *Hanekom 2402. 3220* (Sutherland): Houthoek (–CA), *Hanekom 1571. 3320* (Montagu): Bloutoring (–AD), *Mauve & I. Oliver sub G.19654b*; Whitehill Karoo Garden (–BA), *Compton 3538. 17387*.

Typical of this species are the tightly, spirally coiled, flat leaves and their loose arrangement on the flat broad apex of the bulb. The leaves of *O. polyphyllum* also curl up when withering, but these irregularly rounded coils differ from the regular corkscrew pattern of *O. apertum*.

50. *Ornithogalum polyphyllum* Jacq.,  *Ic. Pl. Rar.* 2: 19, t. 430 (1795);  *Coll.* 5: 79 (1797);  *Leighton in Jl S. Afr. Bot.* 10: 116 (1944). Type: t. 430 in Jacq.,  *Ic. Pl. Rar.*

*O. consanguineum* Kunth,  *Enum.* 4: 368 (1843). Type: Cape,  *Mund & Maire* (B, prob. destroyed).

*O. tuberosum* sensu Bak. in  *Fl. Cap.* 6: 506 (1897), non Mill.  
*O. odoratissimum* C.A. Smith in  *Flower Pl. Afr.* 5: t. 194 (1925). Type: Cape, Vanrhynsdorp,  *Rood* sub PRE 2941 (PRE, holo.!).

Plants 0,25–0,6 m tall. *Bulb* ovoid, 30–50 mm in diam. with dark rough tunics usually forming a short broad neck, with much frayed thin leaf-bases above. *Leaves* numerous, erect, not sheathing below, in a close bundle with the 1–2 racemes in their midst, terete to narrowly linear, usually about 0,25 m long, canaliculate, broader and flat basally, synanthous but starting to wither from the tip downwards and then forming a loose spiral coil. *Raceme* many-flowered, lengthening with age, usually exerted but in young plants about as long as the leaves; peduncle erect, firm; bracts auriculate-aristate; pedicels erectopate, up to 20 mm in fruit. *Flowers* scented like  *Freesia*. *Perianth-segments* oblong, c. 12 mm long, white with a narrow green or brown 3–5 ribbed band. *Stamens* with the filaments slightly widened at the base, occasionally scabrid. *Ovary* narrowly oblong-ovoid, 6 mm; ovules biseriate c. 50 in each locule; style and stigma typical for subgenus. *Capsule* oblong-globose, c. 20 mm long, trigonous; seeds semi-discoid, 4 mm, minutely papillate. FIGS 48 and 49.

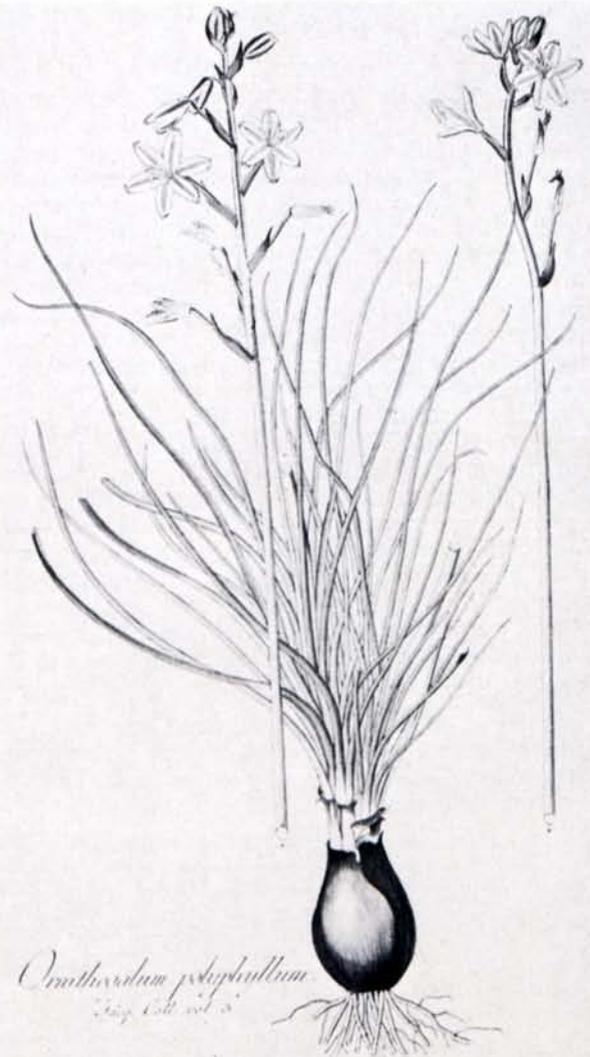


FIG. 48.—*Ornithogalum polyphyllum*; Jacq.,  *Ic. Pl. Rar.* 2, t. 430 (iconotype).

