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SUCCULENT PLANTS

Succulent Plants

DESCRIPTION, CULTIVATION AND USES OF SUCCULENT PLANTS, OTHER THAN CACTI

BY

H. JACOBSEN

(Curator of the Botanic Garden Kiel Germany)

AUTHORISED TRANSLATION

BY

VERA HIGGINS, M.A.

WITH 277 ILLUSTRATIONS

LONDON

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TO

Dr GUSTAV SCHWANTES

(Professor at Kiel University)

THE LEADING AUTHORITY ON
SUCCULENT PLANTS

THIS BOOK IS RESPECTFULLY DEDICATED

FOREWORD TO THE ENGLISH EDITION

THE appearance of the first (German) edition of this book in 1933 brought me an extraordinary number of friendly letters and numerous reviews in the horticultural press, as well as in scientific journals and those devoted to succulents at home and abroad. Opinion was unanimous that this book on succulents filled a gap in the literature of the subject. From English-speaking countries I received many requests for an English edition of the book, which would be of great assistance to amateurs interested in succulent plants.

In 1933 the Cactus and Succulent Society of Great Britain were already probing the possibilities of the publication of an English edition. The efforts of the Society, represented by Mrs Vera Higgins, Croydon, have been crowned with success, so that I can now offer English readers this English edition, which, at the same time, has been considerably enlarged. I am greatly indebted to the Cactus and Succulent Society of Great Britain for their recognition of my work.

This new edition closely follows the German one. The alphabetical arrangement of the species has been retained for easy reference. The text has been much amplified, especially as regards omissions from the earlier edition, such as the new species. The critical reader, however, will kindly note that the book does not and cannot pretend to be a monograph on succulent plants. Specialists in certain genera should therefore consult the special literature on the different genera in conjunction with this book.

Together with the augmentation of the text by an increased number of species and the increase in the number of illustrations from 219 to 277, I have endeavoured to adjust the present differences of opinion with regard to certain genera and species due to the different conceptions by various authorities. For the placing of certain species in their genera, when not finally settled by the authors themselves, I can only present the current conception, as far as it is apparent from the available literature (e.g. *Aloinopsis*, *Nananthus*, etc.). At the same time, some of the illustrations must remain unnamed, in accordance with certain changes in the text, but, on the other hand, some errors have been corrected.

The present edition contains descriptions of 151 genera, including 1091 species. The 277 illustrations represent altogether 394 species.

In addition to the literature referred to in the first foreword, the following books were invaluable for the amplification of the work: Prof. K. Dinter, *Neue und wenig bekannte Pflanzen Deutsch-Sudwest-Afrikas* (Okohandja, 1914); "Botanische Reiseeindrücke in Sw.-Afrika," "Diagnosen neuerer Südwestafrikanischer Pflanzen," "Beitrage zur Flora Sw.-Afrikas" (additional numbers to *Fedde's Repertorium speciorum novarum regni vegetabilis*, Berlin); Alain White and Boyd L. Sloane, *The Stapeliae* (Pasadena, California, 1933), Dr A. Engler, *Die Natürlichen Pflanzen-Familien* (vol. 18*a*, 1930; vol. 16*c*, 1933, Leipzig); Dr von Poellnitz, "Anacampseros, Versuch einer Monographie" (*Botan. Jahrbucher*, vol. lxv, Nos. 4 and 5, 1932), "Die Aufteilung der Gattung Mesembrianthemum" (*Fedde's Repertorium*, xxxii, Berlin, 1933); and also the periodical *The Gardener's Chronicle* (London, 1926–29), *South African Gardening and Country Life* (Speciality Press, Cape Town, 1929–34); *Fedde's Repertorium sp. n.r.v.* (Berlin, various dates); L. Bolus, *Notes on Mesembrianthemum and allied Genera* (Cape Town, 1927 *et seq.*).

Valuable help in the completion of the work was afforded me by numerous letters from Dr Leon Croizat, New York; Herr F. Erni, Bern; Herr H. Herre, Stellenbosch; Dr A. Tischer, Siegburg (Rhld.); and last, but not least, Wilh. Triebner, Windhoek, who has some 30,000 plants (amongst which are 4000 Lithops alone) representing 1200 species, from whom I have received many valuable plants which greatly lightened my labours. I heartily thank the above-mentioned persons for their disinterested assistance. My thanks are also due to Dr G. Schwantes, Kiel, Dr E. Werdermann, Berlin, and Dr G. Tischler, Kiel, for their friendly help in placing the literature at my disposal.

At the same time I wish to thank Dr Camerloher, Vienna, Herr Pfarrer Bertram, Bindersleben, and Herr F. Kahl, Kiel, for the loan of one illustration each, and Herr W. Triebner, Windhoek, for two illustrations.

The publishers, Messrs Williams & Norgate, Ltd. (London), who have undertaken the trouble and expense of the edition, deserve my special thanks for the excellent manner in which the work has been produced.

May this book help to spread and deepen an interest in succulent plants throughout the world.

THE AUTHOR.

KIEL, GERMANY,
April 1935

FOREWORD TO THE GERMAN EDITION

THE intention of the present book is to collect together in a comprehensive manner, by word and picture, all succulent plants except cacti, in order to bring before a larger circle a knowledge of their form and mode of life as well as their treatment, and to serve as a reference book for professional and amateur alike.

It seemed advisable, together with hints on cultivation, habitat and mode of life, to arrange this list of the majority of succulent plants found in cultivation in alphabetical order, so as to facilitate quick reference to the species. Since, as a result of rearrangements in recent years, some of the succulents have received new names and others have been distributed under wrong names, I have put in the synonyms with references to the valid name in the list, so that the right name can easily be ascertained. The new names of the Mesembrianthemums are, for ease of reference, arranged alphabetically under the genus "Mesembrianthemum." The families are given and the most important genera noted. In the space of this book it was unfortunately impossible to include all the known species. I have endeavoured to choose the most important ones from the great mass of material.

In addition to the simplest possible description of the outer form of the plants, with a short reference to the flowers, it seemed to me that the presentation of as many illustrations as possible would be of great assistance in differentiating the plants. I have succeeded in showing at least one picture of most genera; in genera rich in species I have considered it essential to give the largest number of illustrations possible

When beginning this work I realised that much useful matter on succulents had already been written, and that my chief duty lay in collecting, sifting and combining the material, descriptions and illustrations and to add thereto my own practical experience. I obtained the most valuable information from the books of Alwin Berger: *Mesembrianthemum und Portulacaceen*, *Sukkulente Euphorbien*, *Stapelien und Kleinien*, *Agaven*. These books I can heartily recommend to anyone interested who wishes to go thoroughly into the individual genera. Further contributions towards the descriptions of the plants have been taken from the works of A. Berger on Crassulaceae in Engler's *Pflanzen-Reich*, A. Engler's *Natürliche Pflanzen-*

familien, and also Berger's work on succulents in *Parey's Blumengärtnerei*. I obtained much of value from the issues of the last fifteen years of the *Monatschrift der deutschen Kakteengesellschaft* (periodical for those interested in cacti and succulents), the organ of the German Cactus Society in Berlin. (Membership of this Society is recommended to all lovers of succulents.) Hints on cultivation I have found in quantity in *Gartenwelt*, *Moller's deutsche Gartner-Zeitung*, *Parey's Blumengärtnerei* and *Gartenflora*. I have found descriptions of new plants in the American periodical *Desert*, in the South African *Notes on Mesembrianthemum and some allied Genera* (L. Bolus), *A Manual of Flowering Plants and Ferns in the Transvaal* (J. B. Davy), and in the English paper "New and Old Species of Mesembrianthemums, with Critical Notes" (N. E. Brown) in *The Journal of the Linnean Society*, as well as in several Cape "Floras." Valuable information on the Canary Island succulents was afforded by the important work of Dr O. Burchard, *Beitrage zur Ökologie und Biologie der kanarischen Pflanzen* (Stuttgart, 1929); details for the chapters "The Home of Succulent Plants" and "Form and Mode of Life" were obtained from the book of E. Warming, *Ökologische Pflanzengeographie* (Berlin, 1914), Ad. Hansen, *Die Pflanzendecke der Erde* (Leipzig, 1920), as well as from the lectures of Dr Fitting of Bonn and Dr Tischler of Kiel on Ecology and Plant Geography.

The illustrations for which the author is responsible were taken in the Botanic Garden at Kiel with a Zeiss Tessar f/6·3 on Perutz-Braunsiegel plates, without a yellow filter. The illustrations of Mesembrianthemums show plants in the famous collection of Dr Schwantes at Kiel, which is housed in the Kiel Botanic Garden. Excellent photographs have also been placed at my disposal by Herr K. Josefsky of Berlin, a few by the publisher of *Moller's deutsche Gärtner-Zeitung*, the German Cactus Society and *Gartenflora*. A large number of blocks have been kindly loaned by Herr Graessner of Perleberg and by the firm of Paul Parey from the material for *Gartenwelt* and *Parey's Blumengärtnerei*. Dr Burchard has kindly permitted the use of illustrations from his book on plants of the Canary Islands. Herr C. Backeberg of Hamburg and Herr R. Blossfeld of Potsdam have each loaned one illustration, and Herr Ad. Haage, jun., of Erfurt and Dr W. Kriechbaum of Vienna have each loaned two photographs.

It is my pleasant task to thank all those who have aided me in this difficult but interesting work. My special thanks are due to Dr G. Schwantes of Kiel for the support which I have received through his goodwill and the generous manner in which he offered to read the proofs of the section on Mesembrianthemum. I also wish to thank Herr J. Saathoff of Berlin, Editor of the *Gartenwelt*, for valuable advice which has had great influence on the form of the

book. Further, I would like to thank Dr O. Burchard of La Orotava for much information in his letters, for contributing illustrations and for permitting the use of blocks of pictures from his book. I thank Herr R. Graessner of Perleberg for the disinterested loan of numerous blocks, as well as for supplying rare plants from his succulent nurseries, which I must here very strongly recommend. At the same time, I heartily thank Herr Adolf Griese of Kiel who very kindly made himself responsible for developing my negatives. I should like especially to thank Dr Werdermann of Berlin for the trouble he has taken over the pictures in the possession of the Cactus Society and for sending important literature; at the same time I wish to thank the publishers of *Gartenflora* and *Moller's deutsche Gartner-Zeitung*, as well as the gentlemen previously mentioned, for the illustrations. To the publishing house of Paul Parey, who spared neither expense nor trouble to increase the value of the book, my special thanks are due.

I hope that the work will help to further a love of the plant world, and thus to give to the German people new and deeper values.

H. JACOBSEN.

KIEL *February* 1933

Signs and Abbreviations in the Text

Names in heavy type *before a description* give the valid name of the plant. Names in brackets in italics are synonyms

$\pm$ = more or less

ϕ = diameter.

L. = leaf or leaves.

F. = flower or flowers

$\bigcirc$ = annual plant.

$\bigcirc$ = biennial plant.

Abbreviations in the Texts to the Illustrations

(From B z Ö u B d K) = from *Beitrage zur Ökologie und Biologie der Kanarenpflanzen* by Dr O. Burchard, published by Schweizerbart, Stuttgart.

(From M d d.K.G) = from *Monatsschrift der deutschen Kakteengesellschaft* (Zeitschrift fur Sukkulentenkunde, Kakteenkunde), Berlin

(From M d G.Ztg) = from *Moller's deutsche Gartner-Zeitung*, Erfurt.

(From V P B.) = from the publishing firm Paul Parey, Berlin (*Gartenwelt*, *Parey's Blumengartnerei*)

Where no name is given, the photographs are the work of the author, and were taken in the Botanic Garden, Kiel.

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I

THE HOME OF SUCCULENT PLANTS

THE widespread impression that deserts are entirely bare of plant life is not strictly correct. There are certainly vast desert regions, as for instance the Sahara, the Gobi Desert and the great Sand Plains of Australia, where hardly any vegetation exists except a few annuals and low thorn bushes. But extensive desert regions, especially the so-called semi-deserts, are colonised by a considerable number of plants, many of which have in fact only been discovered in quantity during the last decades. Exploration by well-known botanists into regions hitherto considered inaccessible, especially in South Africa, has shown the existence of many plants and especially those of succulent habit Many plants which had been found by travellers over a hundred years ago, but had since been lost to cultivation as a result of insufficient knowledge of their requirements, have been re-discovered, and some have been collected in large quantities The reason for the occurrence of succulence in plants is lack of an adequate supply of water, which is of the utmost importance to plant life, together with warmth and sunshine—that is to say, a constant state of dryness In the deserts and semi-deserts, which are usually open plains where solar radiation is very intense, the occurrence of succulents is readily understandable. But the conditions of vegetation in the high mountains are strictly comparable. In the higher zones of the alpine regions precipitation is much less than in the lower zones and, at the same time, the drying effect of the winds is much stronger in the rarified atmosphere. As, moreover, the ground is often frozen and therefore physiologically dry for plants, the conditions of life hardly differ from the dry desert regions, especially as strong insolation in the mountains is the rule, on account of the altitude. It is therefore not surprising that plants on high mountains are adapted to withstand drought (Xerophytes). Dwarf shrubs, cushion and rosette plants with fleshy leaves (*Sedum*, *Sempervivum*), whose growth form may be regarded as an adaptation to drought, are typical representatives of the high alpine flora. Special modifications such as long roots, protection of the leaves by hairs or bluish waxy covering help to assure the absorption of water or are most effective protectors of transpiration Succulent high alpines occur on the dry rocks of the

Alps and the Caucasus, as well as here and there in dry places in the mountains of Central Europe.

A remarkable similarity of form with that of desert plants is found in certain plants which occur in salt deserts or on the sea coast. Probably this is also an adaptation to the conditions of soil and water. The absorption of water and food material is rendered difficult when the soil is impregnated with salt and the water is saline, as the salt is in solution. By a considerable reduction of the leaf surface to prevent too great a loss of water the plants have become more or less succulent (*Salicornia herbacea* by the North Sea, *Sedum acre* on the coasts of the North Sea and the Baltic, *Sarcocaulon* in the South African salt deserts and also several species of *Mesembrianthemum*).

Most of the succulents occur in the South African deserts, the Great and Little Karroo, the southern Kalahari, in Namaqualand, in the Namib and in Cape Province proper. The conditions of soil and climate are unfavourable to vegetation, so that only plants capable of considerable power of adaptation can thrive there. The districts are characterised by great heat and lack of rain. Mountain ranges, which keep off rainy winds as well as the dry prevailing winds, contribute greatly to the fact that large areas are without precipitation for years and are characterised by sunny weather for long periods. Soil temperatures of 120–140° F. and more at noonday are not rare, whilst the average temperature of the air is about 100° F. In contrast, the relative humidity of the air is often only 10–20 per cent. During the night the temperature often drops to 32° F., so that heavy dew falls at night and, during the dry period, this constitutes almost the only source of water supply above ground.

The South African deserts stretch from 18 to 30° southern latitude. The western coastal district consists of old formations, high mountains buried in sand, their summits rising free above it The stony plateau, which stretches eastwards to the Kalahari, is known as the Karroo and extends across the greater part of northern and north-western Cape Province. Though the Karroo cannot be considered as all desert, yet in some parts the water supply is very short. In the Great Karroo one finds tree-like plants only along the usually dry, sandy river-beds, the most frequently occurring tree being *Acacia karroo* Hayne. The ground is covered with shrubby *Mesembrianthemums*, large and small, and similar plants, which spread over hill and mountain as far as eye can see, and are only lacking on the stony, sandy or saline patches. But even here, in wet years, a mass of flowers appears, such as one can hardly imagine, for these sandy flats are the home of lovely bulbs, together with species of *Conicosia*, *Herrea* and *Grielum* which have fleshy roots sometimes deeply buried in the ground. Many *Cephalophyllum* also inhabit these sandy places, whilst in the salt pans typical salt plants (sp. of *Salsola*) grow, near

which also are the beautiful *Argyroderma*, *Dactylopsis*, *Conophytum*, etc. Only where the soil is too saline are no plants found. Some of the desert regions, like the Sahara, are found along the western coast (Swakopmund, Lüderitz Bay), whilst the sand in the Namib and Kalahari is not everywhere too sterile, but more closely resembles that of the Karroo (Namib) or forms grass steppes (Kalahari). The

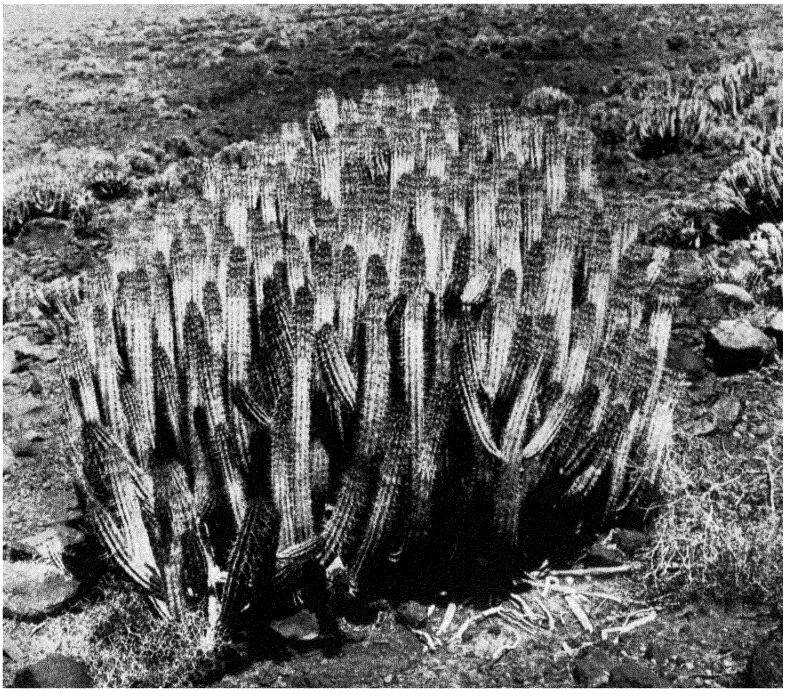


FIG. 1.—Euphorbia handiensis Burch. in Gran Valle Handia, Fuerteventura, Canary Islands. (Photo, Dr Burchard.)

Karroo soil suitable for our succulents is geologically more or less weathered, so-called Dwyka conglomerate, *i.e.* a very fertile schist, at first yellowish, later red in appearance, and only requiring rain to bring forth a good harvest. It is remarkable that it is not washed away by thunderstorms, but is merely loosened by water and not carried along with it. The Great Karroo is the home of most of the shrubby *Mesembrianthemums*, as well as many succulent species, such as *Didymaotus*, *Pleiospilos*, *Stomatium*, *Faucaria*, etc., and of the Asclepiadaceae, most of the *Stapelias*, *Duvalias*, *Pectinarias*, many *Trichocaulons* and also some species of *Hoodia*. But very few *Lithops* or *Conophytum* grow here. The rainfall of the Great Karroo occurs mostly as thunderstorms from November to April, that is in

summer, whilst the neighbouring Little Karroo more often receives rain in winter and mist from the nearby coast. Bushmanland is, like the Great Karroo, a region of summer rain and, with its usually sandy or even chalky soil, is the home of many beautiful species of *Lithops*, *Titanopsis*, *Schwantesia*, *Hoodia* and *Trichocaulon*.

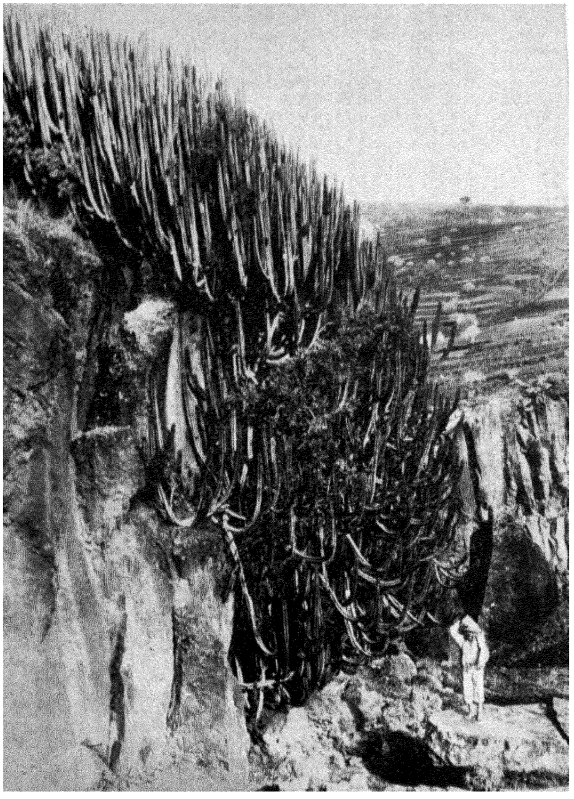


FIG. 2.—500-year old Euphorbia canariensis L. in the baranco, Teneriffe. Columns about 40 ft. high. (Photo, Dr Burchard.)

Winter rains (April to October) occur in Little Namaqualand (South African Namaqualand), a mountainous country with many ranges, where the soil is red or even yellow schist, with granite or gneiss near. The latter support, as in the Karroo, more or less large bushes, whilst the schist is the home of beautiful *Conophytums*, *Mitrophyllums*, *Monilarias*, *Cheiridopsis*, etc. The succulent Crassulaceae and Asclepiadaceae mentioned before also occur here.

Great Namaqualand, especially the succulent regions in the former German South-West Africa, has down to the extreme south its rainfall in summer (November to March). Here is the home of many extremely succulent species as, for example, *Lithops*, *Conophytum*, *Juttadinteria*, *Dinteranthus* and many Asclepiadaceae, which here grow partly in sand or in weathered granite or gneiss.

Whilst the coastal zone along the western coast has the smallest rainfall, with at Lüderitz Bay, for example, a yearly average of $\frac{2}{3}$–1 inch, the former German South-West Africa has a considerably greater quantity of about 4–12 inches, and in Little Namaqualand the normal is 5 inches or even more. The Cape proper, that is the environs of Cape Town, receives in winter an average of 20–40 inches and more, whilst the eastern part of Cape Province has rain chiefly in

summer, as much as 8–20 inches and more falling then. Here are the tall *Euphorbias*, *Aloes* and *Cotyledons* often growing in large clumps, so that these succulent forms determine the character of the landscape.

Whilst up to now succulents have not been found in the Sahara, in the dry coastal regions of North Africa, Morocco, Abyssinia and Arabia, numerous Asclepiads such as *Caralluma*, *Heurnia* and *Echidnopsis* do occur. In Abyssinia, especially on the stony slopes of the mountains, grows the candelabra-like *Euphorbia abyssinica*, sometimes solitary, sometimes in small groups.