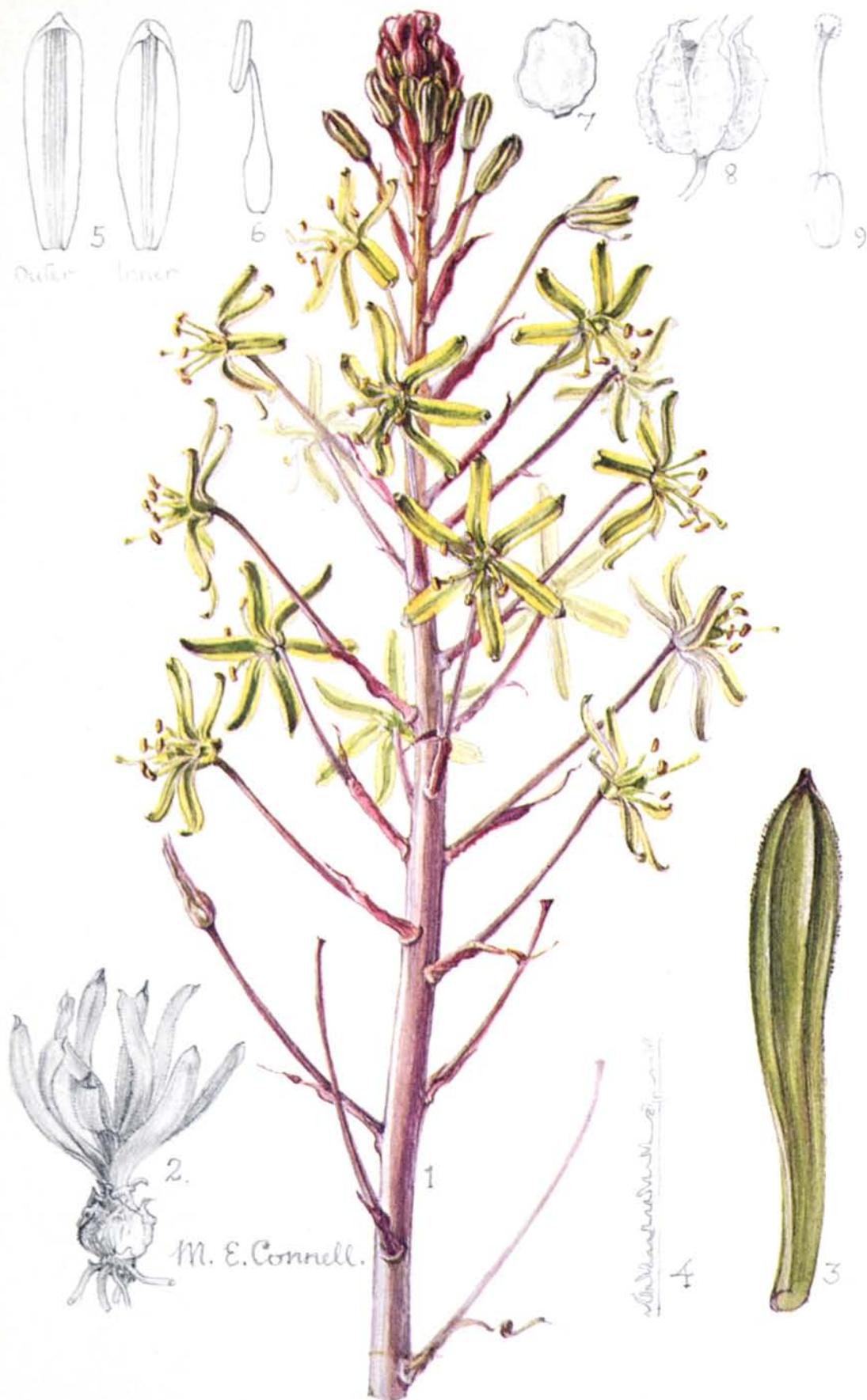


FIG. 46.—*Ornithogalum secundum* from Namaqualand, Mauve 4183; from *Flowering Plants of Africa*, 37, t. 1464 (1966).