Many beautiful and interesting succulents come from the Canary Isles. The coastal belt has an almost African climate, with great heat and drought in summer, aggravated by the strong wind. Besides numerous shrubby *Euphorbias* there grow here in great quantity giant specimens of the cactus-like *Euphorbia canariensis* and *E. handiensis*, which often form large thickets with their numerous, angled branches. Whilst stem succulents occur chiefly on the screes of the foot-hills, numerous leaf succulents are distributed along the coastal belt. The Crassulaceae are especially remarkable. Many species of *Aeonium*, often with stout, woody stems and sometimes large rosettes of leaves, are striking and typical plants, as well as the *Greenovias* and the small *Aichryson* and *Monanthes*. Widely distributed also are *Kleinia neriifolia*, and several South African *Aloes* which have colonised the mountain slopes. In screes amongst the rocks are found the small columnar *Ceropegias*, which in summer look like bleached bones.

That succulents grow in Mexico as well as in Central and South America is well known, for these countries are the home of the largest family of succulents, the Cacti. On the Mexican plateaux are widespread deserts lying in the track of the north-eastern trade winds. The area of desert and semi-desert extends to some height, up to 5000 ft. high, so that the drying effect of the high altitudes is strongly marked. In summer it is very warm and sunny there, whilst in winter snow often falls. In the stony, calcareous soil of the western and southern sides there grow between xerophilous thorn bushes numerous succulents such as *Agaves*, *Echeverias* and *Sedums*. The conditions of soil and climate are similar in the rocky deserts of Central America and in Venezuela and Guiana, where similar species occur.

The succulent flora of the Riviera is particularly luxuriant, especially along the Mediterranean, in Spain, Italy and North Africa to the shores of the Balkans. *Agaves*, *Aloes*, *Euphorbias* and others are found, not only as choice specimens in gardens, but often wild as well. The plants were introduced a hundred years ago by travellers and, encouraged by the favourable climate, soon became widely distributed. Often the plants have become naturalised, and to-day are characteristic plants in the landscape.

II

FORM AND MODE OF LIFE

SUCCULENTS, that is juicy plants, are amongst the most specialised of plant forms. They are a living expression of peculiar conditions of soil and climate. Whilst plants in the warm, moist tropics and sub-tropics produce, as a result of the heat and extreme damp there, a luxuriant growth of leaves, those in the deserts and semi-deserts must conserve water because of the greatly reduced moisture of air and soil and of the intense sunshine. Plants in hot rainless situations must possess the power of absorbing quickly the little water at their disposal and, above all, by reducing transpiration, of retaining it as long as possible. These requirements necessitate a different form and mode of life from that of plants in more favourable circumstances, as is in fact indicated by the extraordinary variety of forms.

The adaptations for the rapid absorption and the conservation of the scanty water supply are very various. Sometimes the roots of the plant penetrate very deeply in order to reach the water table (*Welwitschia*). The majority, however, have very shallow roots, so as to be able to take up quickly the nightly dew fall. Water is partly conserved in the leaves or in the shoots, which may contain as much as 95 per cent. of their volume as water, and hence are more or less fleshy. The water-storage tissue occupies almost the whole leaf, and is surrounded by only a thin layer of assimilating tissue (*Aloe, Agave, Mesembrianthemum*, etc.). The vesicular hairs filled with water found on the upper surface of the leaf in certain Aizoaceae are also characteristic and advantageous (*Drosanthemum, Delosperma*, etc.). The leaves, by means of which transpiration is carried on, are much reduced in size and number in succulent plants, and are variously adapted to retard transpiration. Some plants have much reduced leaves adpressed to the stem (*Crassula lycopodioides, C. pyramidalis*), or they are fat and fleshy, often sessile or, so as to reduce the surface area, small and cylindrical (*Kleinia, Senecio*, etc.), ovate or spherical (*Sedum Stahlii, Kleinia gomphophylla*) or united into ovate or spherical bodies (*Conophytum, Lithops*). During the dry period the plants are usually completely at rest and look dead since they have shrunken or the surface of the leaves has dried up. But they recover quickly after the first rains, and in a short time produce new leaves or show

new growth by swelling up of the plant body. Some Aizoaceae, like *Cheiridopsis* and *Mitrophyllum*, etc., form specially for the resting period a pair of completely united leaves which enclose the pair of separate leaves for use during the growing period. A large number of succulents are protected by the method of arrangement of the leaves; the rosette form occurs frequently, thus making it possible for the leaves to close together like a bulb under strong sunshine (*Aeonium*, *Haworthia altilinea*). The majority are protected by a special coating of the leaves, some with layers of bluish or white wax (*Echeveria farinosa*) or with white felted or woolly hairs (*Kleinia tomentosa*, *Crassula tecta*, *Echeveria leucotricha*), with a sticky resin (*Psammophora*). Almost all are protected by a much thickened outer skin. The chlorophyll is often protected by red colouring matter (*Aeonium urbicum*, etc.). Plants such as those briefly enumerated above, which are characterised by their remarkable and often really beautiful leaves, are known as leaf succulents. In contrast to these are the stem succulents which are almost or completely leafless and actually protected from undue transpiration by the absence of leaves. The functions of the leaves, transpiration and assimilation, are then taken over by the green shoots, unless small leaves are formed during the growing period which are discarded again during the resting time (*Euphorbia bupleurifolia*, *Testudinaria*, etc.). Leafless succulents are usually very fleshy. The shoots consist largely of water-storage tissue. The formation of wood and cork is slight, whilst the cuticle is greatly thickened. When leaves are lacking they may have been partly converted into spines (*Euphorbia*) which are really protection against browsing animals. The drier the habitat of the plant, so much the greater is the reduction of the total surface area. All transitional forms between the columnar (*Stapelia*, *Euphorbia canariensis*) and the spherical (*Euphorbia obesa*) are found. The fact that the climatic conditions of dry regions so markedly influences the form of the plants may be observed in the same way in Cacti. In the American Cactus regions the plants experience similar conditions of life to the succulents in the South African deserts. Amongst Cacti all forms of stem succulent occur, and for the same reason. It is not surprising that confusion continually arises between Cacti and other succulents of different plant families, for they bear a strong outward resemblance to each other. In figs. 3 and 4 succulents from different families are shown side by side. Fig. 3 shows a *Stapelia*, a *Euphorbia* and a *Cereus*, representatives of columnar stem succulents; in fig. 4 a *Euphorbia* and a spherical *Opuntia* are compared with each other. The accurate observation of insignificant but essential differences is necessary in order to recognise the species. The spines, thorns or even the internal structure may lead to the recognition of the genus, but the surest confirmation is the flower. The essential parts of the

flower are not altered by exterior influences. (Compare, for instance, the flower of a *Cereus* with that of a *Euphorbia*.)

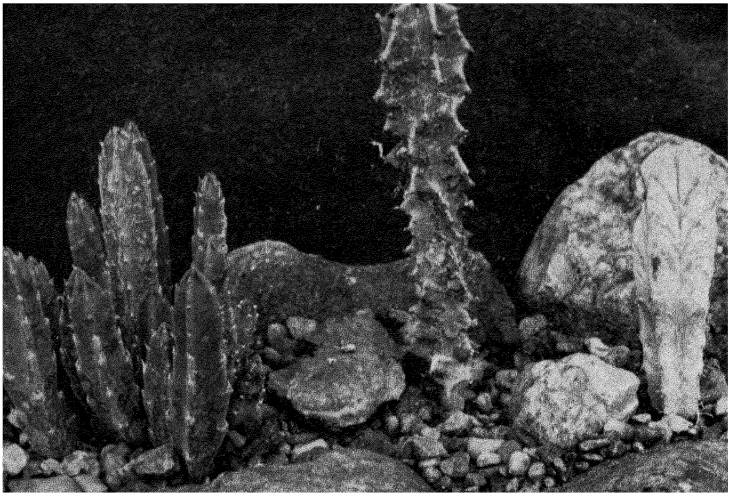


FIG. 3.—Succulents of different families but similar appearance (convergence). Left: Stapelia. Centre: Euphorbia. Right: Cereus.

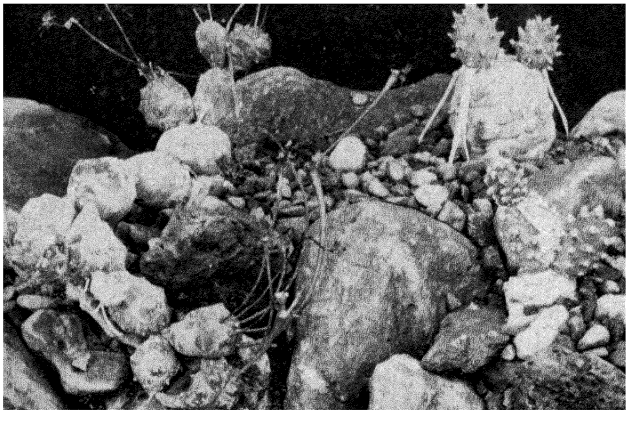


FIG. 4.—Succulents of different families but similar appearance (convergence). Left: Euphorbia globosa Sims. Right: Opuntia diademata.

The many adaptations of the surface layer of plants, which may be regarded primarily as protection against too great evaporation, naturally reduce at the same time the effect of light and hence the power of assimilation of the plant. The formation of new material is therefore small, which explains the slow growth of succulents.

But in order to make the access of light to the assimilating tissue possible under all circumstances, without thereby foregoing full protection of the transpiration, certain plants have developed so-called "windows," tissue lacking chlorophyll, usually at the tips of the leaves (*Fenestraria*, *Ophthalmophyllum*, *Lithops optica*, *Haworthia retusa*). Whilst the plant has its leaves more or less buried in the ground, the "windows" alone are exposed to the light. The penetrating, glaring sunlight is mitigated by a layer of calcium oxalate crystals in the cuticle and thus, much diminished in intensity but still effective, it can reach the chlorophyll layer deep down in the leaf. At the same time, the light is further reduced by the convex surface of the "windows" in *Fenestraria* and *Ophthalmophyllum* which reflect the sun's rays like a lens.

Not only are succulents influenced by the effects of important growth factors, but many of the South African species resemble most confusingly in colour and form the ground in which they grow, so as completely to escape detection. The *Lithops* closely resemble the pebbles around them, whilst *Pleiospilos* are difficult to distinguish from angular bits of rock. Other plants which occur on calcareous soil, like *Titanopsis* and *Crassula mesembrianthemopsis*, etc., can hardly be recognised amongst the rough, whitish limestone. Some of the *Anacampseros* are interesting in this connection, for they resemble the white excrement of birds. All these mimicry forms may be regarded as protection against browsing animals.

III

USES AND CULTIVATION

To-day, when the interest of a wide circle is centred on succulents, it is not only the beauty of form of the plants and their often remarkable flowers that appeal, but primarily the modesty of their requirements in cultivation. Succulents are liked as foliage and flowering plants for cool or warm rooms, verandas and balconies. In summer some may be used as decorative plants in the garden. In the rock garden not only the hardy species find a place, but many others too which prefer a sunny position out of doors in summer. Many succulents are marketable plants, and find a ready sale in florists' shops. Amongst connoisseurs may be found to-day collections of plants, rare and difficult to grow, which are often very valuable and make great demands on the skill of their owner. Certain plants will only grow under the most careful treatment of a master hand, so that rarities will remain expensive treasures.

In our modern houses, which are often centrally heated and whose concrete walls remove much of the humidity, the conditions for growing plants are generally bad. Only plants which are adapted to a dry climate find the conditions suitable. These facts have long been known. Many lovers of plants, after fruitless attempts with other foliage and flowering plants, have filled their window-cases with succulents. Since succulent plants are all sun-lovers, only those windows are suitable for their accommodation which have a few hours' sunlight a day. A southern or south-western aspect is best, but eastern windows can be used. In summer too much sunlight may damage even succulent plants when they are behind glass and not sufficiently ventilated. Hence during the summer, if they cannot be placed near open windows or on balconies, they should be put out of doors or in a frame. During the winter months care should be taken to avoid a cold draught, which may easily cause serious damage. The experienced grower will use a small indoor greenhouse for his best succulents. But this should not be too small, and should be provided with good ventilation as well as means of draining off water.

The first thing in the choice of plants is a knowledge of their appearance as well as their mode of life. All plants are not equally pleasing to everyone. The novice in the cultivation of succulents

will spare himself much disappointment if he chooses the easily grown kinds and at the same time takes into consideration the space at his disposal.

For the cultivation of valuable plants a small greenhouse with central heating is ideal. The best is one with a span roof, running north and south, 10 ft. wide and about 7 ft. high. To get good ventilation, windows in the roof should be provided as well as a number



FIG. 5.—Euphorbias and Mesembrianthemums in the nurseries of Haage, Erfurt. (Photo, F. A. Haage, jun.)

of side-windows and ventilators in the wall. The roof is best made of wooden sash-bars and wide glass panes. Shading blinds are superfluous; sensitive plants may be protected by a light coating of limewash on the glass. The provision of two stagings is useful, one of which is arranged as a sandy bed in which tender plants may be inserted. It is advisable to have the walls and staging made of concrete, for the concrete absorbs water so that the air can always be kept fairly dry. The temperature provided by the heating should not be above 55–60° F. in winter. Special attention should be paid to the floor of the house. If the ground is hard and impervious, suitable drainage must be provided, if necessary by the introduction of rubble or something similar to drain off the water, for stagnant damp and superfluous moisture are especially harmful to many succulents.

Frames are suitable for growing most succulents and especially

for reproduction on a large scale. Cold and slightly heated frames are best; and these should be uncovered in dry weather in summer to harden the plants. High temperatures are not required to winter most succulents, a bright, dry cold house is enough, in which the hanging shelves may be used for the plants.

The watering of succulents must be carried out with great care, and the resting period of the plants should be properly observed. When watering it is often desirable to limit the amount given. It should be remembered that the plants in their native home often have to remain dry for months on end and get only the dew at night.

Succulents should be repotted in spring, that is at the beginning of the growing season, and this need not be repeated every year for slow-growing species. The soil should not be fresh, but old and stored. Calcareous compost, with the addition of old hot-bed soil or cow manure, is the best, to which may be added, according to the species to be dealt with, sand, mortar rubble or brick dust. It is especially important that clean, porous pots should be used, the drainage hole being covered with crocks and a layer of coarse sand, so that the superfluous water can drain away easily.

Succulents are often propagated by seed. These should be sown in small pots or pans, which are stood in a warm place. The seeds generally germinate in a few days; the seedlings should be pricked out early and accustomed to more air. Most species make reasonable sized plants more quickly from cuttings which are easily rooted in sand in a propagating box. As a rule young seedlings and cuttings should be kept moister and more shaded than older plants so that they are kept growing continuously. But by autumn they should be quite hardened to sun and air.

Under careful cultivation succulents do not suffer much from disease. In summer, and also in winter if the air is hot and dry, *Euphorbias* may get red spider, which is easily combated by spraying with a 2 per cent. solution of nicotine. Scale and woodlice are easy to remove. The rotting of many young plants may be put down to an over-moist house or to over-watering. Plants which are diseased should immediately be removed from the collection. Damage due to rot may be cured by cutting away and drying or sometimes by dusting with powdered charcoal. For the treatment of plants attacked by root mealy bug, or seedlings damaged by bacteria, see under *Mesembrianthemum*.

More detailed instructions, as well as the cultural requirements of the different succulents, are given with the descriptions of the plants.

IV

SUCCULENTS IN NURSERY PRACTICE

THE assurance that a nurseryman's business will be profitable depends on the recruitment of amateurs to maintain adequate sales. Fashion and the inclination of the public have proved this. The succulent fashion, which has been revived during the last ten years, has become a hobby. The demand for plants is large, even valuable species finding buyers owing to increased knowledge in amateur circles. There are in England, as in Germany, U.S.A., South Africa and other countries, a number of specialised businesses, which are exclusively occupied with the cultivation of succulents. Most nurseries with mixed stock carry many of those succulents which can be easily grown and produced in large numbers. With succulents one has to distinguish between those bought solely on account of their peculiarities and those which have a market value on account of their beautiful flowers. The latter are often reared in very large numbers and are always a paying proposition, and the period of growth is as a rule no longer than that of other flowering plants and yet the plants have the advantage that they will last.

It is not always easy for people to choose from amongst the wealth of material the plants appropriate to the desired end. The following summary gives a list of plants arranged in families and divided according to their characteristics.

Group I

Easily grown pot plants, Leaf and Stem Succulents

Aizoaceae : (*a*) Shrubby, free-flowering plants. *Aridaria maxima, Carpobrotus edulis, Corpuscularia Lehmannii, Delosperma Brunnthaleri, D. echinatum*, etc , *Dorotheanthus criniflorus, Dor gramineus, Drosanthemum floribundum*, etc., *Erepsia inclaudens, Hymenocyclus luteus, Mesembrianthemum blandum, Mes. coccineum, Mes. conspicuum, Oscularia caulescens, O. deltoides, Ruschia semidentata, R. uncinata*, etc., *Trichodiadema barbatum, T. densum*, etc (*b*) Low-growing plants: *Bergeranthus vespertinus, B. multiceps, B scapigerum, Carruanthus caninus, Cephalophyllum decipiens*, etc , *Conophytum calculus, C. minutum, C obcordellum, C. Wettsteinii, Faucaria felina, F. Bosscheana, F. tigrina, Glottiphyllum* (various), *Hereroa hesperantha*,

etc., *Lithops bella, L. pseudotruncatella, L. Leslıei, Pleıospilos Bolusıı, P. simulans, P. Purpusıı, Rhombophyllum dolabriforme, R. rhomboıdeum.*

Amaryllidaceae : *Agave amerıcana* and its varıegated forms, *A. echıoides, A. Ferdınandı-Regıs, A. parrasana, A. strıcta, A. Vıctorıae-Reginae.*

Asclepiadaceae : *Ceropegıa Woodıı* (Plant for hangıng baskets), *Stapelıa grandıflora, St. hırsuta, St. sororıa, St. varıegata*

Compositae : *Kleınıa acaulıs, K. artıculata, K. ficoıdes, K tomentosa, Othonna crassıfolıa* (basket plant), *Senecıo scaposus, S. fulgens.*

Crassulaceae : *Aeonıum arboreum, A. canarıense, A. decorum, A. Haworthıı, A. nobile, A. tabulaeforme, A. urbıcum, Bryophyllum crenatum, B. daıgremontıanum, B tubıflorum, Cotyledon macrantha, C. orbıculata, C. teretıfolıa, C. undulata, Crassula arborescens, Cr argentea, Cr. corallına, Cr. falcata, Cr. lycopodıoıdes, Cr. perfolıata, Cr. pseudolycopodıoıdes, Cr. rupestrıs, Echeverıa agavoıdes, E. Derenbergıı, E. elegans, E. gıbbıflora v metallıca, E. glauca, E. Peacockıı, E. perelegans, E. setosa, E. secunda, Greenovıa aurea, G. gracılıs, Kalanchoe marmorata, K. somalıensıs, K thyrsıflora, Pachyphytum bracteosum, P. ovıferum, Sedum Adolphıı, S. allantoıdes, S dendroıdes, S Nussbaumerı, S. pachyphyllum, S. Palmerı, S Sıeboldıı, S Stahlıı, Sempervıvum arachnoıdeum.*

Euphorbiaceae : *Euphorbıa alcıcornıs, E. Ammak, E. cereıformıs, E. Echınus, E. Hermentıana, E. meloformıs, E. Morınıı, E pseudocactus, E. trıangularıs, E. vırosa.*

Liliaceae : *Aloe arborescens, A. arıstata, A. ausana, A Beguınıı, A. eru, A. ferox, A. saponarıa, A. varıegata, Apıcra* (varıous), *Bulbıne aloıdes, Gasterıa carınata, G. verrucosa* (and many others), *Haworthıa atrıvırens, Haw margarıtıfera, Haw. m. v. granata, Haw. radula,* etc

Portulacaceae : *Anacampseros arachnoıdes, A. fılamentosa, A lanceolata, A. Telephıastrum, A. rufescens, A tomentosa, Portulacarıa afra.*

Group II

Marketable Flowerıng Plants

Crassulaceae : *Aıchryson dıchotomum, Crassula falcata, Cr lactea, Cr. Schmıdtıı, Cr. Cooperı, Echeverıa setosa, E. carnıcolor, Kalanchoe flammea, Kal. Blossfeldıana, Rochea coccınea, R versıcolor.*

Euphorbiaceae : *Euphorbıa splendens.*

Group III

Collection of Plants for Specialists

Aizoaceae : *Argyroderma octophylla, Aloınopsıs* (all), *Bıjlıa cana, Chasmatophyllum musculınum, Cheırıdopsıs* (almost all specıes), *Conıcosıa brevıcaulıs,* etc., *Conophytum* (almost all species), *Dınteranthus mıcrospermus,* etc , *Dracophılus montıs-Moltkei, Ebracteola montıs-draconıs, Fenestrarıa aurantiaca,*

F. rhopalophylla, *Gibbaeum* (various), *Herreanthus Meyeri*, *Juttadinteria* (various), *Lapidaria Margaretae*, *Lithops* (almost all species), *Nananthus* (all species), *Nelia Meyeri*, *Odontophorus primulinus*, *O. Marlothii*, *Ophthalmophyllum* (almost all species), *Pleiospilos* (all), *Psammophora longifolia*, *Rhinephyllum Muirii*, *Rimaria Heathii*, *Ruschia amoena*, etc , *Schwantesia Ruedebuschii*, *Stomatium erminium*, etc., *Titanopsis calcarea*, *T. Schwantesii*, etc.

Asclepiadaceae : *Caralluma europaea*, *C. Burchardii*, *C. Nebrownii*, *Ceropegia fusca*, *C. dichotoma*, *C. Sandersonii*, *Duvalia Pillansii*, *Echidnopsis cereiformis*, *Heurnia barbata*, *H. Blackberdae*, *H. Penzigii*, *H. Pillansii*, *H primulina*, etc., *Hoodia Gordonii*, etc , *Stapelia bella*, *St. gigantea*, *St. Hanburyana*, *St. pulvinata*, etc., *Tavaresia grandiflora*, *Trichocaulon cactiforme*.

Compositae : *Kleinia gomphophylla*, etc , *Othonna clavifolia*, *Senecio* (various).

Crassulaceae : *Adromischus* (almost all species), *Cotyledon* (all), *Crassula Alstonii*, *Cr. barbata*, *Cr columnaris*, *Cr. deceptrix*, *Cr. mesembrianthemopsis*, *Cr. pyramidalis*, *Cr. tecta*, *Cr. teres*, *Echeveria densiflora*, *E farinosa*, *E. gibbiflora v carunculata*, *E. leucotricha*, *E. pulvinata*, *Monanthes laxiflora*, *M muralis*.