FIG. 47.—*Ornithogalum apertum*; from Flowering Plants of Africa 33, t. 1314. (holotype: Calvinia district, Acocks 17753, PRE).





FIG. 49.—*Ornithogalum polyphyllum*; flower enlarged; from south-western Cape near Kamiesberg, E. & I. Oliver 5942, ex hort. PRE.

Western Cape, Namaqualand to Clanwilliam, where it appears to be common; flowering August–September.

CAPE.—2917 (Springbok): Spektakel (–DA), Compton 11461; 21 km S. of Springbok and 3 km W. on Koringhuis road (–DB), Hall 4150; Mesklip (–DD), Barker 3680, Lewis 1423a. 3017 (Hondeklipbaai): Kanariesfontein (–BA), Acocks 19399; Grootvlei (–BB), Barker 3745. 3018 (Kamiesberg): Kamiesberg area (–AC), Marloth 12481; Garies (–CA), Barker 1920, 7405. 3118 (Vanrhynsdorp): between Vanrhynsdorp and Vanrhyns Pass (–DB), Lewis 3327, 3328, Barker 6440. 3119 (Calvinia): near Blaauwkrans, 56 km N.W. of Calvinia on Loeriesfontein road (–AB), Lewis 2565. 3218 (Clanwilliam): Bosch Kloof (–BB), Bond 535. 3219 (Wuppertal): Brandewyn River, E. side of Pakhuis Pass (–AA), Lewis 3326; Bidou River valley (–AB), Lewis 2570.

The flowers in typical specimens are white and green, but in a few cases collectors noted that they were yellow and green. It is not always easy to distinguish between young narrow-leaved *O. suaveolens* plants and few-leaved, not so well developed plants of *O. polyphyllum*, but in the former the leaf-bases are folded, whereas in the latter they are flat.

51. *Ornithogalum glandulosum* Oberm. sp., nov. *O. polyphylo* Jacq. affinis, sed planta minora tenua et glanduloso-stipitata differt.

Planta ad 0,18 m alta tenuis glanduloso-stipitata. *Bulbus* ovoideus 20 mm diam. tunicis membranaceis albis. *Folia* plura anguste linearia ad 140 mm longa complanata margine et costa glanduloso-stipitata. *Racemus* c. 180 mm 6–10 florus. *Perianthii-segmentis* flavis, viridi-costatis. *Staminum filamenta* subulata. *Gynoecium* typicum pro subgenere. *Capsula* non vidi.

Type: South West Africa, 2716 (Witpütz), N. of Rosh Pinah (–DD), Giess 12870 (WIND, holo.; PRE, photo.).

Plants up to about 0,18 m tall, slender, shortly glandular-pubescent. *Bulb* ovoid, c. 20 mm in diam. with membranous white tunics, the outer leathery and brown. *Leaves* rosulate, c. 10, narrowly linear, up to about 140 mm long, 1 mm broad, involute, the margins and ribs closely beset with minute stipitate glands; withering at anthesis from the filiform apical half downwards in irregular coils, soft, glaucous-green. *Raceme* up to about 180 mm, and about 6–15-flowered; peduncle firm, c. 60 mm long; bracts ovate-aristate, shorter than pedicels; pedicels erectopatent c. 15 mm long, membranous. *Perianth-segments* spreading to reflexed, yellow with a broad green 3–5-ribbed central band, narrowly oblong, 10 mm long. *Stamens* with subulate, green filaments. *Ovary* narrowly oblong, 6 mm, many-ovulate; style and stigma typical for the subgenus. *Capsule* and seeds (immature) typical for the subgenus. FIG. 50.

A rare species collected recently in southern South West Africa and once (in 1925) by Marloth in the Richtersveld, north-western Cape; flowering September.