Euphorbiaceae : *Euphorbia bupleurifolia*, *E. caput-medusae*, *E. globosa*, *E. gorgonis*, *E grandicornis*, *E. horrida*, *E. obesa*, *E. polygona*, *E. pseudoglobosa*, *E. stapelioides*, *E stellaespina*, *E. Suzannae*, *E. viperina* (and many others)

Geraniaceae : *Pelargonium echinatum*, *P. tetragonum*, etc., *Sarcocaulon rigidum*, etc.

Liliaceae : *Apicra* (species), *Bulbine caulescens*, *Haworthia altilinea*, *Haw cymbiformis*, *Haw. planifolia*, *Haw. tessellata*, *Haw. truncata* (and many others).

Portulacaceae : *Anacampseros Meyeri*, *A. Herreana*, *A. papyracea*, *etc.*

V

ENUMERATION AND DESCRIPTION OF SUCCULENT PLANTS, WITH SPECIAL DIRECTIONS FOR CULTIVATION

Adenium Roem. et Schult.

Family: APOCYNACEAE.

Adenium Lugardii N. E. Br., Namaqualand (S. Africa) Succulent plants with swollen, brown-skinned stems, as large as a head, whose upper half grows vertically upwards and produces roots, shoots 1–5, erect, 8 in. high, $\frac{3}{8}$–$\frac{3}{4}$ in. thick, brown skinned, L. in a tuft, 10–15, 2-6 in long, $\frac{3}{8}$–$\frac{5}{8}$ in broad, linear, narrowed into the short stalk, grooved, pale grey-green, glossy with a few minute hairs; F. 2–4, on $1\frac{1}{2}$-in long stalks, corolla tube *c.* $1\frac{1}{2}$ in. long, *c.* $\frac{3}{8}$ in. ϕ above, pink, corolla with 5 oval lobes with a red middle stripe Very rare plant. Cultivation as for *Pachypodium*.

Adenium namaquanum Wylei = *Pachypodium namaquanum* Welw

Adromischus Lem.

Family: CRASSULACEAE.

Occurrence: Namaqualand, Cape Province.

Succulent plants or small bushes, the stems often with small aerial roots which soon die, but persist. L. alternate, variously shaped flat and roundish or even club-shaped. Flower stem terminal F. short stalked or sessile, in clusters or spikes, small, erect, in the axils of leaflets, whitish or pink, in summer.

Cultivation as for *Cotyledon*, in a warm, light greenhouse, not below 55° F. Propagation by cuttings or from leaves which readily fall off and root easily; also by seed.

Adr. clavifolius Lem (fig. 6) (*Adr. van der Heydenii* hort., *Cotyledon clavifolia* Haw., *Esula species* hort.). Low plants, stems short with aerial rootlets; L. 6–8, club-shaped, narrowed into the stalk, abruptly truncate above, with or without a blunt apex, $1\frac{1}{4}$–$1\frac{1}{2}$ in long, $\frac{1}{5}$–$\frac{1}{2}$ in. thick, smooth, green; flower stem 4–6 in. high; F. $\frac{1}{2}$ in. long, greenish, with reddish tips

Adr. Cooperi Bgr. (*Cotyledon Cooperi* Baker), Namaqualand. Stems small, with aerial roots, bare; L. roundish or lanceolate-spatulate, flat, truncate, narrowed towards the base, grey-green, usually with darker markings.

Adr. cristatus Lem. (fig. 6) (*Cotyledon cristata* Haw., *Cot. Zeyheri* Haw.), Cape Province. Low plants; stem short, with stiff, red, curled, aerial roots; L. wedged-shaped, narrowed into the stalk, 1–1½ in. long, ⅛–⅝ in. wide, hatchet-like, blunt above with a wavy edge, with thick, soft hairs; flower stalk 6–8 in. long; F. greenish, with pale red tips.

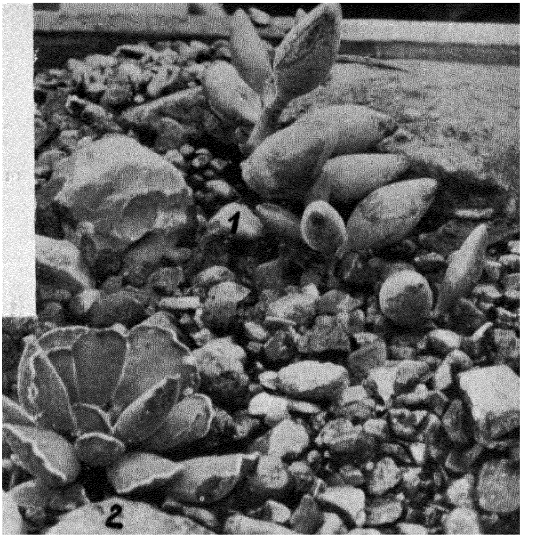


FIG. 6. –1. Adromischus clavifolius Lem.
2. Adr. cristatus Lem. ⅔ nat. size.

Adr. hemisphaericus Lem. (*Cotyledon hemisphaerica* L.), Cape Province. Stems and branches 2–4 in. high, very leafy; L. alternate, rarely opposite, rather compressed, ⅝–1⅛ in. long, ¾–1 in. wide, roundish or obovate, blunt or with short tip, narrowed towards the base, flat above, much thickened on the reverse, pale green, with numerous pale grey scales, reddish on the margins; flower stalk 8 12 in. long; F. ½–⅝ in. long, greenish, with pale red tips.

Adr. Keilhackii Werd., S. Africa. L. pea-shaped, with red dots. F. white.

Adr. maculatus Lem. (fig. 7) (*Cotyledon maculata* Salm.), Namaqualand. Stems up to 4 in. high, little branched from the base; L. erect, 1–1¾ in. long, ¾–1¼ in. wide, both sides slightly convex, blunt or truncate, with a short tip, dark grey-green, both sides heavily flecked with reddish-brown, the margin horny.

Adr. mamillaris Lem. (*Cotyledon mamillaris* L. f.). Low, bare plantlet; L. in cross-section semicircular, narrowed each side, ¾–1¾ in. long, ½ in. wide, ¼–½ in. thick, grooved on the upper surface, with definite margins, green, heavily flecked with brown.

Adr. Mariannae Bgr. (fig. 7) (*Cotyledon Mariannae* Marl.), Cape. Low shrub, forming clumps; L. compressed, *c.* ½ in. long, ¼–½ in. wide, *c.* ⅓ in. thick, flat or slightly convex on the upper surface, often furrowed as well, the margins thickened and rolled slightly inwards, pointed above, and the upper third often recurved, the back semicylindrical, dark grey-green, with grey-brown markings, the margin pale grey; F. green, with red tips.

Adr. montium Klinghardtii Bgr. (*Cotyledon montium Klinghardtii* Dtr.), Great Namaqualand. Semi-shrub with many stems, up to 8 in. high; L. alternate, various in form, 1¼ in. long, ¼ in. thick, ½ in. wide, convex above and below, narrowed on both sides, with a blunt edge to the leaf; or sometimes 1 in. long, ¾ in. wide, ½ in. thick, with blunt tip, grey-green, often reddish,

easily dropping off and rooting; flowers in loose spikes, the 6–15 flowe standing out at right angles; F. *c.* $\frac{1}{2}$ in. across, greenish-red.

Adr. rhombifolius Lem. (*Cotyledon rhombifolia* Haw.), Cape Provinc Shrubby; L. broad obovate, spatulate, 2–4 in. long, $1\frac{1}{2}$–2 in. broad, flat abov convex on the back, with somewhat horny edge and short tip, grey-green, scal F. pale pink.

Adr. robustus Lem. = *Adr. triflorus* Bgr.



FIG. 7.—1. Adromischus maculatus Lem. 2. Adr. triflorus Bgr. 3. Adr. Mariannae Bgr. $\frac{2}{3}$ nat. size.

Adr. Schäferiana Bgr. (*Cotyledon Schäferiana* Dtr.), Great Namaqu land. Low plants; stems with pale grey rind, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, about $\frac{1}{8}$ i thick, with fleshy root, often stemless; L. 1–2, alternate, almost spheric usually $\frac{1}{2}$ in. long and broad, almost sessile, about $\frac{1}{4}$ in. thick, edge rounde upper side slightly concave, glassy green or even pale greyish-brown, wi red stripes, bare. Inflorescence terminal, *c.* $\frac{3}{4}$ in. long, with 1–3 F.; F. *c.* $\frac{1}{4}$ i long, tubes greenish, with red stripes. Mimicry plant!

Adr. triflorus Bgr. (fig. 7) (*A. robustus* Lem., *Cotyledon triflora* L Namaqualand. Stems $3\frac{1}{4}$–4 in. high, little branched from the base; L. sprea ing, longer than broad, convex on both sides, outlined, pale green; F. in lo racemes, often three together, pale red.

Adr. van der Heydenii hort. = *Adr. clavifolius* Lem.

Aeonium Webb. et Berth.

Family: CRASSULACEAE.

Occurrence: Canary Islands, Cape Verde Islands, Madeira, N. Africa.

Succulent shrubs or sub-shrubs with woody and ± branched stems, with true leaf scars, usually with aerial roots. L. alternate, usually crowded into rosettes at the ends of the branches. Some species have no distinct stem, so that the rosettes lie close to the ground. Rosettes flat or saucer-shaped. L. smaller the further from the ground, edge entire or ciliate. F. in pyramidal, dichotomously branched, curved racemes, bright yellow, white, pink or red, in spring. The flower-bearing branches die in many species after the seeds have ripened or, below the dead inflorescence, new shoots may break.

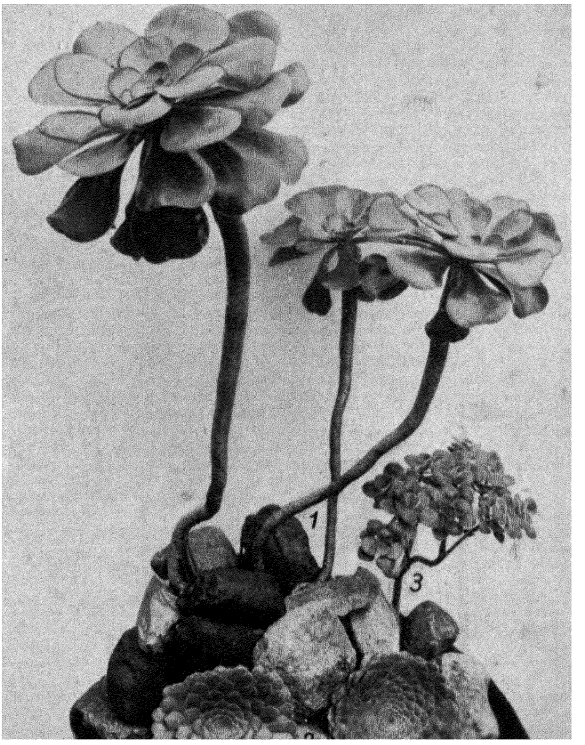


FIG. 8.—Aeonium arboreum W. et B. 2. Ae. tabulaeforme W. et B. 3. Aichryson dichotomum W. B.

Easily grown plants, especially suitable for cultivation in rooms. In winter they require a position in a bright cold house, not over 50° F., or in a cool room without too much moisture. In summer put out of doors, in groups or in the rock garden. The pots should be sunk so that water need only be given in very dry periods. But the plants like plenty of water in summer and a rich, sandy soil. Propagation is easy by means of seeds in August, quicker still from cuttings which may usually be stuck straight in the pots and even root easily in a room.

Ae. arboreum W. et B. (fig. 8) (*Sempervivum arboreum* L.), Southern Mediterranean region. Up to 3 ft. high, with erect stems, little branched; rosettes with many leaves, *c.* 8 in. ϕ; L. spatulate, blunt, with short tip, pale

green, with white hairs along the edge; F. in long racemes, 10–12 in. high, golden yellow.

Ae. arboreum W. et B. **v. atripurpureum** hort. In full sun the leaves become blackish-red.

Ae. arboreum W. et B. **v. albi-variegatum** hort. L. mottled, white.

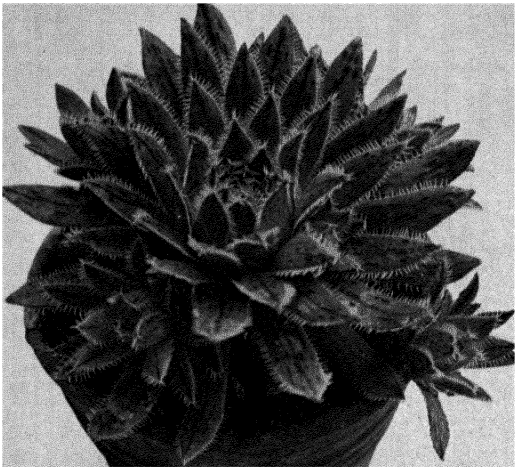


FIG. 9.—Aeonium caespitosum W. et B. (Photo, K. Josefsky.)

Ae. arboreum W. et B. **v. aurei-variegatum** hort. L. mottled, golden yellow.

Ae. balsamiferum W. et B. (*Sempervivum balsamiferum* W. et B.), Lanzarote (Canary Islands). Very tall, with stout stems, branched; rosettes saucer-shaped, 8 in. ϕ; L. spoon-shaped, with slender tips, pale green, sticky; F. pale yellow, rare. Very sensitive to excess moisture even in summer, therefore best kept in a greenhouse. Growing period in spring.

Ae. Burchardii Praeg. (*Sempervivum Burchardii* Praeg.), Teneriffe (Canary Islands) 8–12 in. high, branched, with shining brown rind; rosettes 3–4 in. ϕ; L. thick, keeled on the upper side, dark green; F. in slender racemes, soft ochre yellow. Beautiful but slow-growing species.

Ae. caespitosum W. et B. (fig. 9) (*Sempervivum caespitosum* C. Sm., *Semp. ciliatum* Sims), Grand Canary. Low, with spreading branches, forming cushions; branches very leafy, even the old L. do not fall off readily; rosettes wide; L. linear-lanceolate, fresh green, with reddish stripes, with numerous white hairs, $\frac{1}{16}$ in. long, close set along the edge; F. dark yellow. In the resting period the rosettes close up like bulbs. Requires full sun and a resting period. Striking species!

Ae. canariense Webb. (*Sempervivum canariense* Webb.), Teneriffe. Stem very short, rosettes appearing almost sessile; rosettes very large, up to 20 in. ϕ; L. broad spatulate, spoon-shaped, round above, dark green, both sides with thick, white hairs, rather sticky; inflorescence up to 30 in. high; F. pale yellow. Numerous offsets from the base of the rosette.

Ae. canariense Webb. **v. latifolium** Burch. Like the foregoing, with broader leaves.

Ae. ciliatum W. et B. (*Sempervivum ciliatum* Willd.), Palma, Teneriffe. Stems producing many side branches from the base, which are much twisted; central stems with large rosettes; L. at the end roundish spatulate, green to bluish-green, edge ciliate; inflorescence broad; F. whitish-green.

Ae. cuneatum Webb. (*Sempervivum cuneatum* W. et B.), Teneriffe. Stem very short, forming numerous offshoots; rosettes large, somewhat half egg-shaped; L. very long, narrow spatulate, smooth, pointed, bluish-green; flower stalk slender; F. pale yellow.

Ae. decorum W. et B. (*Sempervivum decorum* Christ.), Gomera (Canary Islands). Bushes up to 10 in. high, hemispherical; rosettes $1\frac{3}{4}$–$2\frac{1}{2}$ in. ϕ; L. pointed, weakly and irregularly toothed at the edge, green, flushed with



FIG. 10.—Aeonium hierrense Murr. (Photo, Dr Burchard.) (From B.z.Ö.u.B.d.K.)

bright coppery red, deep red margins; flowering sprays slender; F. soft pink. Freely branched even as small pot plants.

Ae. domesticum Praeg. (*Aichryson tortuosum* W. et B., *Sempervivum domesticum* Praeg., *S. tortuosum* DC.). Small shrub, rosettes $\frac{3}{4}$–2 in. ϕ; L. almost circular, narrowed towards the base, with fine hairs; F. yellow.

Ae. domesticum Praeg. **v. variegatum** hort. With mottled white leaves.

Ae. Goochiae Webb. et Berth. (*Sempervivum Goochiae* Webb.). Branches slender, little branched, prostrate, sometimes pendent; L. spirally arranged, crowded into rosettes at the top, horizontally outspread, stalked, rhomboidal-ovate, small, rather sticky, dark olive green; L. of the flowering rosettes dark purple; F. pink! Valuable for pots or hanging baskets.

Ae. Haworthii W. et B. (*Sempervivum Haworthii* S.D.), Teneriffe. Up to 2 ft. high, freely branched, with thin stems; rosettes numerous, close, in cultivation usually $2\frac{1}{2}$–3 in. ϕ; in its habitat the plant often has only one

stem and the rosettes are then up to 6 in. ϕ; L. uniformly broad, then abruptly sharp-tipped, bluish-green, edges reddish-brown, with horny teeth, keeled on the under side; F. white. Useful plant for rooms; recommended for growing in quantity.

Ae. hierrense Murr. (fig. 10) (*Sempervivum hierrense* Murr.), Ferro (Canary Islands). Stems short, silver grey, much swollen, 20 in. high; rosettes *c.* 20 in. ϕ, loose; L. long, narrow, smooth, curved upwards towards the tip, bluish-green, flushed with purple or violet, with stiff, fine ciliate hairs along the edge. Inflorescence *c.* 16 in. high and wide; F. pale pink, with darker stripes. Slow growing, producing flowers only when old.

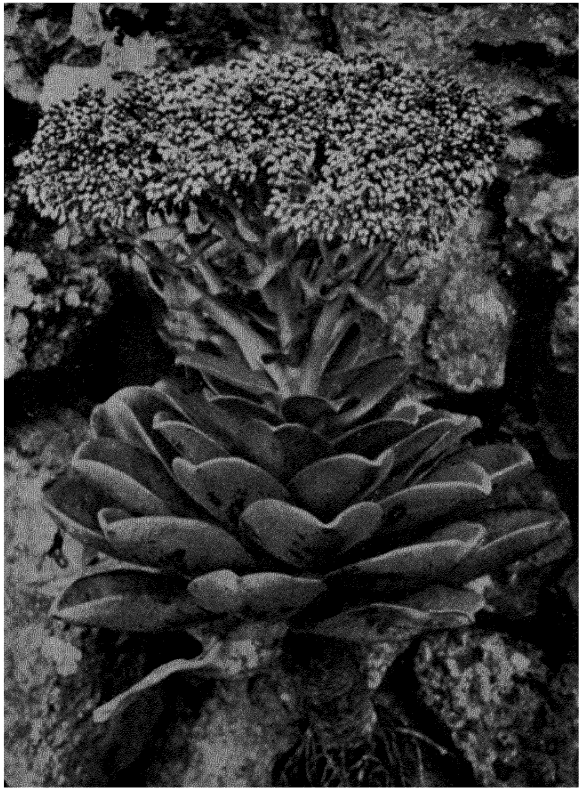


FIG. 11.—Aeonium nobile Praeg. et Burch. in flower. (Photo, Dr Burchard.) (From B.z.Ö.u.B.d.K.)

Ae. holochrysum W. et B. (*Sempervivum holochrysum* Christ.), Teneriffe. Tall stemmed, freely branched, erect at first, later somewhat pendent; rosettes close, *c.* 8 in. ϕ; L. narrow spatulate, smooth, pale yellowish-green, with a red middle stripe, red-margined and ciliate, thin; F. golden yellow. During the dry period the leaves go brown and are thrown off till only a small rosette remains.

Ae. Lindleyi W. et B. (*Ae. tortuosum* Pit. et Proust., *Sempervivum Lindleyi* W. et B., *S. viscosum* Webb., *S. tortuosum* Link), Teneriffe. Thick, hemispherical bushes, 6–8 in. high; branches numerous, thin, curved; rosettes small; L. roundish rhomboidal, thick, hairy, sticky, pale green, often reddish; F. golden yellow.

Ae. nobile Praeg. et Burch. (fig. 11) (*Sempervivum nobile* Praeg. et Burch.), Palma (Canary Islands). Short-stemmed when old; rosettes very large, up to 20 in. ϕ! L. up to 12 in. long, 5–8 in. wide, very fleshy, broadly channelled, margins turned up and rounded, pale olive green, sticky; inflorescences 20 in. wide, false umbels with purple, succulent involucral leaves; F. coppery scarlet. This species is quite the most beautiful of the Aeoniums,

but unfortunately still too little known. Young plants need considerable warmth, sun and moisture. After flowering, which seldom occurs before it is 7 years old, the plant dies and no side-shoots are produced. Propagation by seed.

Ae. percaneum Murr. (*Sempervivum percaneum* Murr.), Grand Canary. Erect growing; stems stout, freely branched, silver-grey skinned, producing many adventitious roots, which grow down into the soil; rosettes 3–5 in. ϕ; L. very fleshy, green, flushed with red; F. soft pink to flesh coloured.



FIG. 12.– Aeonium Saundersii Bolle × Ae. canariensis W. et B. v. latifolium Burch. (Photo, Dr Burchard.) (From B.z.Ö.u.B.d.K.)

Ae. Saundersii Bolle (*Sempervivum Saundersii* Christ.), Canary Islands. small, freely branched; rosettes 1¼–2½ in. ϕ; L. roundish oval, hairy, fleshy, juicy, green; F. yellow. In the resting period the rosettes close right up into balls the size of cherries. During the growing period wants moist soil and air. Attractive species.

Ae. Saundersii Bolle × **Ae. canariense** W. et B. **v. latifolium** Burch. (fig. 12), Gomera. Natural hybrid. Larger than *Ae. Saundersii*.

Ae. sedifolium Webb. (*Aichryson sedifolium* Webb., *Sempervivum sedifolium* Christ.), Canary Islands. 4–6 in. high, forming cushions, bushes with woody stem and branches, erect at first, later pendent; L. compressed into rosettes at the ends of the branches, short, thick, convex above, ¼ in. long, usually reddish-brown; F. large, golden yellow. Requires moisture.

Ae. Smithii W. et B. (*Sempervivum Smithii* Sims), Teneriffe. Low, little branched, older branches with thick, ½-in. long hairs; rosettes *c.* 4 in. ϕ, loose; L. fairly broad, wavy at the edge, with soft hairs, pale green or yellowish-

green, often bronze, with longitudinal red stripes on both sides; F. pale yellow.

Ae. strepsicladum W. et B. (*Sempervivum barbatum* Chr. Sm., *S. lineare* Haw., *S. spathulatum* Hornem., *S. strepsicladum* W. et B., *S. villosum* Ldl.), Teneriffe. Small shrubby species of pendent growth, thickly clothed with leaves; leaf rosettes arched, ascending; L. with raised reddish lines running longitudinally, sap green; F. yellow. Likes plenty of water and sun.

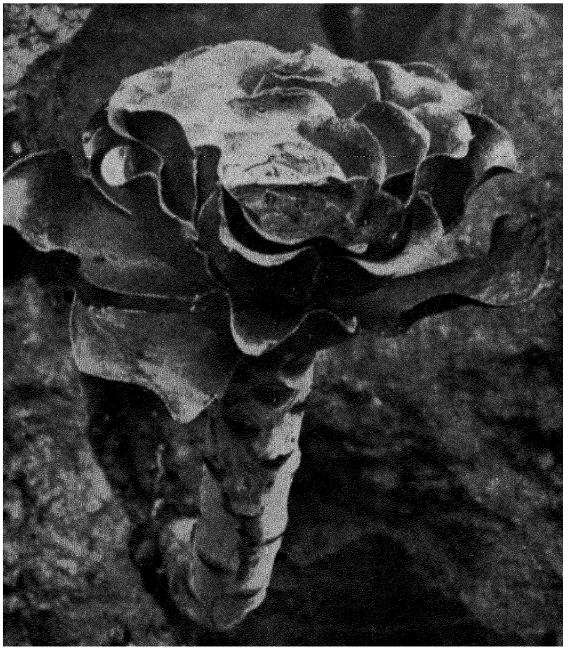


FIG. 13. Aeonium undulatum Webb.
(Photo, Dr Burchard.) (From B.z.Ö.u.B.d.K.)

Ae. tabulaeforme W. et B. (fig. 8) (*Sempervivum tabulaeforme* Haw.), Teneriffe. Very low semi-shrub or shrub; rosettes sessile, flat, plate-like, up to 20 in. ϕ; L. narrow spatulate, imbricate, finely ciliate at the edge, grass green; later the rosettes develop into freely branched inflorescences 2 ft. high; F. sulphur yellow. In their natural habitat the rosettes do not grow horizontally, but almost vertically. Species worth growing as a room plant, recommended for growing in quantity. Propagation by seed. The plants flower when 2–3 years old, and die after flowering. Not too bright a position.

Ae. tortuosum Bgr. (*Aichryson pulvinatum* Burch., *Ai. radicescens* W. et B., *Sempervivum pygmaeum* C. Sm., *S. radicescens* Lowe, *S. tortuosum* Ait.), Canary Islands. Small, forming cushions; intricately branched with small rosettes; L. $\frac{1}{2}$–$\frac{3}{4}$ in. long, about $\frac{1}{4}$ in. wide, $\frac{1}{6}$ in. thick, pale green, brownish when in the sun, with thick hairs. F. golden yellow. Very attractive.

Ae. tortuosum Pit. et Proust. = *Ae. Lindleyi* W. et B.

Ae. undulatum Webb. (fig. 13) (*Sempervivum undulatum* W. et B., *S. Youngianum* Bourg.), Grand Canary. Larger, stout stemmed, little branched shrub, up to 3 ft. high, silver grey, with reddish-brown leaf traces; rosettes up to 12 in. ϕ; L. spatulate, very broad at the end, almost spoon-shaped, edge bordered and wavy, finely ciliate, shining dark green; inflorescence broadly pyramidal; F. dark yellow. Beautiful species!

Ae. urbicum W. et B. (*Sempervivum urbicum* C. Sm.), Teneriffe Stem simple, little branched, freely forming aerial roots; branches mostly springing from the base and curved upwards; rosette 8–10 in. ϕ eventually; L. oblong spatulate, ± sharp pointed, margins reddish to violet-purple; F. greenish-white or pale pink. Likes moist air.

Agave L.

Family: AMARYLLIDACEAE.

Occurrence: Southern N. America, Mexico, Central America, northern S. America, West Indies.

Shrubs or low bushes. L. in rosettes, of very firm, hard and ± fleshy texture, lanceolate to sword-shaped, edge entire or toothed, usually with a strong spine at the tip, green or bluish-green, often with a coloured margin; the young L. usually in cone-shaped buds, often bearing the impress of the older leaves. F. in long, terminal and usually very tall panicles, numerous. Since, as a rule, the F. appear only when the plant is old and after it has attained a considerable size, they are of no great importance in cultivation. The rosettes die after flowering or at least when the fruit has ripened. Most Agaves make many offsets, which usually root while still attached to the parent plant and can be used for propagation.

Agaves have long been considered attractive plants. They are suitable, large specimens especially, as decorative plants in the garden. In summer the Agaves like a very sunny position in the open, on balconies or near open windows. They are best out of doors, planted in a very well-drained, heavy soil. In pots or tubs a sandy, rich compost and soil from a hot bed should be used. The receptacle should not be too large, and good drainage provided by means of a layer of crocks or stones. Most species should be wintered in a frost-free, cold house or a cool room. Agaves planted out in summer need not necessarily be potted up but may be plunged in ashes. For this method of cultivation planting in a wire basket is useful, as this holds the roots together better. Propagation is easy by means of the offsets, which should have the cut surface well dried before planting. Propagation by seed in spring in a temperate greenhouse. Since the Agaves have often been crossed amongst themselves, seed raising is not entirely recommended. Many species are useful for cultivation in quantity. Below, the best known species only can have brief mention. Those interested are referred to the excellent work of Alwin Berger, *Die Agaven.*

A. americana L. (*A. Vera-Cruz* Drumm. et Prain.), Mexico? In S. Europe, the coasts of S. and N. Africa, as well as in the East Indies, partly naturalised. Rosettes forming numerous off-shoots, reaching 6–9 ft. ϕ when

old; L. 20–30, stiffly erect, the upper part often hanging over, long lanceolate, up to 5 ft. long and 8 in. broad, gradually narrowing, upper side almost flat, twisted like a screw towards the tip and ending in a thick spine $1\frac{1}{8}$ in. long; grey-green, with light grey cross-stripes, margins slightly crenulate, toothed, marginal spines $\frac{1}{3}$–$\frac{1}{2}$ in. long, curved, blackish-brown, later grey. Grows easily. Much admired and very suitable for growing in quantity, especially the variegated forms: **v. marginata** Trel. (fig. 14), leaf margins golden yellow; **v. marginata alba** Trel., leaf margins white or pale pink; **v. marginata aurea** Trel., leaf margins pale or greenish-yellow; **v. marginata pallida** Bgr., leaf margins pale green; **v. mediopicta** Trel., L. with pale yellow and green stripes in the centre; **v. striata** Trel., L. with very narrow cream-coloured stripes in the centre.

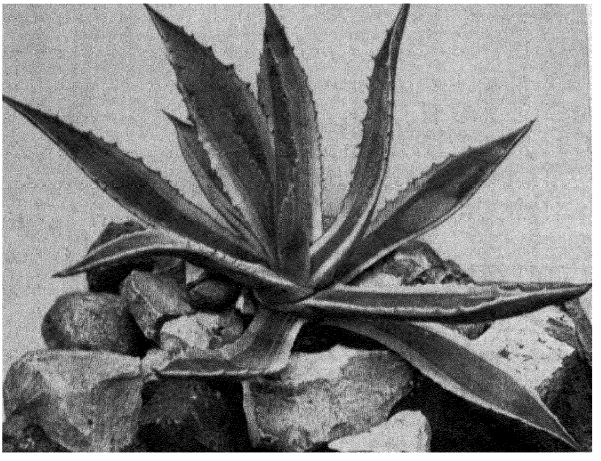


FIG. 14.- Agave americana L. v. marginata Trel. (Photo, K. Josefsky.)

A. applanata C. Koch, Mexico. Rosettes very close, making few off-sets; L. rigid, erect, up to 3 ft. long, broadly linear-lanceolate, 4 in. wide, tapering, slightly hollow on the upper side towards the tip, edge horny, blackish-brown terminal spine $2\frac{1}{2}$–3 in. long, marginal spines stout, curved; pale grey, almost white. Beautiful species.

A. atrivirens Baker = *A. Salmiana* Otto.

A. atrovirens Karw., Mexico. Similar to *A. Salmiana*. L. broader, tips turned inwards; blackish-green.

A. attenuata Salm., Mexico. When old with a stem 3 ft. high and 3–4 in. thick, branching from the base; rosettes with 6–15 leaves; L. erect, 30 in. long, elliptical, $\frac{3}{4}$–1 in. wide, with a soft tip, much narrowed at the base, somewhat hollow on the upper side, edges curved out, very convex at the back; smooth, green, with soft flesh; margins without spines, rather paler. Requires warmth.

A. densiflora Hook. (*A. polyacantha* Jacobi *v. densiflora* Terrac.), Mexico. Like *A. polyacantha*. Leaf margins reddish.

A. Desmetiana hort. = *A. horrida* Lem.

A. disceptata hort. Decorative hybrid: **A. schidigera** Lem. × **A. filifera** Salm.

A. Dyckii hort. = *A. Salmiana* Otto.

A. echioides Jacobi (*A. striata* Salm. *v. echioides* Baker), Mexico. Similar

to *A. stricta* Salm. Rosette only about 12 in. ϕ; L. rather flatter. Popular small species, recommended for growing in quantity.

A. Ferdinandi-Regis Bgr., Mexico. Similar to *A. Victoriae-Reginae*. L. *c.* 5 in. long, very stiff, upper side deeply concave, almost grooved, sloping below, sharply keeled; horny strips black in the lower part. Very beautiful!

A. ferox C. Koch, Mexico. Rosettes large, making but few offsets; L. 20–30, up to more than 3 ft, oblong spatulate, up to 12 in. broad, narrower below, tapering suddenly above, rather hollow on the upper side, forming almost a groove at the tip; the reverse very convex and keeled; rigid; fleshy, dark green, shining, margins wavy and toothed, marginal spines $\frac{1}{2}$–1 in. long, hooked; terminal spine $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, blackish-brown.

A. filifera Salm., Mexico. Rosettes forming offsets, spherical, with thicker, more conical leaf buds, up to 25 in. ϕ; L. numerous, somewhat curved upwards, 8–10 in. long, 1 in. broad, lanceolate, gradually tapering, stiff, upper side rather hollow, rather shiny green, with 2–3 white lines and a pale horny band, which splits up into 5–6 long threads, terminal spine $\frac{1}{2}$-$\frac{3}{4}$ in long, brown, later grey. Beautiful slow-growing species.

A. filifera Salm. **v. filamentosa** Baker (*A. filifera* Salm *v. major* hort.) Like *A. filifera*. L more loosely arranged and almost twice as long.

A. Franzosinii Nissen, Mexico Similar to *A. americana*, but more imposing and beautifully coloured. Rosettes up to 15 ft. ϕ; L. about 16 in. wide at the centre.

A. Ghiesbreghtii C. Koch, Mexico. Rosettes many leaved, forming offsets, L. curved inwards slightly, tapering gradually, not very hollow on the upper side, rounded on the back, with an almost round keel, shining dark green, horny edge *c* $\frac{1}{8}$ in. broad, marginal spines about $\frac{1}{8}$ in. long, mostly wanting above, terminal spine $\frac{1}{2}$ in. long.

A. heteracantha Bgr, Mexico. Similar to *A. univittata* Rosette without offsets; marginal spines very close together, irregularly curved this way and that

A. horrida Lem. (*A. Desmetiana* hort., *A. Regeliana* hort., *A splendens* Jacobi), Mexico. Rosette without offsets, up to 24 in. ϕ, many-leaved; L. slightly incurved, oblanceolate, up to 16 in. long, tapering suddenly, stiff and hard, glossy dark green, smooth, with brown horny edge; marginal spines large and stout, curved this way and that; terminal spine 1–$1\frac{1}{4}$ in. long, twisted. Very spiny.

A. ingens Bgr., Mexico. Similar to *A. americana*. More elegant in form Terminal spine slender, thin, lateral spines distant, almost wanting towards the tip.

A. ingens Bgr. **v. picta** Bgr. (*A. picta* Salm.). L. with a beautiful yellow margin

A. lophantha Schiede, Mexico. Rosettes large, loose, forming offsets; L. up to 3 ft. long, 3 in. at the base, $1\frac{1}{2}$ in. wide in the middle, tapering gradually, stiff, firm, grey-green, slightly hollow on the upper side, slightly convex

on the back, triangular, curved upwards; terminal spine very sharp, 1 in. long. Beautiful species.

A. lurida Ait., Mexico. Rosette many-leaved, forming offsets; L. up to 3 ft. long, linear-lanceolate, up to 6 in. broad in the middle, tapering gradually, with brown terminal spine, $\frac{3}{4}$–1 in. long; marginal spines triangular; thin, flaccid, the older leaves often curved over; grey-green, with grey stripes longitudinally and transversely.

A. parrasana Bgr. (fig. 15), Mexico. Rosettes almost spherical, making but few offsets; L. up to 12 in. long, 4–7 in. broad, tapering abruptly to a short

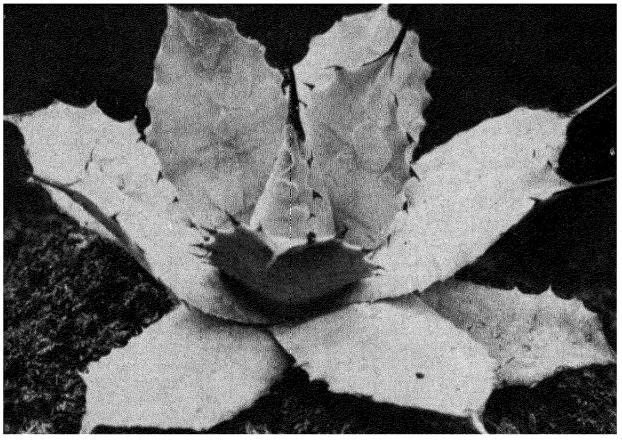


FIG. 15.—Agave parrasana Bgr. (Photo, Hanburg.) (From V.P.B.)

point; terminal spine 1 in. long, brown; edges sinuous and toothed, the upper half with strong curved spines; light bluish-green.

A. picta Salm. = *A. ingens* Bgr. *v. picta* Bgr.

A. polyacantha Haw., Mexico. Rosette broader than high; L. *c.* 20–30 in. long, 4–6 in. broad in the middle, slightly curved inwards, compact, green or slightly frosted with pale grey; marginal spines numerous, small, triangular, brown, about $\frac{1}{8}$ in. long; terminal spine $\frac{1}{2}$–$\frac{1}{4}$ in. long. Beautiful species.

A. polyacantha Haw. **v. densiflora** Terrac. = *A. densiflora* Hook.

A. Regeliana hort. = *A. horrida* Lem.

A. Salmiana Otto. (*A. atrivirens* Baker, *A. Dyckii* hort., *A. Whitackeri* hort.), Mexico. Rosettes forming offsets, leaves loose; L. somewhat recurved, up to 6 ft. long, oblanceolate, up to 20 in. broad, narrower below, tapering above; slightly hollow on the upper side, slightly incurved towards the tip, very convex on the back; close and very fleshy, rigid, grey-green; marginal spines stout, very distant in the upper part, finally wanting; terminal spine 3 in. long, blackish-brown.

A. schidigera Lem., Mexico. Rosette low spherical, up to 3 ft. ϕ;

L. numerous, thickened at the base, then suddenly narrowed, 20 in. long, $\frac{1}{2}$ in. broad, convex on both sides, pale green, with a narrow, horny margin which splits into threads; terminal spine $\frac{1}{4}$–$\frac{1}{2}$ in. long. Not forming offsets.

A. sisalana Perr. Native country unknown. (Cultivated plant, yields sisal hemp.) Forming a stem with age, forming offsets; L. in thick rosettes,

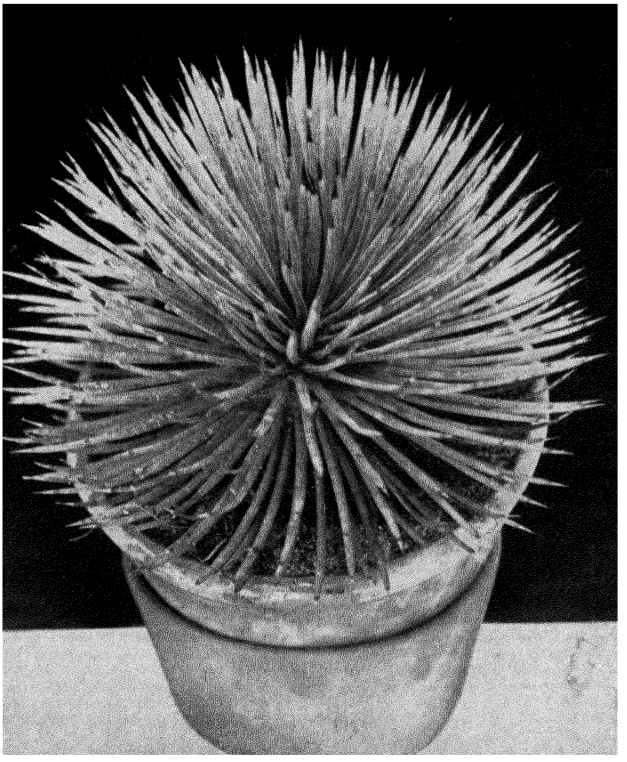


FIG. 16.—Agave stricta Salm. (Photo, K. Josefsky.)

narrow lanceolate, fairly long, green, with a horny edge, with small terminal spine. Cultivation in a warm greenhouse.

A. splendens Jacobi = *A. horrida* Lem.

A. striata Zucc., Mexico. Rosettes with many leaves; L. stiff, ascending, 16–18 in. long, thickened at the base, then suddenly narrowed and tapering, $\frac{1}{4}$ in. wide, triangular, grey-green, with darker stripes, edge smooth; terminal spine about $\frac{1}{3}$ in. long, brown.

A. striata Salm. **v. echioides** Bak. = *A. echioides* Jacobi.

A. striata Zucc. **v. stricta** Bak. = *A. stricta* Salm.

A. stricta Salm. (fig. 16) (*A. striata* Zucc. *v. stricta* Bak., *A. Hystrix* hort.), Mexico. Rosettes spherical, with leaves very close; L. erect or slightly curved inwards, *c.* 14 in. long, very broad at the base, then suddenly narrowed,

linear and tapering to a short tip, $\frac{1}{3}$ in. wide, both sides slightly keeled, green, with a thin, horny edge; terminal spine $\frac{3}{4}$–1 in. long, 3–4-angled, very sharp.

A. tehuacanensis Haw. (*A. tehuacensis* Karw.), Mexico. Similar to *A. Salmiana*, but more rigid; leaf margins sinuous, spines curved backwards; terminal spine long, very sharp, chestnut brown; colour of the L. paler, grey-green.

A. univittata Haw., Mexico. Rosettes forming offsets, up to 16 in. ϕ; L. lanceolate-sword shaped, gradually tapering, 1–1$\frac{1}{2}$ in. wide, rather shiny, green, with horny edge, with definite, paler central stripe; marginal spines hooked, triangular, bent forwards and backwards; terminal spine about 1 in. long, slender, brown.

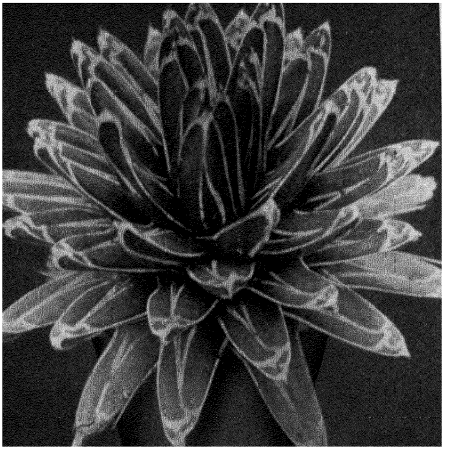


FIG. 17.—Agave Victoriae-Reginae T. Moore. (Photo, K. Josefsky.)

A. Victoriae-Reginae T. Moore (fig. 17) (*A. Consideranti* Duch.), Mexico. Rosettes without offsets, broadly spherical; L. numerous, stiff, 4–6 in. long, narrowed into a short tip, 2 in. broad, stiff, slightly curved inwards, hollow above, convex at the back, keeled near the tip; edges and keel smooth and with a white, horny band, dull dark green marked with oblique white lines; terminal spines $\frac{1}{2}$–$\frac{3}{4}$ in. long, often with two short spines near. Beautiful, slow-growing species, recommended for growing in quantity.

Propagation by seed. Requires rather more warmth.

Aichryson Webb. et Berth.

Family: CRASSULACEAE.

Occurrence: Canary Islands, Madeira.

Annual or biennial herbs, dying after flowering, 8–16 in. high, succulent. Stem erect, forked, loose leaved. L. only towards the ends, in rosettes, alternate, stalked, with soft hairs. F. in pseudo-umbels, yellow, in summer.

Easily grown plants for room cultivation. Position not too bright, rather cool. Propagation from seed. Usually flower the second year.

A. dichotomum W. B. (figs. 8 and 18) (*Sempervivum annuum* Chr. Sm., *S. dichotomum* DC.). Stem dichotomously branched; L. broad ovate, blunt, thickly covered with soft hairs, like the stem often flushed with purple or bronze, otherwise bright green; F. bright yellow.

A. pulvinatum Burch. = *Aeonium tortuosum* Bgr.

A. radicescens W. et B. = *Aeonium tortuosum* Bgr.
A. sedifolium Webb. = *Aeonium sedifolium* Webb.
A. tortuosum W. et B. = *Aeonium domesticum* Praeg.

Aizoaceae (Family) Genera described: *Acrodon, Acaulon, Aethephyllum, Aistocaulon, Aloinopsis, Antimima, Argeta, Argyroderma, Aridaria, Apatesia, Aptenia, Astridia, Bergeranthus, Bolusanthemum, Braunsia, Brownanthus, Bijlia, Calamophyllum, Carpanthea, Carpobrotus, Carruanthus, Cephalophyllum, Chasmatophyllum, Cheiridopsis, Cleretum, Conicosia, Conophyllum, Conophytum, Corpuscularia, Cryophytum, Cylindrophyllum, Dactylopsis, Deilanthe, Delosperma, Derenbergia, Didymaotus, Dinteranthus, Diplosoma, Disphyma, Dorotheanthus, Dracophilus, Drosanthemum, Eberlanzia, Ebracteola, Echinus, Erepsia, Faucaria, Fenestraria, Frithia, Gibbaeum, Hereroa, Herreanthus, Hydrodea, Hymenocyclus, Imitaria, Juttadinteria, Lampranthus, Lapidaria, Lithops, Machairophyllum, Mentocalyx, Mesembrianthemum, Meyerophytum, Mitrophyllum, Monilaria, Muiria, Muirio-Gibbaeum, Namibia, Nananthus, Nelia, Neorhine, Odontophorus, Oophytum, Ophthalmophyllum, Orthopterum, Oscularia, Platythyria, Pleiospilos, Prenia, Psammophora, Punctillaria, Rabiea, Rhinephyllum, Rhombophyllum, Rimaria, Roodia, Ruschia, Sceletium, Schwantesia, Schönlandia, Semnanthe, Sterropetalum, Stomatium, Thyrasperma, Titanopsis, Trichocyclus, Trichodiadema, Verrucifera.*

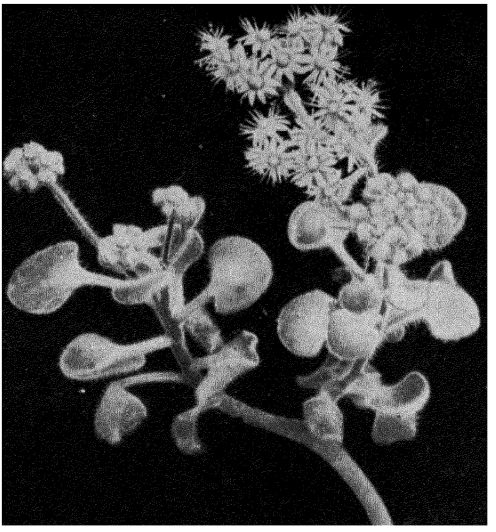


FIG. 18. Aichryson dichotomum W. B.