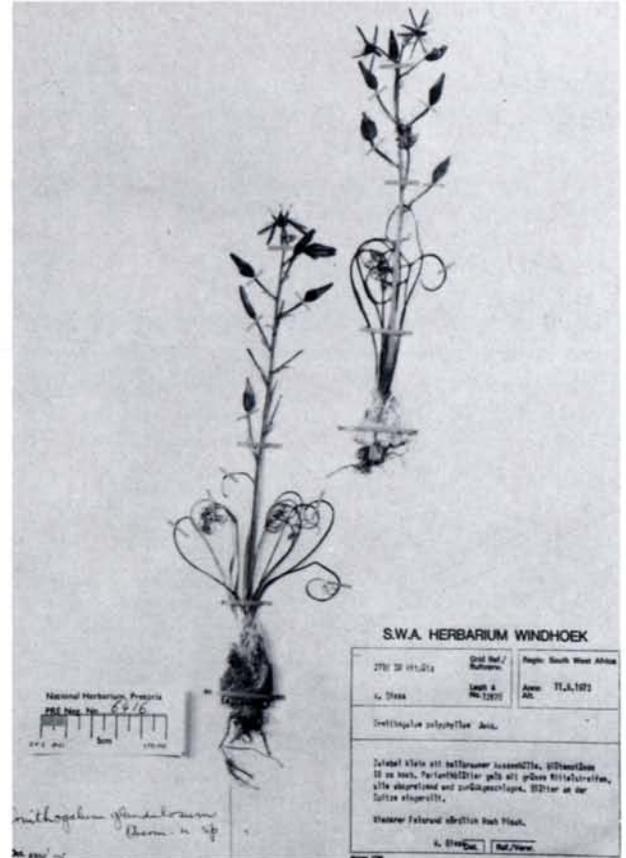


FIG. 50.—*Ornithogalum glandulosum* from southern South West Africa, (holotype: S.W.A.—2716 (Witpütz): N. of Rosh Pina, Giess 12870).

S.W.A.—2616 (Aus): Garub W. of Aus (–CA), Merxmüller & Giess 3034. 2716 (Witpütz): farm Spitzkop, LU 111 (–DC), Giess 14655; N. of Rosh Pinah (–DD), Giess 12870; farm Zebrafontein, LU 87 (–DD), Giess 12886.

CAPE.—2817 (Vioolsdrif): Richtersveld, Taaibosvlei, Marloth 12411.

52. *Ornithogalum zebrinum* (Bak.) Oberm., comb. nov.

*Albica zebrina* Bak. in Rec. Albany Mus. 1: 92 (1904). Type: Cape Namaqualand, Goechas, Schlechter 11371 (GRA, holo., PRE!).

Plants up to 0,24 m. *Bulb* globose, c. 20 mm in diam., with dark tunics. *Leaf* 1, terete, c. 0,14 m long, withering from the apex downwards into a loose coil;

enveloped at the base by membranous sheaths distinctly banded with raised dark horizontal stripes. *Raceme* up to 0,2 m, up to 10-flowered; peduncle surrounded at the base by a sheath similar to that of the leaf; bracts narrowly ovate-acuminate, 10 mm; pedicels thin, up to 10 mm. *Perianth-segments* linear, 8 mm, yellow with a green striate midrib. *Stamens* subulate, minutely scabrid. *Ovary* oblong, 4 mm, angled, many-ovuled; style and stigma typical for subgenus *Osmyne*. *Capsule* not seen. FIG. 51.

A rare species from Namaqualand, seldom collected; flowering September.

CAPE.—2917 (Springbok): 32 km N. of Springbok (—BD), *Mauve 4181*; 4 km N. of Springbok (—BD), *Lewis 2333*. Namaqualand without precise locality, *Meyer sub STU 9130*.