Aloe L.

Family: LILIACEAE.

Occurrence: S. Africa, Arabia, Mediterranean.

Stemless, with short stems or making tall, shrub-like plants. L. arranged in rosettes, less often in two rows or scattered, fleshy, usually lanceolate, edge entire, horny or toothed, with spines on the surface also in some cases, green, grey-green, reddish, often flecked or striped. Inflorescence from the leaf axils simple or branched. F. in nodding racemes, short stalked, numerous, red, yellow or orange.

Usually unpretentious succulents, the smaller species valued as room plants. The majority may be put out of doors in summer in a

sunny place. In winter keep in a cold house, fairly dry. If the plants remain under glass in summer, give plenty of air and water. Need rich sandy soil and good drainage. Easily increased by cuttings, as by the number of offsets formed, and occasionally from leaf cuttings. Readily propagated by seed, but not advised on account of the tendency to hybridisation. Cheap succulents recommended for growing in quantity. The genus consists of many species. Only the most important species can receive brief mention here. Those interested should refer to the specialised literature.

A. albo-cincta Haw. = *A. striata* Haw.

A. altilinea Roem. et Schult. = *Haworthia altilinea* Haw.

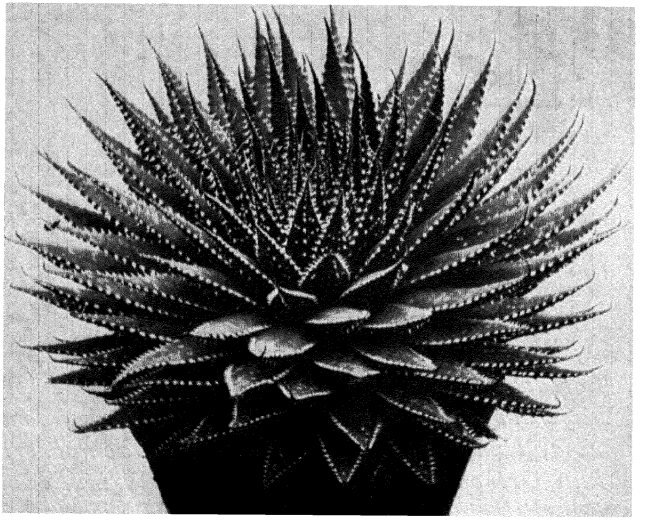


FIG. 19.—Aloe aristata Haw.

A. angulata Willd. = *Gasteria angulata* Haw.

A. arachnoidea Mill. (*A. arachnoides* Thunb.) = *Haworthia arachnoides* Haw.

A. arborea Medic. = *A. arborescens* Mill.

A. arborescens Mill. (fig. 20) (*A. perfoliata* v. *arborescens* Soland, *A. arborea* Medic., *A. fruticosa* Lam.), Cape Province. Stem simple, 3–6 ft. high, *c.* 2 in. thick; rosettes close; L. up to 2 ft. long, 2 in. broad, sword-shaped, thinning upwards, grey or dark green, fleshy, upper side rather hollow towards the base; marginal spines close, up to $\frac{1}{2}$ in. long, sharp; F. red, in winter. Valued plant for room cultivation.

A. aristata Haw. (fig. 19) (*A. longiaristata* R. et Sch.), Cape Province. Stemless; rosette close; L. numerous, spreading, 3–4 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, up to $\frac{3}{4}$ in. thick, green or grey-green, especially on the under side with short,

soft, white, tuberculate spines, as well as on the edge; the tip ending in a transparent bristle, $\frac{1}{2}$ in. long; F. orange red, May–June. Attractive, small species. To be grown under glass. Needs rich hot-bed soil with loam added. Propagation possible by means of leaf cuttings.

A. atrivirens DC. = *Haworthia atrivirens* Haw.

A. attenuata Haw. = *Haworthia attenuata* Haw.

A. ausana Dtr., Great Namaqualand (often called *A. ausensis*). Similar to *A. variegata*, and cultivation the same. L. up to 5–7, not arranged in three rows, but in a rosette, 5 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. wide, deeply grooved, with spots not definitely in lines.

A. barbadensis Mill. = *A. vera* L.

A. Beguinii hort. (hybrid). Similar to *A. aristata*, but more robust, markings on the L. not so strong.

A. brevifolia Mill. (*A. prolifera* Haw.), Cape Province. Short stemmed, simple; rosettes very close; L. 3–4 in. long, $\frac{3}{4}$–1 in. broad, up to $\frac{3}{8}$ in. thick, lanceolate, flat on the upper side, hollow towards the top, smooth, convex at the back, not very spiny above, grey-green, marginal spines about $\frac{1}{8}$ in. long, whitish; F. red.

A. candicans Roem. et Schult. = *Gasteria candicans* Haw.

A. carinata Mill. = *Gasteria carinata* Haw.

A. ciliaris Haw., Cape Province. Stems *c.* $\frac{3}{8}$ in. thick, slender, leaves distant; L. with striped sheath, recurved, linear-lanceolate, tapering, 3–6 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, thin, green, much toothed along the edge; F. bright red, January–March.

A. coarctata Roem. et Schult. = *Haworthia coarctata* Haw.

A. cymbaefolia Schrad. = *Haworthia cymbiformis* Haw.

A. cymbiformis Haw. = *Haworthia cymbiformis* Haw.

A. dichotoma L. f., S.W. Africa. Stem forked when old, becoming very tall; L. arranged in an open spiral, 6–10 in. long, 2–3 in. wide, linear, rounded above, grey, finely toothed; F. yellow.

A. Dinteri Bgr., S.W. Africa. Stemless, without offsets; rosette 10 in. ϕ and high; L. in three rows, 8–10 in. long, below the centre 3 in. broad, very sharp, narrowed to the base, sickle-shaped, recurved, deeply channelled, keeled, almost pleated; keel and edges with fine, horny, almost transparent lines, margins below the middle with fine erect teeth, on the other part $\pm$ wanting; colour on both sides blackish to brownish-green, with 6–10 white, narrow, indistinct flecks in transverse lines. (This species looks like *A. variegata*.) Inflorescence 20–30 in., with 3–8 branches; F. about 1 in. long, pale red

A. disticha Mill. = *A. saponaria* Haw.

A. eru Bgr., Eritrea. Shrubby; L. sword-shaped, curved ascending, 16–24 in. long, $1\frac{1}{2}$–3 in. wide, strongly convex below, shining green, usually beautifully marked with white, edge horny, with stout teeth; inflorescence up to 6 ft high, branched; F. orange yellow, March–May

A. fasciata Salm. = *Haworthia fasciata* Haw.

A. ferox Mill. (*Pachydendron ferox* Haw.), Natal. Tall in old age;

L. close, 18–24 in. long, 4–6 in. wide, up to $\frac{5}{8}$ in. thick; lanceolate, grey-green, brownish-red when young, both sides with many horny spines; marginal spines close, brown, about $\frac{1}{5}$ in. long; F. red, March–April.

A. fruticosa Lam. = *A. arborescens* Mill.

A. granata Roem. et Schult. = *Haworthia margaritifera* Haw. *v. granata* Bak.

A. grandidentata S.D. (fig. 20), Cape Province. Short-stemmed; L. 12–20 in. long, $2\frac{1}{2}$–$3\frac{1}{4}$ in. wide, faintly striped, lanceolate, narrower above, green, with longitudinal, irregular, whitish markings running into each other; edges with close, red-brown spines, $\frac{1}{6}$ in. long; F. pale red to yellow, in summer.

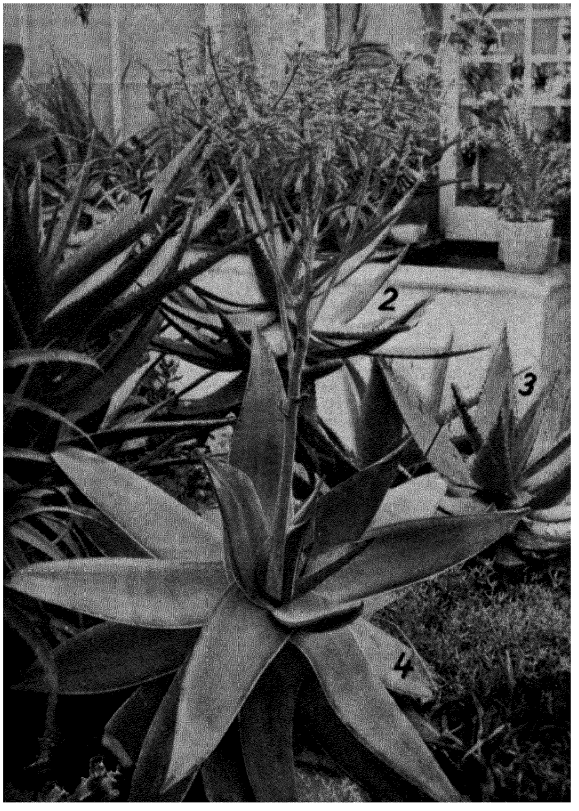


FIG. 20.—1. Aloe grandidentata S.D. 2. A. supralaevis Haw. 3. A. Marlothii Haw. 4. A. striata Haw. To the left, leaves of A. arborescens Mill.

A. herbacea Mill. = *Haworthia atrivirens* Haw.

A. Juttae Dtr., Great Namaqualand. Almost stemless, forming clumps of 2–8 rosettes *c.* 12 in. ϕ; L. ascending, *c.* 12 in. long, *c.* 2 in. wide, gradually narrowing to the tip, in the centre *c.* $\frac{1}{2}$ in. thick, bluish-green, with oblong white spots on both sides; teeth *c.* $\frac{1}{8}$ in. long, at first $\frac{1}{4}$ in. apart, later more distant; inflorescence *c.* 24 in. high; F. pale orange yellow to red.

A. latifolia Haw. (*A. saponaria* Haw. *v. latifolia*), Cape Province. Like *A. saponaria*. L. longer and broader.

A. lingua Thbg. = *Gasteria lingua* Bgr.

A. longiaristata R. et Sch. = *A. aristata* Haw.

A. maculata Willd. = *Gasteria maculata* Haw.

A. margaritifera Willd. = *Haworthia margaritifera* Haw.

A. Marlothii Bgr. (fig. 20), S. Africa. Similar to *A. supralaevis*; L. frosted grey, strongly spined. F. yellow.

A. nigricans Haw. = *Gasteria nigricans* Haw.

A. nitida S.D. = *Gasteria nitida* Haw.

A. obliqua DC. = *Gasteria pulchra* Haw.
A. obliqua Haw. = *Gasteria maculata* Haw.
A. obliqua Jacq = *Gasteria nigricans* Haw.
A. officinalis Forsk. = *A. vera* L. *v. officinalis* Baker.
A. pallida Roem. et Schult = *Haworthia pallida* Haw.
A. perfoliata v. arborescens Soland = *A. arborescens* Mill.
A. planifolia Roem. et Schult. = *Haworthia planifolia* Haw.

A. plicatilis Miller, Cape Province. Usually shrubby; stems repeatedly forked, L arranged in two definite rows, linear, rounded above, 9½–16 in. long, 1–1½ in wide, grey-green, with a horny edge, finely toothed towards the tip.

A. polyphyllus Schonl, S Africa Stem hardly 4 in. high; rosettes usually solitary, 20–32 in ϕ, 12–20 in. high, consisting of 75–150 spirally arranged leaves, L. usually 8–12 in long, 2½–4 in broad, about ¾ in. thick at the base, oblanceolate, tapering, rather sickle-shaped, with a stout, dark brown point at the end, grey-green, the margin with a pale horny edge, with 2–12 pale, curved, three-cornered teeth, ⅕–⅓ in long; inflorescence much branched, 20–24 in high; F. 1⅛–1⅜ in long, green, with purple tips. Interesting and desirable new species, much resembling in habit a large *Aeonium*, which deserves to be widely known.

A. prolifera Haw = *A brevifolia* Mill
A. pulchra Jacq = *Gasteria pulchra* Haw.
A. pumila L **v. margaritifera** = *Haworthia margaritifera* Haw
A. punctata Haw. = *A variegata* L.
A. radula Jacq = *Haworthia radula* Haw
A. radula Salm = *Haworthia attenuata* Haw
A. Reinwardtii Haw = *Haworthia Reinwardtii* Haw.
A. retusa L = *Haworthia retusa* Haw.
A. rubescens DC. = *A. vera* L. *v. officinalis* Baker.

A. saponaria Haw. (*A. disticha* Mill., *A. umbellata* S.D.), Cape Province. Short stemmed, forming offsets; rosettes close; L 6–8 in. long, 1½–2½ in. wide, almost ½ in. thick, narrowed towards the tip, flat above, convex below, green, with oval, whitish markings in irregular, loose rows; edge with three-cornered, brownish spines, F. reddish-yellow, in summer.

A. saponaria Haw. **v. latifolia** = *A. latifolia* Haw.
A. scabra Roem. et Schult. = *Haworthia scabra* Haw.
A. setosa Roem. et Schult. = *Haworthia setosa* Haw.
A. socotrina DC. = *A. succotrina* Lam.

A. striata Haw. (fig. 20) (*A. albo-cincta* Haw.), Cape Province. Almost stemless; rosettes close; L. 18–20 in. long, 4–6 in. wide, *c.* ⅜ in. thick, lanceolate, later recurved, grey-green, often reddish, frosted, indefinitely flecked and striped, edge entire, with a white horny margin $\frac{1}{12}$ in. wide; F. orange red.

A. subcarinata S.D. = *Gasteria subcarinata* Haw.

A. succotrina Lam. (*A. socotrina* DC.), Cape Province. Stem stout, forked; rosette up to 32 in. ϕ; L. *c.* 20 in. long, 2 in. broad, sword-shaped,

grey-blue, edge white, horny, teeth close together, pale; F. reddish, January–February.

A. supralaevis Haw. (fig. 20) (*Pachydendron supralaeve* Haw.). Stem simple, stout, up to 6 ft. high; L. numerous, 20–28 in. long, 4–7 in. wide, lanceolate, sword-shaped, grey-green; edge and upper part of the keel spiny; F. orange yellow, April.

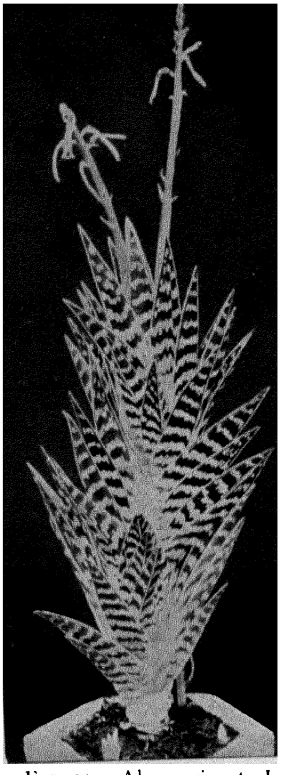


FIG. 21.—Aloe variegata L.

A. tessellata Roem. et Schult. = *Haworthia tessellata* Haw.

A. tessellata Roem. et Schult. **v. parva** = *Haw. tessellata* Haw. *v. parva* Bak.

A. Thraskii Bak., S.E. Africa. Stem up to 8 ft.; L. sword-shaped, edges incurved, not very fleshy, recurved, grey-green, with small brown teeth along the margin; F. yellow.

A. tortuosa Haw. = *Haworthia tortuosa* Haw.

A. trigona Roem. et Schult. = *Gasteria trigona* Haw.

A. turgida Roem. et Schult. = *Haworthia turgida* Haw.

A. umbellata S.D. = *A. saponaria* Haw.

A. variegata Dtr. = *A. ausana* Dtr.

A. variegata L. (fig. 21) (*A. punctata* Haw.), Cape Province. Stem usually not distinct, closely covered with leaves in a rosette in three series, up to 12 in. high; L. erect, 5 in. and more long, up to $1\frac{1}{2}$ in. wide, lanceolate, concave above, keeled on the back, dark green, with oval, whitish markings in irregular transverse lines; margins horny, with white teeth; F. reddish. Favourite species, on account of the dry air grows better in a room than in a greenhouse. Propagation by means of the numerous subterranean offshoots, as well as by shoots above ground in the leaf axils. Seedlings make saleable plants in two years. Keep moist in summer, water very little in winter!

A. vera L. (*A. barbadensis* Mill., *A. vulgaris* Lam.), Southern Mediterranean. Stem short, producing offshoots; L. 16–20 in. long, 3–$3\frac{1}{2}$ in. wide, rounded at the back, grey-green; marginal spines distant, pale; F. yellow, winter to spring.

A. vera L. **v. officinalis** Baker (*A. officinalis* Forsk., *A. rubescens* DC.). Similar to the foregoing; F. orange yellow.

A. verrucosa Mill. = *Gasteria verrucosa* Haw.

A. virens Haw., S. Africa. Stemless, making offshoots freely; L. 8 in. long, 1–2 in. wide, narrow lanceolate, tapering slowly, pale green, with darker stripes, a few pale markings; marginal teeth distant, light; F. red, spring to summer.

A. viscosa L. = *Haworthia viscosa* Haw.
A. vulgaris Lam. = *A. vera* L.

Amaryllidaceae (Family). Genus described: *Agave*.

Anacampseros L.

Family: PORTULACACEAE.

Occurrence: S.W. Africa, Cape Province, S.W. Australia.

The genus Anacampseros is divided into four sections:

(*a*) Avonia E. Mey.: Low, succulent shrubs, often with tuberous roots and simple or branched stems; L. very small, roundish, entirely covered by the silvery, parchment-like, scaly stipules lying closely one over another, and hardly visible. Species: **Anacampseros albissima, A. Alstonii, A. Herreana, A. Meyeri, A. papyracea, A. quinaria, A. Ruschii.** Not easy and rather rare in cultivation. They like sandy, rather loamy, well-drained soil, plenty of water in summer, very dry in winter, always in a bright, warm position in a greenhouse, not below 60° F. Propagation by seed, more difficult by cuttings.

(*b*) Rosulatae Dtr.: Only species: **A. Dielsiana.**

(*c*) Telephiastrum Dill.: Low, succulent shrubs, often with fleshy roots, branches ± numerous, frequently dichotomously branched; L. alternate, often spirally arranged, rather oval acute, thick, very fleshy; often with hairs or bristles in the leaf axils, often the L. covered with a web; F. 2–4 on slender stem, with 5 petals, whitish or red, in summer. The flowers often open for a few hours only, or do not open at all, but produce seeds none the less by self-pollination. Species: **Anacampseros arachnoides, A. Baeseckii, A. crinita, A. filamentosa, A. lanceolata, A. lanigera, A. Poellnitziana, A. rufescens, A. Telephiastrum, A. tomentosa.** Easily grown plants in rich, sandy soil. Need a bright position, rather warm. Keep moist in summer, rather drier in winter. Propagation easy from seeds or cuttings. Sow in heat, in sandy soil, and directly after germination (in a few days) prick out; in a few weeks transfer to small pots.

(*d*) Tuberosae von. Poelln.: Only species: **A. australiana.**

Those interested are referred to A. Berger's book, *Mesembrianthemen und Portulacaceen*, as well as the excellent work of Dr Karl von Poellnitz, "Versuch einer Monographie der Gattung Anacampseros" (1933, *Bot. Jahrb.*, lxv, Nos. 4–5).

An. albissima Marl., S. and S.W. Africa. Stems numerous, branched and ± curved upwards, 1½ in. long, ⅛–⅙ in. ϕ, leaves spirally arranged; L.

very small, completely covered by the close-lying, oval, blunt stipules, often with brownish markings; F. white.

An. Alstonii Schönl., Namaqualand. Root stock turnip-shaped, flattened above, and often up to $2\frac{1}{2}$ in. ϕ; branches very numerous, $\frac{3}{4}$–1 in. or less in length, $\frac{1}{12}$ in. ϕ; L. covered by the silvery, acutely triangular, closely adpressed stipules, $\frac{1}{12}$ in. long; F. *c* $1\frac{1}{8}$ in. ϕ, white.

An. arachnoides hort. = *An. rufescens* DC.

An. arachnoides Sims (*Portulaca arachnoides* Haw, *Rulingia arachnoides* Haw.), Cape Province. Stems *c.* 2 in. high, leaves close; L. rather oval, *c.* $\frac{3}{4}$ in. long, ± acute, much rounded on the under side, thick, green, with a few white hairs over them; bristles few, short; F. whitish-pink.

An. australiana J. M Black, S W. Australia. Roots tuberous, $2\frac{1}{2}$ in long, $1\frac{1}{2}$ in. thick; stem thin, subterranean; L. crowded into rosettes, oval, $\frac{5}{8}$–1 in. long, $\frac{1}{5}$–$\frac{2}{5}$ in. wide, very fleshy, bare, bristly hairs short, whitish; F. pink. Likes stony soil. Easily increased by cuttings

An. Baeseckii Dtr., Namaqualand. Similar to *An. crinita*; L more spherical, the bristly hairs shorter; F. carmine, with a white edge.

An. Baeseckii Dtr. **v. crinita** Dtr. = *An crinita* Dtr.

An. crinita Dtr. (*An. Baeseckii* Dtr. *v. crinita* Dtr), S.W. Africa. Stems $\frac{3}{4}$–$1\frac{1}{8}$ in. high, leaves in a close spiral; L. $\frac{1}{6}$ in long, ± oval, with truncated tip, pale green, with white felt; bristly hairs *c.* $\frac{1}{3}$ in. long, numerous, wavy, whitish-red; F. reddish.

An. Dielsiana Dtr., Great Namaqualand Small, stemless plant, with close rosettes $\frac{3}{4}$–1 in. ϕ, consisting of 18–20 leaves; L. almost cylindrical, $\frac{1}{2}$–$\frac{5}{8}$ in. long, rather club-shaped at the end; L. when young covered with matted hairs, so that the rosettes are generally covered with grey woolly tufts; inflorescence $2\frac{1}{2}$–4 in. long, with 2–3 flowers, F. $\frac{5}{8}$ in. ϕ, pink.

An. filamentosa De Willd. = *An. rufescens* DC.

An. filamentosa Sims (*An. intermedia* Nich., *Portulaca filamentosa* Haw., *Rulingia filamentosa* Haw.), Cape Province. Stems 2 in long, with tuberous roots, densely leafy; L. oval to round, thick, short tipped, $\frac{1}{4}$–$\frac{2}{5}$ in. long, rough at the tip, covered with fine white threads; bristly hairs long, curved; F. red.

An. Herreana v. Poelln. (fig. 22), Namaqualand. Roots thickened above; stems with forked branching, ± prostrate, up to 4 in. long, $\frac{1}{8}$ in. thick, leaves spirally arranged; L. round, very small, not entirely covered by the close-lying, acute stipules, which often have a brown central nerve.

An. intermedia Haw. = *An. Telephiastrum* DC.

An. intermedia Nich. = *An. filamentosa* Sims. (According to von Poellnitz!)

An. lanceolata DC. (fig. 23) (*Portulacaca lanceolata* Haw, *Rulingia lanceolata* Haw.), Cape Province. L. numerous on short stems, narrow oblanceolate, 1 in. long, $\frac{1}{3}$ in. wide, short and sharply pointed, with small spiny tips, under side rounded, smooth; bristly hairs numerous, rather long; F. red.

An. lanigera Burch., Cape Province, Great Namaqualand. Stems $\frac{5}{8}$–$1\frac{1}{8}$ in. high; L. spirally arranged, *c.* $\frac{1}{6}$ in. long, oval or round, with thick white wool; bristly hairs long, curly, yellowish; F. pink. Rare.

An. Margaretae Dtr. = *An. tomentosa* Bgr. *v. Margaretae* v. Poelln.

An. Meyeri v. Poelln. (fig. 22), Little Namaqualand. Similar to *An. papyracea*. Stem knotted, thickened. Branches mostly erect; stipules looser lying, whitish, generally with a yellowish middle nerve.

An. papyracea E. Mey. (fig. 22), S.W. Africa. Stem short, freely branched; branches usually prostrate, 2–$2\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. thick, leaves



FIG. 22.—1. Anacampseros papyracea E. Mey. 2. An. Meyeri v. Poelln. 3. An. Herreana v. Poelln. $\frac{2}{3}$ nat. size.

spirally arranged; L. small, covered by the adpressed, broadly oval, blunt, white stipules; F. yellowish-green.

An. Poellnitziana Dtr., S.W. Africa. About 1 in. high, with thickened roots; L. ± wedge-shaped, *c.* $\frac{1}{2}$ in. long, at the tip *c.* $\frac{1}{3}$ in. wide, *c.* $\frac{1}{5}$ in. thick, rather convex at first, later flat or ± concave, at the tip cut off at right angles and with scattered, one-coloured tubercles, sometimes running into each other, shining, brown, young leaves with more felt, older leaves with less; hairs numerous, short, shining, white; F. $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, pink.

An. quinaria E. Mey. Stems $\frac{2}{5}$–1 in. long; branches numerous, simple, 1–2 in. long, $\frac{1}{12}$ in. ϕ, the flower-bearing branches shorter, leaves spirally arranged; L. tiny, covered by the broadly oval, silvery stipules, flecked with brown; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, purple.

An. rotundifolia Lodd. = *An. Telephiastrum* DC.

An. rubens hort. = *An. rufescens* DC.

An. rufescens DC. (fig. 23) (*An. arachnoides* hort., *An. arachnoides* hort. *v. grandiflora* Sonders, *An. filamentosa* De Willd., *An. rubens* hort., *Rülingia rufescens* Haw.), Cape Province. Growing in clumps; stems 2–3 in. high, erect, dichotomously branched; L. arranged in a close spiral, obovate-lanceolate, acute, *c.* $\frac{3}{4}$ in. long, $\frac{3}{8}$ in. wide, thick, not much recurved, green, reddish below; bristly hairs numerous, *c.* $\frac{3}{4}$ in. long, often wavy, white; F. red.

An. Ruschii Dtr. et v. Poelln., Great and Little Namaqualand. Similar to *An. papyracea*; branches *c.* $1\frac{1}{2}$ in. long, *c.* $\frac{1}{4}$ in. ϕ, leaves spirally arranged,



FIG. 23.—1. Anacampseros Telephiastrum DC. 2. An. lanceolata DC. 3. An. rufescens DC. 4. An. tomentosa Bgr. $\frac{3}{4}$ nat. size.

stipules rather yellowish, at the tip bent outwards like a hook, with numerous hairs at the base.

An. spectabile Jord. = *Sedum spectabile* Boreau.

An. Telephiastrum DC. (fig. 23) (*An. intermedia* Haw., *An. rotundifolia* Lodd., *An. varians* Sweet, *Rülingia Anacampseros* Ehrh., *Portulaca Anacampseros* L., *Talinum Anacampseros* Willd.). Forming clumps when old; L. closely compressed into rosettes, oval or round, short pointed, *c.* $\frac{2}{3}$ in. long, thick, smooth, green or brownish; bristly hairs short, few; F. large, red. Grows easily.

An. tomentosa Bgr. (fig. 23), S.W. Africa. Stems often several from a thickened root, *c.* 2 in. high; L. closely overlapping, like tiles on a roof, obovate, with short, truncated, tuberculate tip, $\frac{3}{8}$ in. long, $\frac{1}{4}$ in. wide, much thickened below, brownish-green, with much white felt; bristle hairs few, as long as the leaves, curved, white; F. red.

An. tomentosa Bgr. **v. crinata** Dtr. Like the foregoing, with numerous, longer bristly hairs.

An. tomentosa Bgr. **v. Margaretae** v Poelln (*An Margaretae* Dtr.). Like *An. tomentosa*; L. smaller, red-brown; bristly hairs more numerous, longer, F. darker.

An. varians Sweet = *An. Telephiastrum* DC.

Apicra Willd.

Family: LILIACEAE.

Occurrence: Cape Province.

Closely allied to the genus *Haworthia*; leafy rosettes stem-like, elongated; L. with thorny teeth. Cultivation like *Haworthia* and *Gasteria*. Decorative, small plants for growing in a room.

A. aspera Willd. (*Haworthia aspera* Haw.). Stem rosette erect; L. in three compressed spiral rows, long triangular, acute, $1\frac{1}{8}$ in. long, green, rough on the upper side, with two distinct keels on the back, both covered with fairly close, green tubercles

A. attenuata Willd = *Haworthia attenuata* Haw.

A. bicarinata Haw L in a few compressed rows, long triangular, acute, $\frac{3}{4}$ to 1 in. long, with two distinct keels on the back, pale green, rough; the margins and keels, and often parallel to the edge on the upper side also, a raised line with small, white tubercles, on the back with small, whitish tubercles in ± distinct transverse lines

A. cymbifolia Willd = *Haworthia cymbiformis* Haw

A. deltoidea Baker (fig. 24). Stem-like rosettes 8–12 in. long, ± prostrate; L in five almost straight rows, broadly triangular, acute, about $\frac{3}{4}$ in long, very fleshy, green, margin and keel rather rough and cartilaginous.

A. egregia von Poelln. (fig. 24). Stem rosette erect, 4–6 in. high, $1\frac{1}{8}$ in. ϕ, branching from the base, leaves in five spirally compressed rows, oval-triangular, $\frac{3}{4}$ in. long, $\frac{5}{8}$ in wide at the base, with very short tips, on the back sharply keeled to one side, the edge on this side generally shortened, bluish-green, often reddish, with a few longitudinal green stripes on the back, margin and keel rough and cartilaginous Interesting species!

A. fasciata Willd = *Haworthia fasciata* Haw

A. foliolosa Willd (fig. 24) (*Haw foliolosa* Haw.). L. in five twisted rows, $\frac{2}{5}$ in. long, roundish triangular, with drawn-out tip, the edges horny, shining green

A. pentagona Willd. (fig. 24) (*A. spiralis* Willd., hort., *Haworthia pentagona* Haw.). Stem-like rosettes about 10 in high, ± erect; L. in five straight or slightly twisted rows, lanceolate, acute; pale, shining, green, rather rough.

A. radula Willd. = *Haworthia radula* Haw.

A. spiralis Bak. (*Haworthia spiralis* Haw.). Similar to *A. pentagona*; L. in closely compressed spiral rows.

A. spiralis hort., **A. s.** Willd. = *A. pentagona* Willd.

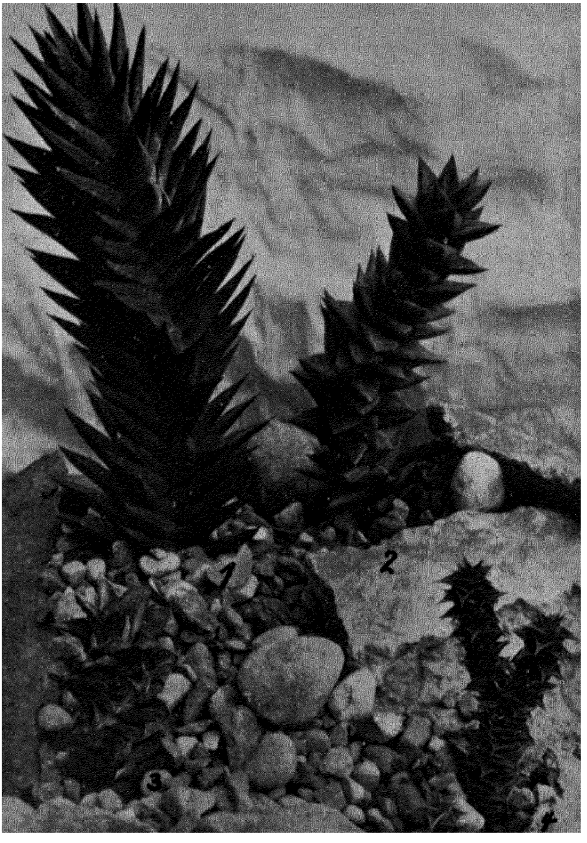


FIG. 24. 1. Apicra pentagona Willd. 2. A. deltoidea Bak. 3. A. egregia v. Poelln. 4. A. foliolosa Willd. $\frac{1}{3}$ nat. size.

Apocynaceae (Family). Genera described: *Adenium*, *Pachypodium*.

Apteranthes Gussoneana Mik. = *Caralluma europaea* N. E. Br.

Apt. tessellata Decne. = *Echidnopsis cereiformis* Hook. f.

Asclepiadaceae (Family). Genera described: *Apteranthes*, *Boucerosia*, *Caralluma*, *Ceropegia*, *Decabelone*, *Diplocyatha*, *Duvalia*, *Echidnopsis*, *Fockea*, *Heurnia*, *Heurniopsis*, *Hoodia*, *Hoodiopsis*, *Orbea*, *Pectinaria*, *Piaranthus*, *Sarcophagophilus*, *Sarcostemma*, *Stapelia*, *Stapeliopsis*, *Tavaresia*, *Trichocaulon*.

Boucerosia, see *Caralluma*.

Bowiea Harv.

Family: LILIACEAE.
Occurrence: S. Africa.

Bowiea volubilis Harv. (fig. 25). Shrubs with a large, pale green, spherical, succulent bulb up to 8 in. ϕ, growing above the soil. In August are produced long, twining, thin shoots with a few short, linear, pale green leaves which soon drop. F. greenish-white. Should be grown in the succulent house. Likes very sandy, rich soil, and to be dried during the resting period.

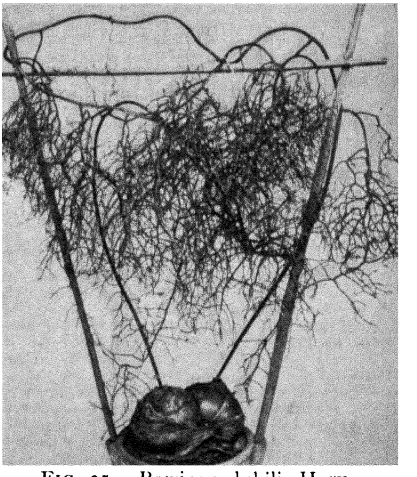


FIG. 25.—Bowiea volubilis Harv. (Photo, K. Josefsky.)

Bryophyllum Salisb.

Family: CRASSULACEAE.
Occurrence: Madagascar, Tropics in the Old and New Worlds.

Succulent shrubs or bushes. Stem erect, generally woody at the base; L. opposite or in whorls, stalked, simple or unevenly segmented, notched or crenulate, often with adventitious buds (which root easily) in the notches; F. fairly large, nodding, in many-flowered, paniculate false umbels, white, greenish or red.

Should be grown in temperate or cold house. Likes rich but well-drained soil. Propagated easily by cuttings, by the adventitious buds or by seeds.

B. calycinum Salisb. = *B. pinnatum* Kurz.

B. crenatum Bak. (fig. 26) (*Kalanchoe crenata* R. Hamet). Shrubs. Stems 12–20 in. high, slender; L. stalked, oval, bluntly rounded, heart-shaped at the base with recurved lobes, notched, toothed, grey-green, with reddish margin; F. red, $\frac{3}{4}$ in. long, in winter. Seedlings flower the first year.

B. Daigremontianum Bgr. (fig. 27) (*Kalanchoe Daigremontianum* R. Hamet et P. de la Bathie). Becoming about 32 in. high; stem round; L. stalked, *c.* 5 in. long, $\frac{3}{4}$–2 in. wide, running to a point, toothed at the tip; upper side grey-green or shining green, irregularly flecked on the under side; adventitious buds in the notches, often 30–50 on one leaf; F. pale yellow to pink, autumn and winter. Attractive plant to grow in a room. Best grown during summer in a hot frame, warm and moist at first, later in full sun with the lights off. In winter keep in cold house.

B. delagonense H. Schinz. = *B. tubiflora* Harv.

B. pinnatum Kurz. (*B. calycinum* Salisb., *Cotyledon pinnata* Lam., *Kalanchoe pinnata* Pers.). Shrub; stems fleshy, 24–40 in. high; L. fleshy,

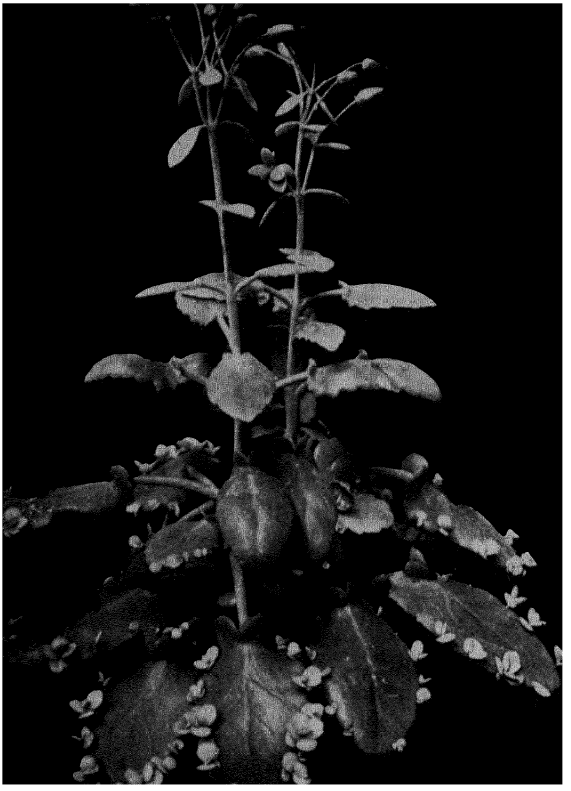


FIG. 26.—Bryophyllum crenatum Bak. (Photo, Schläger.) (From V.P.B.)

rather leathery when old, the lower ones simple oval notched, the later ones pinnate; F. greenish and pinkish.

B. proliferum Bowie (*Kalanchoe proliferum* K. Hamet). Shrub. Like the foregoing; 3–10 ft. high, stem at first 4-angled; leaf stalk coalescing at the base; F. yellow, in spring. With many plantlets in the inflorescence.

B. tubiflorum Harv. (fig. 27) (*B. delagonense* H. Schinz., *Kalanchoe delagonense* Eckl. et Zeyh., *K. tubiflora* R. Hamet). Erect, up to 20 in. high; L. in threes, in whorls, up to 5 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. wide, often slightly grooved on the upper side, teeth at the tip opposite, with roundish indentations with adventitious buds in them, pale pink, flecked with green; F. orange red, autumn and winter. Attractive plant for a room. Cultivation as for *B. daigremontianum*.



FIG. 27.—1. Bryophyllum Daigremontianum Bgr. 2. Br. tubiflorum Harv. (Photo, Bertram.)

Bulbine L.

Family: LILIACEAE.

Occurrence: S. Africa.

Stemless or short-stemmed plants, often with a tuberous root stock; L. opposite, or compressed together at the base, lanceolate or linear, fleshy; F. numerous, small, yellowish, in terminal racemes. Cultivation like *Haworthia*, but rather warmer and moister. The species with tuberous roots should be dried in summer.

B. aloides Willd. (fig. 28). L. in basal rosettes, lanceolate, *c.* 3 in. long, about 1 in. wide at the base, *c.* $\frac{1}{6}$ in. thick, flesh very soft, pale green, with reddish tips.

B. caulescens L. (fig. 28). L. opposite, on short brown-skinned stems, *c.* $\frac{3}{4}$ in. long, $\frac{1}{3}$ in. wide, linear, semicylindrical, $\frac{1}{6}$ in. thick, with very soft flesh, pale green.

B. mesembrianthemoides Haw. Tubers $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ; L. $1\frac{1}{2}$–2 in. long, $\frac{1}{5}$–$\frac{2}{5}$ in. thick, almost cylindrical, narrowed towards base and tip, often swollen like a bladder in the middle, very fleshy, pale green, almost translucent, slightly striped with grey. (Called by the natives "water bladder.")

B. rhopalophylla Dtr., Great Namaqualand. Tubers *c.* $\frac{3}{4}$ in. ϕ, with several "toes" below, and *c.* 3-in. long roots; rudimentary leaves 2–3, very short and wide, brownish, transparent; L. 4–5, erect, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{8}$–$\frac{1}{4}$ in.

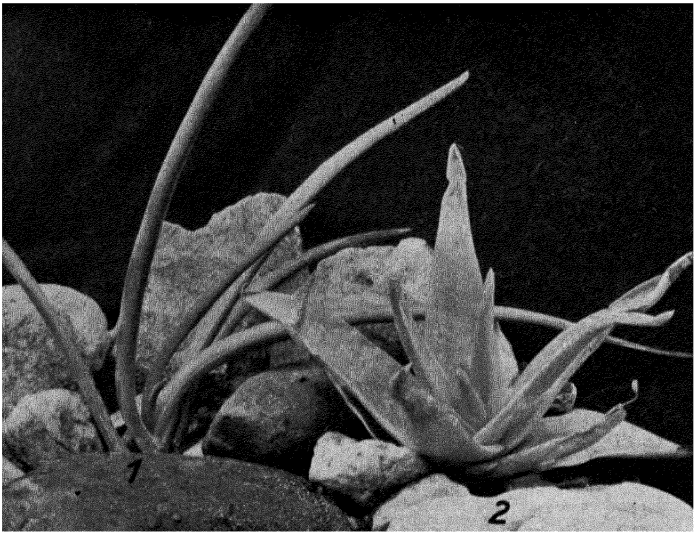


FIG. 28.—1. Bulbine caulescens L. 2. B. aloides Willd. *c.* $\frac{1}{2}$ nat. size.

thick in the middle, very fleshy, upper side flattened, ± grooved, ending in a short tip; pale sap green; F. in 1–3-in. racemes, with 2–7 brownish flowers.

B. tetraphylla Dtr., Great Namaqualand. Stemless; tubers $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, $1\frac{1}{8}$ in. high, with 3–6 branched roots below; from the top of the root stock spring several broad, brownish-white, finely striped rudimentary leaves $\frac{3}{8}$–$\frac{3}{4}$ in. long; L. usually 4, $\frac{2}{5}$–$\frac{5}{8}$ in. long, $\frac{2}{5}$–$\frac{5}{8}$ in. broad at the base, gradually narrowing to a point, flesh very soft, flaccid, dark bluish-green; inflorescence up to 12 in. long, with 15–30 yellowish flowers.

Byrnesia Weinbergii Rose = *Sedum Weinbergii* Bgr.

Cacalia, see *Kleinia.*

Caralluma R. Br.

Family: ASCLEPIADACEAE.

Occurrence: S. and N. Africa, Abyssinia, Arabia, S.W. Mediterranean Region.

Succulent shrubs, very similar to the *Stapelias.* Stems usually

4-angled, often pushing out through the soil like offshoots, later growing erect; angles ± toothed, at first with minute leaves, green or grey-green; F. either from the base, lateral or terminal, solitary, several together or in bunches, on young stems, various in size, bell-shaped or rotate, deeply 5-lobed, inner part of corolla ring- or cup-shaped, united or even wanting, variously coloured and marked, ± evil smelling.

Easy to grow, suitable for cultivation in a room. Position and cultivation like *Stapelia*. Need wide, shallow pots.

For references to the literature, see under *Stapelia*.

Car. Burchardii N. E. Br. (fig. 29), Fuerteventura (Canary Islands). Making offshoots, forming clumps; stems 6–8 in. high, 4-angled, angles with erect teeth, olive or grey-green; F. small, almost at the ends of the stems, $\frac{3}{8}$ in. ϕ, without markings, with thick white hairs.

Car. europaea N. E. Br. (*Apteranthes Gussoneana* Mik., *Boucerosia Gussoneana* Hook. f., *Stapelia europaea* Guss., *S. Gussoneana* Jacq.), S. Mediterranean Region, N. Africa. Stems and branches spreading, sparingly branched, the branches often bending over and rooting, of various heights, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, 4-angled, almost square, grey-green, with a few indistinct reddish markings, edges blunt, slightly curved, toothed; F. 10–13 in sessile umbels, $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, 5-cleft to the centre, tip ovate, edge hardly ciliate, greenish-yellow, with close reddish-brown cross-lines, the tips brownish-red, blackish-brown near the centre, with ten yellow, knob-like, excresences, smell slight. Flowers almost throughout the year.