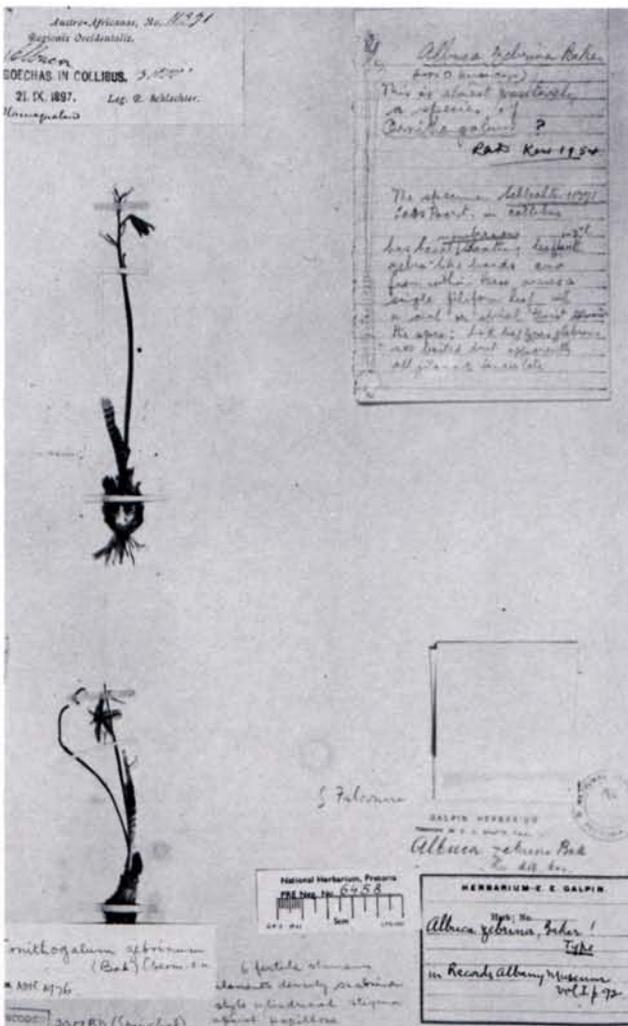


FIG. 51.—*Ornithogalum zebrinum* from Namaqualand (holotype: *Schlechter 11371 GRA*).

*Ornithogalum monophyllum* and *O. anguinum* also develop a striped leaf-sheath and one leaf, but the flowers are different, small and white. They belong to the subgenus *Aspasia*.

53. *Ornithogalum unifoliatum* (Rowley) Oberm., comb. nov.

*Albuca unifoliata* Rowley in *Ashingtonia* 2: 55 (1975). Type: Cape, Namaqualand near Steinkopf, Eenriet, *Hall & Rowley* sub GR 329 (K, holo.).

Small plants with globose yellowish bulbs about 20 mm in diam. *Leaf* 1, protheranthous, absent at anthesis, clavate, c. 40 mm long, 10 mm diam. succulent, smooth. *Raceme* 5–9-flowered, up to 120 mm long; peduncle c. 50 mm long; bracts triangular-acuminate, 10 mm long, with membranous margins;

pedicels erecto-patent, 10 mm. *Flowers* typical for the subgenus; perianth-segments narrowly oblong, 15 mm long, yellow, green-keeled. *Capsule* (not described and not seen); seeds flat, semicircular, angled, 1,7 mm by 0,8 mm, with a uniformly pustulate black glossy surface (fide *Rowley*). FIGS 52 and 53.



FIG. 52.—*Ornithogalum unifoliatum* from Eenriet, Namaqualand, *Hall 4092*. Plant in leaf, August 1971. Photo: W. F. Barker.



FIG. 53.—*Ornithogalum unifoliatum* from the same locality, *Hall 4179*. Plant in flower, October 1971. Photo: W. F. Barker.

CAPE.—2917 (Springbok): Eenriet, 9–13 km N. of Steinkopf (–BB), Hall 4092, 4179; Steinkopf, Marloth 13228.

This small succulent species is known from one locality only, Eenrietberg near Steinkopf in Namaqualand, where it was found to be fairly common although somewhat sparsely scattered and difficult to spot in the non-flowering stage. It was found in leaf in August 1971 and in flower but leafless by then, in October. Hall's collection formed part of the original type collection when he visited the area in 1971 together with Mr G. D. Rowley. Mr Hall is sincerely thanked for sending me Rowley's article published in *Ashingtonia*, a magazine not available in South Africa. Thanks to Miss W. F. Barker's excellent photographs we have a good visual record of this little succulent.

54. *Ornithogalum diluculum* Oberm., sp. nov. *O. suaveolenti* Jacq. affinis, sed folio uno oblongo coriaceo glauco differt.

Plant ad 0,25 m longa. *Bulbus* globosus, c. 30 mm diam. *Folium* unum ad anthesim marcidum anguste oblongum canaliculatum coriaceum glaucum margine tumido albido. *Racemus* ad 10-floriferus laxus; pedunculus validus; bractea anguste ovato-acuminata striata tenua. *Perianthium* aperturam ad diluculum clausum 2–3 horis postea. *Stamina* filamentis subulatis. *Stylus* cum stigmate antheros superantus. *Capsula* oblongo-globosa.

Type: Cape, 3320 (Montagu), Bloutoring (–AD), Mauve & I. Oliver sub PRE 57046 (PRE, holo.!).