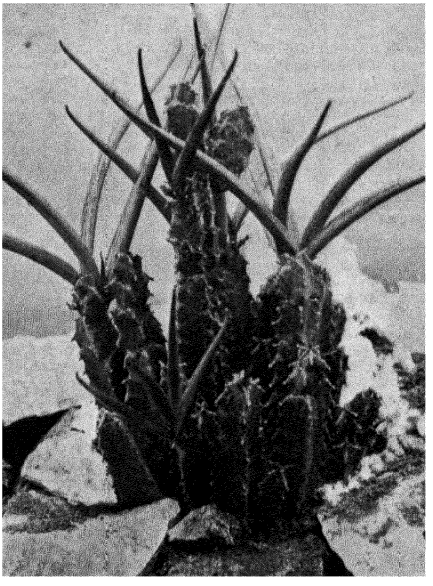


FIG. 29.—Caralluma Burchardii N. E. Br. with fruits. (Photo, K. Josefsky.)

Car. Lugardii N. E. Br., S.W. Africa. Stems prostrate or ascending, often creeping below the soil like offshoots, little branched, 4-angled, $\frac{3}{8}$ in. thick, 4–6 in. long, dark green or with brownish flecks or stripes, edges blunt, divided by deep grooves, with erect pointed teeth; F. 2–2$\frac{1}{2}$ in. ϕ, 3–5 in. short-stalked umbels towards the tips of the stems, flower stalk 2 in. long, corolla wide bell-shaped at the base, tips erect, 1$\frac{1}{8}$ in. long, $\frac{1}{4}$ in. broad, narrow lanceolate, tapering gradually, brown up to the bottom of the free lobes, with fine hairs, greenish-yellow in the upper part of the lobes, with short hairs on the margin.

Car. lutea N. E. Br., Eastern S. Africa. Forming clumps; stems branching from the base, 2–4 in. high, up to $\frac{3}{4}$ in. across, 4-angled, bare, fluted and toothed; F. numerous, 17–20 in large clusters, stems $\frac{3}{4}$ in. long, 2–3 in. ϕ, lobes narrow lanceolate, gradually tapering, finely corrugated, golden yellow, with red hairs on the margin; rarely flowering, smell very unpleasant.

Car. Munbyana N. E. Br. (*Boucerosia hispanica* Coincy, *B. Munbyana* Decne.), S. Spain, Algeria. Forming clumps. F. $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, dark brown; October.

Car. namaquanum Welw., see *Sarcophagophilus Winklerianus* Dtr.

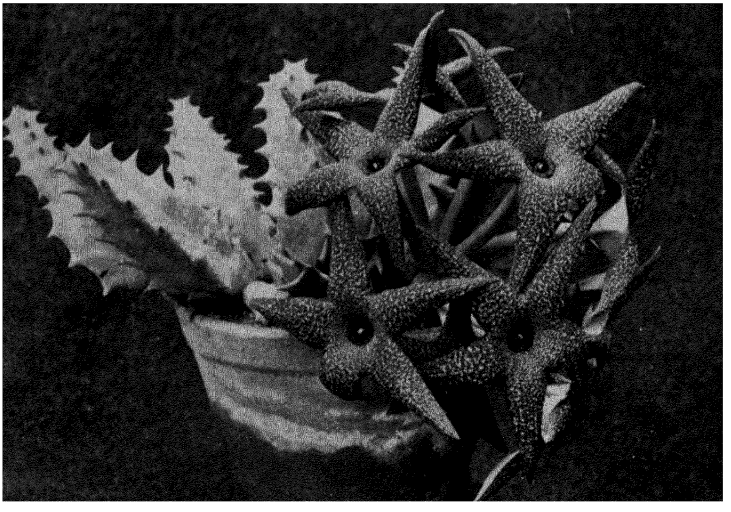


FIG. 30.—Caralluma Pseudo-Nebrownii Dtr. (Photo, K. Gielsdorf.) (From M.d.d.K.G.)

Car. Nebrownii Dtr. et Bgr., S.W. Africa. Forming clumps; stems 6–7 in. high, $1\frac{1}{2}$ in. wide, 4-angled, sides flat, angles compressed, sinuate, toothed, teeth $1\frac{1}{8}$ in. apart, with sharp tips and two lateral teeth, green or grey-green, mottled with sooty red; F. 15–30, on a common, short stalk, flat, $3\frac{3}{4}$–4 in. ϕ, corolla lobes lanceolate, pointed, fleshy, dark reddish-brown, with transverse grooves and wrinkles, edges with a few purple hairs; in July–October; strong smelling.

Car. Pseudo-Nebrownii Dtr. (fig. 30), Central and Southern Namaqualand. Forming clumps, with subterranean offshoots; stems $2\frac{1}{2}$–$6\frac{1}{2}$ in. long, grey-green, freely flecked with brown, 4-angled, edges laterally compressed, with sharp teeth $\frac{5}{8}$ in. long, $\frac{5}{8}$–$1\frac{1}{8}$ in. apart; older stems up to $1\frac{1}{8}$ in. thick, squarer in cross-section, teeth shorter; flower clusters from the young branches with 5–15 F., stalks $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{5}$ in. across, square in cross-section, F. 3–6 in. ϕ, open bell-shaped, corolla lobes $1\frac{1}{8}$–$1\frac{3}{4}$ in. long, lanceolate, margins rather turned under, with $\frac{1}{4}$-in. long, reddish-black, club-shaped hairs, corolla

otherwise without hairs, reddish-brown, tuberculate, with yellow, branched markings, tips of lobes free from markings; some varieties more or less dotted with white, red or pink; corona $\frac{1}{3}$ in. ϕ, $\frac{1}{4}$ in. high, reddish-brown; F. with very offensive smell.

Car. (?) Rangeana Dtr. et Bgr., S.W. Africa. Forming low clumps; stems $3\frac{1}{4}$–4 in. high, 4-angled, with broad triangular teeth, bare, grey-green, marked with faint brown; inflorescence from the base of young stems; F. with red striped stalks, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{8}$ in. thick, *c.* 2 in. ϕ, corolla deeply cleft, lobes $\frac{3}{4}$ in. long, margins much curled under, at its broadest $\frac{3}{8}$ in. wide, with club-shaped hairs $\frac{1}{12}$ in. long on the edges; colour of flower greenish-yellow, with long, concentric, dark red-brown markings, upper surface covered closely with fine papillae; corona flat, $\frac{1}{5}$ in. ϕ, $\frac{1}{25}$ in. high, yellowish-brown.

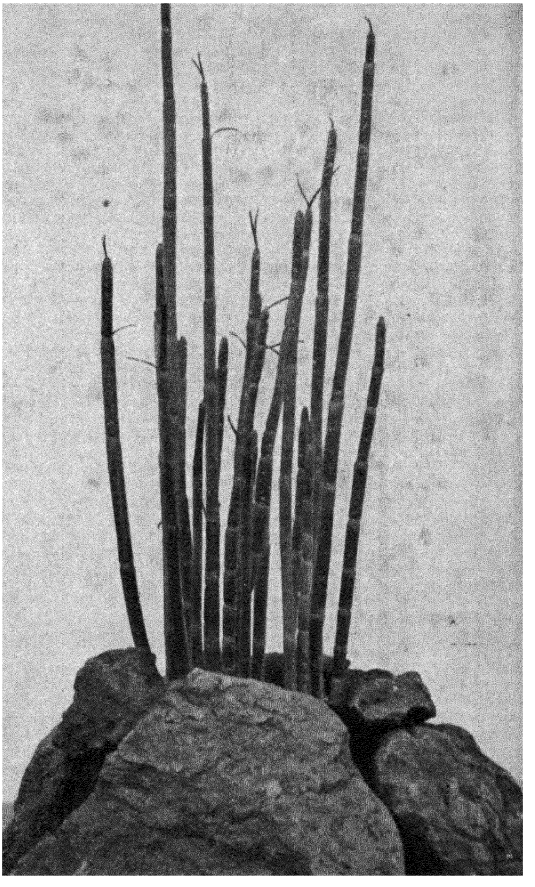


FIG. 31. Ceropegia fusca C. Bolle.
(Photo, Dr Burchard.) (From Gartenflora.)

Ceropegia L.

Family: ASCLEPIADACEAE.

Occurrence: Tropical and S. Africa, E. Indies, Canary Islands.

Succulent half-shrubs or bushes. Stem fleshy and leafless, or twining and with opposite leaves, often with a tuberous root. L. variously shaped, lanceolate to cordate. F. tubular, sometimes expanded at the base, the five corolla lobes usually remaining attached at the tip, of various size and colouring. Summer to autumn. Valued for growing in rooms. The twining species are trained up wires or stakes, or grown in hanging baskets. Keep warm and moist in summer, drier in winter, not above 55° F. Soil as for *Stapelia*. Propagation by seeds or cuttings.

Cer. debilis N. E. Br., E. Africa. Plants with tuberous roots. Stems thin, pendent or twining; L. short stalked, linear, $1\frac{1}{8}$ in. long, up to $\frac{1}{8}$

in. wide, grooved on upper surface, green; F. 1–3, 1 in. long, cylindrical, thicker below, lobes folded back, greenish-white, pink inside. Attractive for baskets.

Cer. dichotoma Haw., Canary Islands. Sub-shrub. Stems erect, up to 3 ft. high, dichotomously branched, thick as a finger, cylindrical, with 2–4-in. long, joint-like, sections, grey to chalk white, sometimes violet; L. at the nodes during the growing period narrow, linear, pointed, short stalked, $1\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. broad; F. at the tips of the branches, $\frac{3}{4}$ in. long, lemon yellow, cylindrical, the lobes remaining attached. Keep very dry in winter.

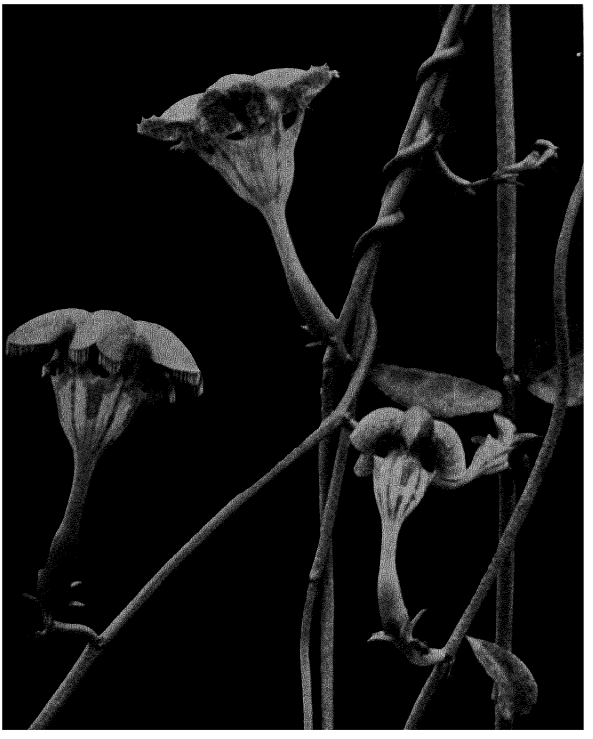


FIG. 32.—Ceropegia Sandersonii Decne. *c.* ½ nat. size.

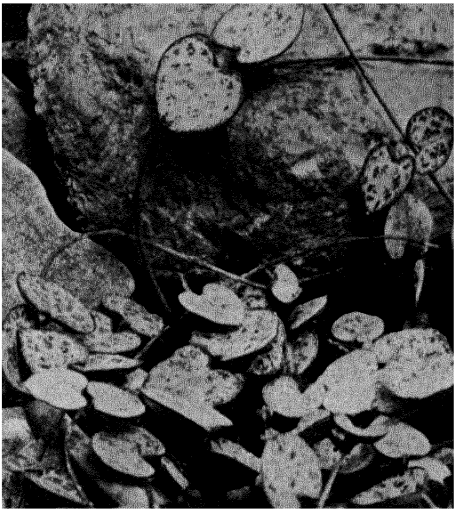
Cer. elegans Wall., E. Indies. Trailing plant; L. 2–4 in. apart, oval lanceolate, pointed, 2–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, ciliate; F. 2–6, 2 in. long, lobes remaining attached at the tip, white, with violet markings. Likes a warm position.

Cer. fusca C. Bolle (fig. 31), Canary Islands. Habit like *Cer. dichotoma*. Irregularly jointed; new shoots dark at first, almost black, later chalk white; L. $1\frac{1}{8}$–2 in. long, $\frac{1}{8}$ in. wide, linear; F. in clusters on branches of the preceding year, brown, yellow inside. Should be kept very dry in winter!

Cer. Haygarthii N. E. Br., Natal. Quick-growing, trailing plant; stem $\frac{1}{6}$–$\frac{1}{4}$ in. thick; L. on $\frac{3}{8}$-in. long stalks, elongated cordate, $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide; F. about $1\frac{1}{2}$ in. long, the tube somewhat swollen at the base, curved outwards and expanding like a funnel, 1 in. ϕ, the 5 lobes curved in towards the centre and thus forming a chamber, then uniting into a small, stem-like column, and on the top forming another small chamber $\frac{1}{3}$ in. ϕ, which has a ring of long hairs round the edge; ground colour of the F. pale red, markings purple; the column and the upper chamber dark purple. Interesting and beautiful species!

Cer. Sandersonii Decne. (fig. 32), Natal. Climbing plant, free growing;

stem $\frac{1}{6}$–$\frac{1}{4}$ in. thick, green; L. short-stalked at the nodes, which are 4–8 in. apart, heart-shaped, $1\frac{1}{2}$–2 in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. wide, fleshy, green; F. on short branches 2–4, with short stalks; corolla green, up to 3 in. long, swollen below like an inverted club, above expanded into a 5-sided funnel, $1\frac{1}{2}$–2 in. ϕ, the lobes narrow at first, then suddenly widening and united at the sides into a structure resembling a parachute, the edges wavy and upturned and with white, mobile hairs; the "umbrella" green, irregularly marked with darker green. Desirable species!



Cer. stapeliiformis Haw., Cape Province. Climbing plant; stems at first thick and round, jointed and gibbose, often re-entering the soil, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, dull green, with grey markings, rough, with white dots; later thin, climbing, up to 5 ft. long; L. minute; F. 4 or more, upturned, $2\frac{1}{4}$–$2\frac{3}{4}$ in. long, funnel-shaped above, lobes standing apart, outside white, bare, marked with brown, inside white, hairy. Requires a bright cold house.

Cer. Woodii Schlechter. (fig. 33), Natal. Plants with slender, thread-like stems, forming small tubers at the nodes, creeping or hanging; L. stalked, usually heart-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{5}{8}$ in. wide, pale green below, upper side dark green marbled with white; F. $\frac{3}{4}$ in., pinky-brown. Flowering almost the whole year. Attractive plant for baskets, easy to propagate by means of the little tubers.

Chenopodiaceae (Family). Genus described: *Salicornia*.

Cissus DC.

Family: VITACEAE.

Occurrence: S. or Trop. Africa, S.W. Africa.

Succulent plants, often with thick, club-shaped stem, not climbing, with a few leaves in a tuft, which fall in the resting period; or climbing shrubs. The stem-forming *Cissus* are rare and much sought after treasures in our collections. Growing period in winter. Water in moderation. In summer dry completely. Require a very bright position in a warm succulent house. Grow in sandy, loamy soil with broken brick included. Propagation by seeds.

Cis. Bainesii Gilg. et Brandt. (fig. 34), Northern S.W. Africa. Stem barrel-shaped, 2 ft. high, up to 10 in. across at the base, often divided into two thick branches above, skin pale yellowish-green, becoming papery with age and peeling off; L. tripartite. Distinguished by its beautiful coral red fruit stalks.

Cis. cactiformis Gilg. (fig. 34), S. and Tropical Africa. Similar to *C. quadrangularis*. Internodes 4–5 in. long, $1\frac{1}{2}$ in. thick.

Cis. Cramerianus Schinz., S.W. Africa. Up to 13 ft. high, trees with pale yellow bark, and uniformly thick, fleshy stem, and short, thick, interlaced

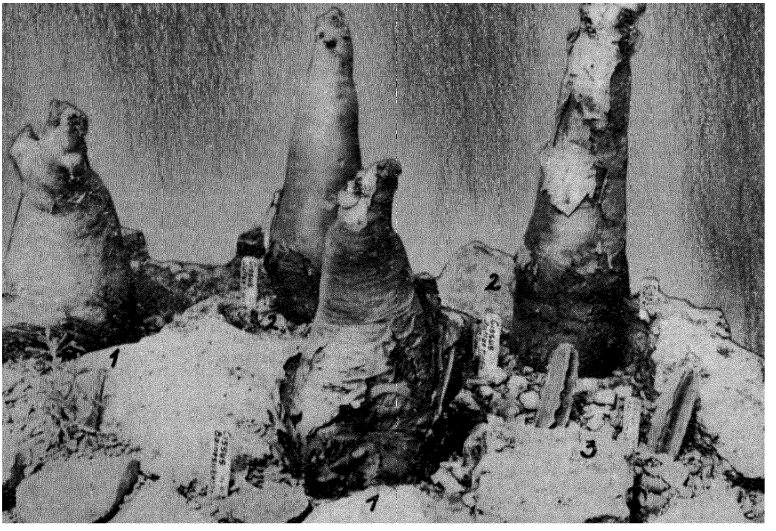


FIG. 34.— 1. Cissus Bainesii Gilg. et Brandt. 2. C. Juttae Dtr. et Gilg. 3. C. cactiformis Gilg. $\frac{1}{5}$ nat. size.

branches; the bark becomes detached in old plants in thin, broad, paper-like strips; L. with long, thick stalks $\frac{3}{4}$ in. long, tripartite, leaf segments short-stalked, ovate-oblong, with irregular, coarse teeth; petiole and L. covered with fine felt; F. $\frac{1}{5}$ in. ϕ, inconspicuous, in long-stalked false umbels of $2\frac{1}{2}$ in. ϕ.

Cis. Juttae Dtr. et Gilg. (fig. 34), S.W. Africa. Stem 3–6 ft. high, barrel-shaped, pointed, divided above into several thick branches, with yellowish-green skin which falls off in papery strips in old age; L. sessile, oval-acute, 4–6 in. long, 2–$2\frac{1}{2}$ in. broad, with irregular, coarse teeth, shining green, often reddish, veins on the lower surface strewn with strong, translucent hairs, $\frac{1}{12}$–$\frac{1}{8}$ in. long. Fruits are dark red berries (plants from Otavi) or even pale yellow berries (from Grootfontain). (Since the plants from the two localities differ somewhat in their leaves, there may possibly be two species which closely resemble each other.)

Cis. quadrangularis L. (fig. 35) (*Vitis quadrangularis* Wall.), S. and Tropical Africa. Climbing shrub; branches 4-angled, green, with waxy bloom; internodes 3–4 in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. thick in the middle, rather thinner at the ends, the edges often slightly curved and drawn out into wings and with a dry margin; L. at the nodes, with heart-shaped lobes, $\frac{3}{4}$–$1\frac{1}{2}$ in. across, green, soon falling; usually with a tendril opposite each leaf. Should be grown in a room or in a fairly moist greenhouse, in sandy, loamy soil. Propagation by cuttings.

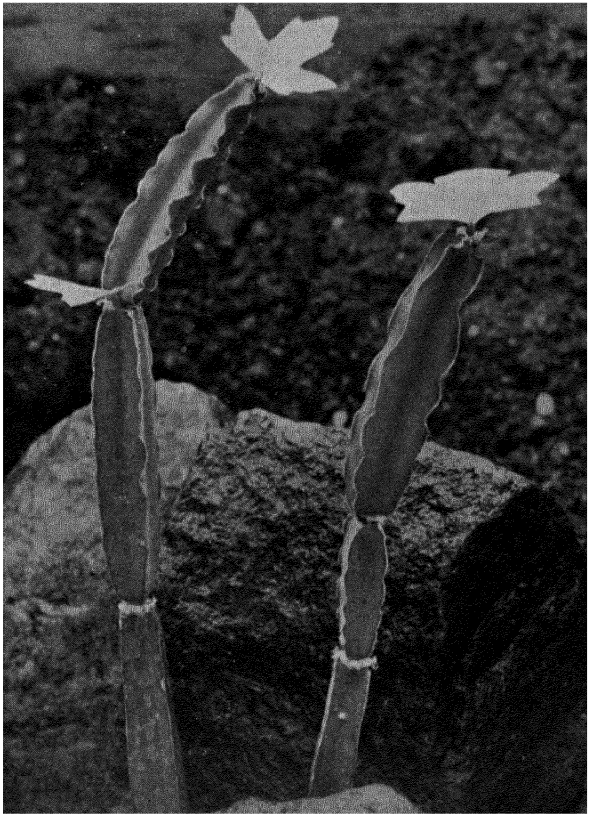


FIG. 35.—Cissus quadrangularis L. $\frac{1}{2}$ nat. size.

Cis. Seitzianus Gilg. et Brandt. is according to Professor Dinter (Bautzen) identical with *Cis. Crameri-anus*. (Clearly the working out of the classification of the succulent species of *Cissus* is not finished.)

Commelinaceae (Family). Genus described: *Tradescantia*.

Compositae (Family). Genera described: *Brachyrhynchos*, *Cacalia*, *Kleinia*, *Notonia*, *Othonna*, *Senecio*.

Cotyledon L.

Family: CRASSULACEAE.

Occurrence: S. Africa, Abyssinia, S. Arabia.

Succulent shrubs or half-shrubs, often growing compactly and forming clumps; L. opposite or alternate, sessile or stalked, fleshy; inflorescence terminal; F. in tall false umbels, usually pendent, tubular.

Easily grown succulents, very useful in a room. Require a bright, airy position in the succulent house or window of a room. To be wintered, unless otherwise mentioned, at not more than 50° F.

Easily propagated from seed, and more quickly by cuttings in spring. Leaf cuttings grow less freely. *Cotyledons* like rich, sandy soil.

Cot. adunca Bak. = *Pachyphytum Hookeri* Bgr.

Cot. agavoides Bak. = *Echeveria agavoides* Lem.

Cot. arborescens Mill. = *Crassula arborescens* Willd.

Cot. ausana Dtr., Great Namaqualand. Semi-shrubby, much branched, 12–16 in. high, *c.* $\frac{3}{4}$ in. ϕ; L. opposite, 8–10 at the ends of the branches, forming close rosettes, broadly spatulate, sessile, base $\frac{5}{8}$ in., 4–$4\frac{3}{4}$ in. long, 3 in. across the widest part, greatest thickness $\frac{2}{5}$–$\frac{1}{2}$ in., blue-green, frosted with bluish-white, upper part of the margin rounded, reddish-brown; inflorescences 2–4, from the axils of the upper pairs of leaves, erect; F. about $\frac{5}{8}$ in. long, nodding, orange red.