Plants up to 0,25 m tall. *Bulb* globose, firm, c. 30 mm in diam. *Leaf* solitary, proteranthous, narrowly oblong, up to 80 mm long and 15 mm broad, canaliculate, leathery, glaucous, the margin swollen, white. *Raceme* up to 0,25 m long; peduncle firm, 5 mm in diam., glaucous; bracts narrowly ovate-acuminate, up to 15 mm long, striate, thin; pedicels c. 20 mm long, spreading, straight, firm. *Flowers* up to 10, laxly, spaced, slightly nodding, opening at dawn, closing about 3 hours later, for about 3 days, when they wither. *Perianth-segments* linear, 15 mm long, 5 mm broad, glaucous green with a narrow yellow margin, the latter somewhat wider on the inner segments. *Stamens* with erect subulate filaments 8 mm long, green. *Ovary* narrowly oblong, 6 mm, shallowly 3-grooved, green; ovules biseriate, c. 30 in a locule; style elongate-clavate, just exserted above stamens; stigma globose-penicillate. *Capsule* oblong-globose, 7–10 mm long, chartaceous; seed ovate, 3 mm in diam. with 2 flat faces and one forming a narrow curved ridge, papillate. FIGS 54 and 55.

The bulbs were in leaf when collected in September 1974; they flowered at the Botanical Research Institute in September 1976 when it was possible to watch the flowers opening early in the morning and soon closing again. This suggested the epithet *diluculum*, the Latin name for dawn.

The type specimen of *O. ovatum* Thunb. has the leaf oblong, coriaceous and with a thickened margin which resembles that of *O. diluculum* but the flowers are similar to those of *O. unifolium*, being placed close together on shorter pedicels; they are smaller and more delicate, unlike those of *O. diluculum* which are firm and greenish.

#### UNCERTAIN SPECIES

*Ornithogalum canaliculatum* Lagasca, Elench. Gen. et Sp. Nov. 14 (1816); Roem. & Schult., Syst. 7: 526 (1829); Kunth, Enum. 4: 370 (1843); Bak. in Fl. Cap. 6: 511 (1897) sub *O. graminifolium* sensu Bak. Type: Origin unknown, ex hortus Madrid.

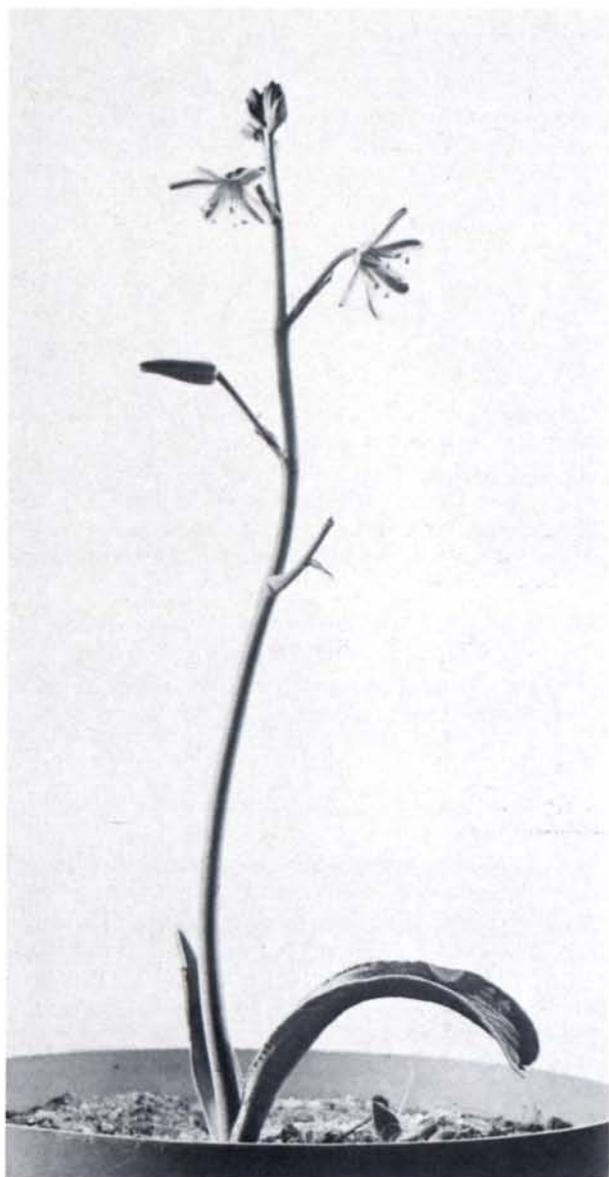


FIG. 54.—*Ornithogalum diluculum* from Bloutoring in the Montagu District, Cape, Mauve & I. Oliver ex hort. PRE 19659. Plant in flower, the old leaf dying down and a second developing.



FIG. 55.—*Ornithogalum diluculum*, close up of two flowers from Fig. 54.

*O. grimaldii* Nocca, Pl. Select. t. 4 (1800). Placed by Baker under *O. thyrsoides* Jacq. in Fl. Cap. 6: 499 (1897). Impossible to identify.

*O. spirale* Wimm. in Linnaea 16, Lit. Ber. 274 (1842). Type: a plant originally from the Cape, growing in the garden of Count Hoffmannsegge in Dresden. It was listed in the garden's catalogue and Wimmer merely described it as having filiform, spirally contorted leaves and small yellow flowers. The description is inadequate.

*O. revolutum* Jacq., Hort. Schoenbr. 1: 46, t. 89 (1797). Near *O. thyrsoides* Jacq.

*O. tenellum* Jacq., Ic. Pl. Rar. 2: 20, t. 427 (1789); Coll. 5: 76 (1789).

It somewhat resembles *O. pilosum* L.f. but the leaves are described as glabrous.

*O. tulbaghense* Bak. in Fl. Cap. 6: 504 (1897). Type: Cape, Nieuwe Kloof near Tulbagh, Zeyher 4205. No type at Kew or BM. The collection consisted of some peduncles bearing solitary, terminal flowers.

#### SPECIES FROM SOUTHERN AFRICA TRANSFERRED TO OTHER GENERA

*Ornithogalum albanense* V. Poelln. in Ber. dt. bot. Ges. 61: 209 (1944), nom. nov. for *O. elatum* Bak. in Fl. Cap. 6: 508 (1897), non Andr. A species of *Albuca*.

*O. altissimum* L.f., Suppl. 199 (1782)=*Urginea altissima* (L.f.) Bak.

*O. amboense* Schinz=*Albuca amboensis* (Schinz) Oberm. comb. nov.

*Ornithogalum amboense* Schinz in Verh. bot. Ver. Prov. Brandenb. 33: 220 (1890); Bak. in Fl. Trop. Afr. 7: 547 (1898); Merxm. et al., Prodr. Fl. S.W.Afr. 147: 58 (1970). Type: S.W.A., Ovamboland, between Olukonda and Omandongo, Schinz 414 (Z, lecto.!), PRE, photo.). No number was cited in the original description. Sölch selected Schinz 414 as the lectotype, as it was annotated by Schinz.

*O. anomalum* Bak. in Saund., Refug. Bot. 3, t. 178 (1870)=*Drimia anomala* (Bak.) Benth.

*O. calcaratum* Bak. in Gdnr's Chron. 1874, 1: 723 (1874). Probably an *Urginea* sp. because of its spurred bracts. The type was not located.

*O. canadense* L.=*Albuca canadensis* (L.) Leighton.

*O. capense* L., Sp. Pl. 308 (1753)=*Eriospermum capense* (L.) Salter.

*O. capitatum* Hook. f., Curtis's bot. Mag. t. 5388 (1863)=*Urginea capitata* (Hook. f.) Bak.

*O. cepaceum* Burm. f., Prodr. Fl. Cap. 10 (Oct. 1768)=*Bulbine tuberosa* (Mill.) Oberm. in Bothalia 12: 62 (1976).

*O. ciliatum* L.f., Suppl. 199 (1782)=*Urginea ciliata* (L.f.) Bak.

*O. cooperi* Bak. in J. Linn. Soc. (Bot.) 13: 284 (1873)=*Drimia cooperi* (Bak.) Benth.

*O. dipcadiodes* Bak. in Bull. Herb. Boissier ser. 2, 4: 999 (1904)=*Dipcadi gracillimum* Bak.

*O. elatum* Bak. in Fl. Cap. 6: 508 (1897)=*Albuca* sp. cf. *A. abyssinica* Dryand. (= *O. albanense* V. Poelln., nom. nov.).

*O. exuviatum* (Jacq.) Kunth, Enum. 4: 369 (1843)=*Urginea exuviata* (Jacq.) Steinh.

*O. filifolium* (Jacq.) Kunth, Enum. 4: 369 (1843)=*Urginea filifolia* (Jacq.) Steinh.

*O. fragrans* (Jacq.) Kunth, Enum. 4: 366 (1843)=*Urginea fragrans* (Jacq.) Steinh.

*O. giganteum* Jacq., Hort. Schoenbr. 1: 45, t. 87 (1797)=*Urginea altissima* (L.f.) Bak.

*O. haworthioides* Bak. in J. Bot., Lond. 16: 322 (1878)=*Drimia ? bolusii* Bak. in Fl. Cap. 6: 443 (1897). Possibly *Drimia hyacinthoides* Bak.

*O. macranthum* Bak. in J. Linn. Soc. (Bot.) 13: 280 (1873)=*Thuranthos macranthum* (Bak.) C. H. Wright.

*O. monteiroi* Bak. in Fl. Cap. 6: 508 (1897)=*Albuca angolensis* Welw.

*O. nanum* (Burm. f.) Thunb., Prodr. Pl. Cap. 62 (1794)=*Eucomis nana* (Burm. f.) L'Hérit., a synonym of *Eucomis regia* (L.) L'Hérit.

*O. punctatum* (L'Hérit.) Thunb., Prodr. Pl. Cap. 62 (1794)=*Eucomis punctata* L'Hérit., a synonym of *E. comosa* (Houtt.) Wehrh.

*O. rupestre* sensu Schlecht. in herbarium Berlin, Kunth, Enum. Pl. 4: 569 (1843), non L.f.=*Bulbinella triquetra* (L.f.) Kunth.

*O. squilla* Ker-Gawl. in Curtis's bot. Mag. t. 918 (1806). Regarded by Baker as a synonym of *Urginea maritima* (L.) Bak. in Fl. Cap. 6: 470 (1897). The specimen, Drège 3527 from the Cape, Tygerberg, (not seen) could possibly belong to *Urginea altissima* (L.f.) Bak.

*O. thunbergii* Kunth, Enum. Pl. 4: 369 (1843)=*Urginea nematodes* (Roem. & Schult. f.) Bak. (= *Anthericum filifolium* Thunb.; non Jacq.).

*O. tuberosum* Mill., Gard. Dict. ed. 8, No. 10 (April 1768)=*Bulbine tuberosa* (Mill.) Oberm. in Bothalia 12: (1976).

*O. undulatum* (Ait.) Thunb., Prodr. 62 (1794)=*Eucomis undulata* Ait., a synonym of *E. autumnalis* (Mills.) Chitt.

*O. viride* sensu Marloth, Fl. S. Afr. 4, t. 29 (1915)=*Ornithoglossum viride* (L.f.) Ait.

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For loan of herbarium specimens including types, I sincerely thank the Directors of the following institutions: Albany Museum Herbarium, Grahamstown (GRA); Berlin Herbarium, W. Germany (B); Bolus Herbarium, Cape Town (BOL); Compton Herbarium, Cape Town (NBG); Geneva Herbarium, Switzerland (G); Kew Herbarium, England (K); Lund Herbarium, Sweden (LD); Botanische Staatssammlung, München, W. Germany (M); Natal Herbarium, Durban (NH); Natal University Herbarium, Pietermaritzburg (NHU); State Herbarium, Stellenbosch (STE); Thunberg Herbarium, Uppsala, Sweden (UPS); the National Herbarium, Windhoek, S.W. Africa (WIND); Institut für Systematische Botanik der Universität, Zürich, Switzerland (Z).

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## UITTREKSEL

'n Taksonomiese hersiening van die geslag *Ornithogalum* L. (Liliaceae) in suidelike Afrika is onderneem. Die 54 spesies is onder 3 subgenera verdeel; 8 van die soorte is nuut vir die wetenskap; daar is 1 nuwe subspezie, 3 is subspesifieke rang gegee, 1 variëteit word as 'n spesie erken, 4 spesies is uit ander genera geneem en in *Ornithogalum* geplaas, terwyl een soort na *Albuca* verplaas is. Onderskeidende kenmerke tussen *Ornithogalum* en *Albuca* word bespreek. Geskiedkundige aantekeninge oor die genus word gegee en melding van giftige en gekweekte soorte word gemaak.

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