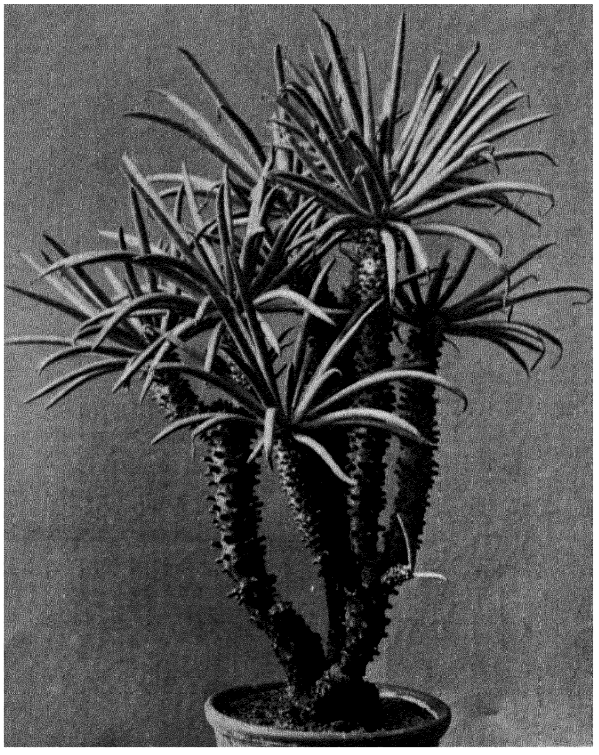


FIG. 36.—Cotyledon cacalioides L. f. (Photo, Dr Camerloher.)

Cot. cacalioides L. f. (fig. 36), Namaqualand. Stems 6–8 in. high, *c.* $\frac{3}{4}$ in. thick, little branched, with protuberances formed by the persistent leaf-bases; L. alternate, close together almost like a rosette, 2–$2\frac{1}{2}$ in. long, almost cylindrical, linear, grey-green, drying up; inflorescence 10–12 in. long; F. numerous, yellowish-red. Needs complete rest in full summer. In winter not below 55° F.

Cot. californica Bak. = *Echeveria Cotyledon* Nels. et Macb.

Cot. carnicolor Bak. = *Echeveria carnicolor* Morr.

Cot. clavifolia Baker = *Adromischus clavifolius* Lem.

Cot. Cooperi Baker = *Adromischus Cooperi* Bgr.

Cot. cristatus Haw. = *Adromischus cristatus* Lem.

Cot. edulis Brewer = *Echeveria edulis* Bgr.

Cot. elata Haw. = *Cot. orbiculata* L.

Cot. elegans N. E. Br. = *Echeveria elegans* Bgr.

Cot. Dinteri Bak. appears to be identical with *Cot. cacalioides* L. f.

Cot. farinosa Bak. = *Echeveria farinosa* Lindl.

Cot. fascicularis Ait. = *Cot. paniculata* Thunb.

Cot. fulgens Bak. = *Echeveria fulgens* Lem.

Cot. gibbiflora Bak. = *Echeveria gibbiflora* DC.

Cot. glauca Bak. = *Echeveria glauca* Bak.

Cot. gracilis Haw., Cape Province. Forming clumps, semi-shrubby; stem prostrate, thin, branched; L. $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, cylindrical, narrowed on both sides, pointed, green; F. red, May–June.

Cot. hemisphaerica L. = *Adromischus hemisphaericus* Lem.

Cot. Herrei Barker (fig. 37), Little Namaqualand. Shrub about 4 in. high; L. 6–7, spirally arranged, oval, fleshy, greenish to brownish-yellow, covered with wax, rough with papillae; the leaves shrink up during the dry period and become brownish-black; F. on long stalks, red. Rest in full summer. In winter not lower than 55° F.



FIG. 37.—Cotyledon Herrei Barker. *c.* $\frac{2}{3}$ nat. size.

Cot. Hoerleinianum Dtr., S.W. Africa Root stock turnip-like; stems often up to 5 together, 2–6 in. high, simple or multi-headed, $\frac{1}{5}$–$\frac{5}{8}$ in. thick, grey, rough skinned, with 2–5 leaves close together at the top; these $\frac{5}{8}$–1 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, oval, with thick edges, ± grooved above, with soft flesh, grey-green, with irregular red dots; F. grey-violet.

Cot. horizontalis Guss. = *Umbilicus horizontalis* DC.

Cot. linguifolia Bak. = *Echeveria linguæfolia* Lem.

Cot. macrantha Bgr., Cape Province. Shrub, 12–32 in. high; stem thick, with erect, smooth branches as thick as a finger and with pale greyish-brown skin; L. opposite in form of a cross, distant, fleshy, obovate, narrowed into the short stalk, bluntly rounded with a small point, dark green, edge sharp, red-margined; F. $\frac{3}{4}$ in. long, bright red, greenish-yellow within, December to spring. Free-growing.

Cot. mamillaris L. f. = *Adromischus mamillaris* Lem.

Cot. maculata Salm. = *Adromischus maculatus* Lem.

Cot. Mariannae Marl. = *Adromischus Mariannae* Bgr.

Cot. nudicaule Abrams = *Echeveria densiflora* Bgr.

Cot. oblonga Haw. = *Cot. orbiculata* L.

Cot. montium Klinghardtii Dtr. = *Adromischus Klinghardtii* Bgr.

Cot. orbiculata L. (fig. 38) (*Cot. elata* Haw., *C. oblonga* Haw., *C. ovata* Haw., *C. ramosa* Haw.), Cape Province. Shrub, 20–32 in. high; stem thick, branches erect; L. obovate, narrowed into a short stalk, bluntish, with a short point, thick, strong light grey or whitish-grey, faintly striped, with a red edge; F. *c.* $\frac{5}{8}$ in. long, yellowish-red, in summer. Free-growing. (According to Professor Dinter (Bautzen) there are plants with green leaves as well as those with a white waxy covering.)

Cot. orbiculata L. **v. oophylla** Dtr. Stems up to $\frac{3}{4}$ in. thick; terminal branches $\frac{1}{3}$-$\frac{2}{5}$ in. thick, with 8–12 leaves; these long ovate, $1\frac{3}{8}$–$2\frac{1}{4}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. wide, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, ± curved upwards, dark purple, greyish-green, frosted with bluish-white, with a moon-shaped mark at the rounded end $\frac{1}{4}$ in. ϕ. Differing from the species in the oval leaves and the thin terminal branches.



FIG. 38.—Cotyledon orbiculata L.

Cot. ovata Haw. = *Cot. orbiculata* L.

Cot. ovata Mill. = *Crassula argentea* Thbg.

Cot. Pachyphytum Bak. = *Pachyphytum bracteosum* Link, Klotzsch et Otto.

Cot. paniculata Thunb. (*Cot. fascicularis* Ait.), Cape Province. Shrub; stem thick, fleshy, up to 5 ft. high, branched; L. compressed towards the tip, falling during the dry period, alternate, broadly obovate, keeled below, short and suddenly tapering, fleshy, 2–$3\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. wide, pale grey-green; F. 1 in. long, finely papillose, red, with yellowish-green stripes, in summer, during the resting period. Keep dry in summer; not below 55° F. in winter.

Cot. Peacockii Bak. = *Echeveria Peacockii* Croucher.

Cot. peltatum Wendl. = *Umbilicus pendulinus* DC.

Cot. pendulinus Batt. = *Umbilicus pendulinus* DC.

Cot. Philippsiae Marl., S.W. Africa. Shrub; forming clumps, making offsets; L. close almost in a rosette, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, about $\frac{1}{3}$ in. wide, thick, lanceolate, concave above, dark green, under side reddish; F. almost $1\frac{1}{8}$ in. long, bright orange red.

Cot. pinnatum Lam. = *Bryophyllum pinnatum* Kurz.

Cot. pulverulenta Bak. = *Echeveria rigida* Bgr.

Cot. pulvinata Hook. f. = *Echeveria pulvinata* Rose.

Cot. pygmaea Barker, Little Namaqualand. Plants 1½–2 in. high; stems thickened, tuberous, stalks erect or ± prostrate; L. opposite in form of a cross, at the ends of the branches, oval, ⅓–⅖ in. long, flat above, rounded



FIG. 39.—Cotyledon teretifolia Thunb., one-year-old seedling.

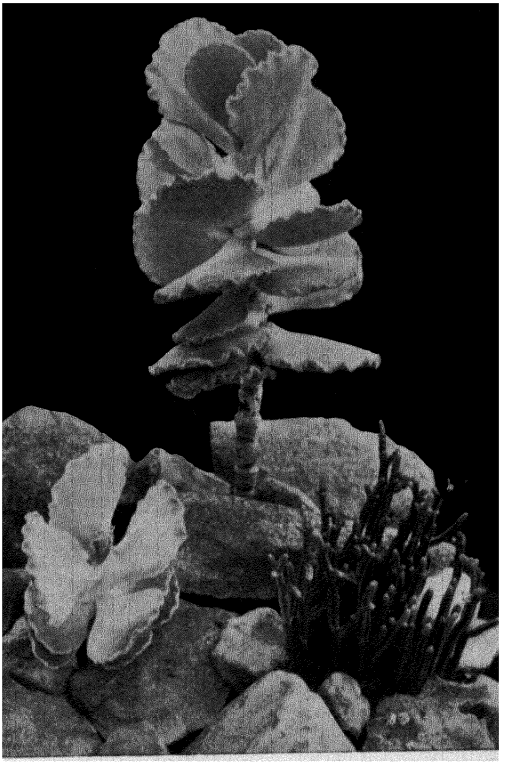


FIG. 40.—Cotyledon undulata Haw. Right, Crassula lycopodioides Lam.

on the back, green, closely covered with whitish, shining papillae; F. white, inconspicuous.

Cot. ramosa Haw. = *Cot. orbiculata* L.

Cot. racemosa E. Mey., Cape Province. Similar to *Cot. cacalioides* L. f. Flower stems with soft hairs, 2–3 in. high, with few flowers; L. bare, ¾ in. long, yellowish-red.

Cot. reticulata Thunb., S. Africa. Shrub, up to 12 in. high; stem branched, up to 3 in. thick; L. 4–6 in a tuft from tuberculate short shoots, falling in the resting period, almost cylindrical, slightly grooved, ⅝ in. long, with a brown spiny tip; flower stem terminal, stiffly branched, becoming woody and persisting, protecting the plant; F. greenish-yellow, glandular, striped with brownish-red, in summer. Rare species; requires complete rest in summer. In winter not below 60° F. Poisonous!

Cot. retusa Bak. = *Echeveria retusa* Lindl.

Cot. rhombifolia Haw. = *Adromischus rhombifolius* Lem.

Cot. rubrovenosa Dtr., Great Namaqualand. Semi-shrubby, up to 10 in. high, very succulent; ends of the branches as thick as a thumb, with

a tuft of awl-shaped, pointed, bare, soft, bluish-green leaves up to 2 in. long; L. falling before the flowers appear, and spirally arranged, leaving stout tubercles behind; inflorescence branched with *c.* 20 pale fawn, ± nodding flowers.

Cot. secunda Bak. = *Echeveria secunda* Booth.

Cot. Schaeferiana Dtr. = *Adromischus Schaeferiana* Bgr.

Cot. spinosa L. = *Orostachys spinosus* Bgr.

Cot. teretifolia Thunb. (fig. 39), Cape Province. Stems 6–8 in. high, branched; L. almost cylindrical, only flattened towards the triangular point, 4 in. long, $\frac{5}{8}$ in. wide, pale green, with close, soft hairs; F. pale yellow, in summer.

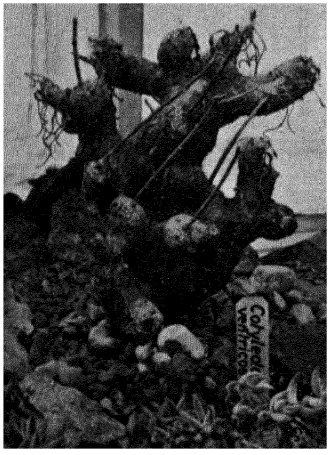


FIG. 41.—Cotyledon ventricosa Burm. ¼ nat. size.

Cot. triflora L. = *Adromischus triflorus* Bgr.

Cot. tuberosus Hal. = *Umbilicus pendulinus* DC.

Cot. Umbilicus L. **v. tuberosus** = *Umbilicus pendulinus* DC.

Cot. undulata Haw. (fig. 40), Cape Province. Shrub; stem thick, with erect branches; L. horizontal or more erect, rhomboidal-obovate, rounded at the top and with a wavy edge, thickly frosted with pure white, beautiful; F. yellowish-red, spring to summer.

Cot. ventricosa Burm. (fig. 41), Cape Province. Low shrubs with short, thickened, little-branched stems; L. only present during the short growing period, soon drying and falling, alternate, almost cylindrical, furrowed on the upper side, $1\frac{1}{2}$–2 in. long; flower stem 6–12 in. long, with glandular hairs; F. about $\frac{3}{4}$ in. long, green, dotted with red above, with soft, glandular hairs.

Cot. Zeyheri Haw. = *Adromischus cristatus* Lem.

Crassula L.

Family: CRASSULACEAE.

Occurrence: S. Africa, a few species in Tropical Africa, some distributed throughout the world.

Mostly succulent shrubs forming clumps, or semi-shrubs with succulent stems and branches. L. opposite, often crowded into rosettes, usually sessile, often united at the base, margin entire or with a horny edge, bare, hairy or scaly. Inflorescence a pseudo-umbel, or in a head; F. fairly small, white, pink, more rarely yellow or greenish; calyx and corolla usually 5-partite.

With a few exceptions the Crassula species are easy succulents, especially suitable for room cultivation and useful commercially.

Their cultivation is easy, in cold house or heated frame, in winter not as a rule above 50° F. Propagation easy from cuttings, which must be dried for a bit. The plants like a rich soil with loam and sand. Seed can be raised in spring. The mimicry forms discovered in the last few years in S. Africa require different treatment; short directions are given with the descriptions.

Cr. Alstonii Marl. (fig. 44), Little Namaqualand. Low shrubs, few branches from the base; stem 3–4 in. high, leaves set closely in rows; L. imbricate, round, rolled inwards, *c.* $\frac{3}{4}$ in. broad, round on the back, bluntly rounded at the top, fleshy, grey-green; F. in stalked false umbels, small, white, October–November. Cultivation like *Cr. barbata*.

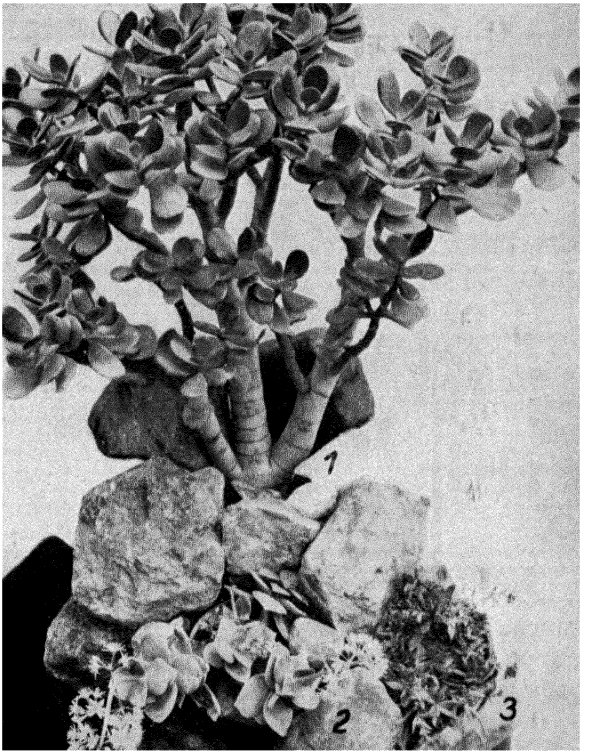


FIG. 42.—1. Crassula arborescens Willd. 2. Cr. lactea Ait. 3. Cr. Schmidtii Rgl.

Cr. arborescens Willd. (fig. 42) (*Cr. Cotyledon* Jacq., *Cotyledon arborescens* Mill.), Cape Province. Shrub, up to 3–6 ft. high; stem and branches stout, cylindrical; L. expanded at the base, roundish obovate, with a soft tip, $1\frac{3}{8}$–3 in. long, flat, bare, edge entire, fleshy grey-green, often with a red margin, reddish dots on the upper surface; F. white at first, later red, in June and July. Rarely flowers. Free growing, resistant; suitable for room cultivation.

Cr. argentea Thbg. (*Cr. portulacea* Lam., *Cr. obliqua* Ait., *Cotyledon ovata* Mill.), Cape Province. Shrub, up to 3–10 ft. high; stem thick, much branched, branches brown skinned; L. not expanded at the base, rather sharply obovate, bluntish and short tipped, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, 1–$1\frac{1}{8}$ in. wide, shining green; F. numerous, $\frac{3}{4}$ in. ϕ, pale pink, March–April. Free growing.

Cr. arta Schönl. (fig. 48) (*Cr. deltoidea* Harv.), Little Namaqualand (S. Africa). Similar to *Cr. deceptrix*, but smaller; the stems with their close-

packed leaves forming small columns; L. pale green, with slightly raised grey lines. Cultivation as for *Cr. barbata*.

Cr. barbata Thbg. (fig. 44), dry deserts of S. Africa. Shrubs, branched from the base, forming clumps; L. in close, basal rosettes 1⅛–1½ in. φ, concave and curved inwards, green, with long white hairs along the edge; flower stalks bunched, fairly long; F. erect, small, white, in winter or spring. The shoots die after flowering, but send out new shoots freely from the base. Require a bright greenhouse, in winter not below 60° F. Resting period in summer. Likes very sandy soil, with half-rotted leaf mould.

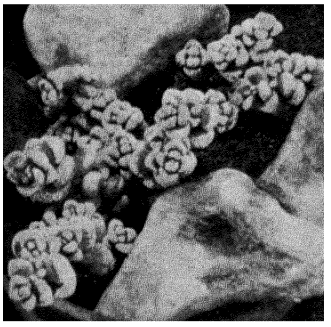


FIG. 43.—Crassula corallina Thbg. *c.* ¾ nat. size.

Cr. Bolusii Hook. f. = *Cr. Cooperi* Rgl.

Cr. brevifolia Harv. = *Cr. Pearsonii* Schönl.

Cr. capitata hort. = *Rochea odoratissima* DC.

Cr. centauroides Harv. = *Cr. marginalis* Soland.

Cr. coccinea L. = *Rochea coccinea* DC.

Cr. columnaris L. f. (fig. 44), Great and Little Namaqualand. Low plants; stem 2–4 in. high, with leaves in four close rows; L. expanded at the base, fleshy, circular or elliptical, upper side concave, bent in, rounded on the back, ¾–1⅛ in. wide, green, brownish in the resting period, shortly ciliate on the edge. Young plants usually form a spherical rosette *c.* ¾ in. φ, which later develops into a small, 4-angled column, with a terminal head of flowers. F. *c.* ⅛ in. across, yellowish orange, sometimes white, scented, October–November, often in spring also. After flowering the plants dry up, but form buds which fall off and easily root. Position as for *Cr. barbata*.

Cr. congesta N. E. Br. (fig. 45) (*Cr. pachyphylla* Schönl.), Western and Central Cape Province. Perennial, succulent plants; shoots fleshy, hardly branched; L. loosely arranged, of various form, ovate, blunt or pointed to lanceolate and acute, much rounded on the back; grey-green; flowers in a terminal head, small, white.

Cr. Cooperi Rgl. (*Cr. Bolusii* Hook. f.), Cape Province. Low plant; stem 3–4 in. high, with scattered white hairs; L. crowded into a close rosette at the base, opposite forming a cross, lanceolate-spatulate, under side with a round keel, ⅜–⅝ in. long, ciliate at the edge, pale green, pitted on the upper surface; F. 3–7 in short-stalked false umbels, *c.* ⅛ in. φ, pale flesh-coloured, in spring. Attractive, free-growing species, flowers well.

Cr. corallina Thbg. (fig. 43) (*Cr. dasyphylla* Harv.). Forming cushions; stem with numerous, prostrate, very leafy branches, which root at the lower end; L. compressed-spherical or elliptical, ⅕ in. long, ⅙ in. broad, pale green, rough, the upper part dusted with white meal and with green dots; F. from the upper leaf axils, small, yellow, in July and August.

Cr. cordata Lodd. = *Cr. spathulata* Thbg.

Cr. cordata Thbg., Cape Province. Semi-shrub, 12–24 in. high; stem erect, slender, much branched; L. heart- or kidney-shaped, edge entire, bare, $\frac{5}{8}$–$\frac{3}{4}$ in. long, rather less wide, with thick, white meal, reddish at the edge; F. white, in summer. Adventitious buds often formed in the inflorescence.



FIG. 44.—1. Crassula pyramidalis L. f. 2. Cr. barbata Thbg. 3. Cr. Alstonii Marl. 4. Cr. columnaris L. f. *c.* $\frac{3}{4}$ nat. size.

Cr. cornuta Schönl. et Baker, S.W. Africa (fig. 45). Small, succulent plants with fleshy, very leafy shoots; L. triangular-ovate, united, about $\frac{5}{8}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, almost $\frac{2}{5}$ in. thick, flat above, keeled on the back, mealy grey; flowers in a head; F. small, white.

Cr. Cotyledon Jacq. = *Cr. arborescens* Willd.

Cr. dasyphylla Harv. = *Cr. corallina* Thbg.

Cr. deceptrix Schönl. (fig. 48), Little Namaqualand (S. Africa). Low plant; little branched from the base, forming clumps; stem $1\frac{3}{4}$ in. and more long, leaves in close rows; L. closely arranged, imbricate, thick, fleshy, *c.* $\frac{5}{8}$ in. long and broad, roundish-triangular, sharply keeled on the back, whitish-grey, marked with a raised hexagonal network; inflorescence a false umbel on a stem $1\frac{1}{2}$–2 in. long; F. white, October–November. Growing period in winter, resting time in summer. Position as for *Cr. barbata*.

Cr. decipiens N. E. Br. = *Cr. tecta* Thbg.

Cr. deltoidea Harv. = *Cr. arta* Schönl.

Cr. deltoidea Thbg. (fig. 46) (*Cr. rhomboidea* N. E. Br.), Namaqualand. Low plant, hardly more than $2\frac{1}{2}$ in. high, stem and branches fleshy; L. united, almost rhomboidal, acute, drawn together at the base, $\frac{5}{8}$ in. long, up to $\frac{1}{3}$ in. wide, $\frac{1}{6}$ in. thick, bluntly keeled on the back, upper side with a broad, deep groove, mealy grey; inflorescence terminal; F. small, sooty white.



FIG. 45.—1. Crassula cornuta Schönl. et Baker. 2. Cr. remota Schönl. 3. Cr. congesta N. E. Br. 4. Cr. teres Marl. 5. Cr. eendornensis Dtr. *c.* ⅔ nat. size.

Cr. Dregeana Harv., Cape Province. Semi-shrub, intricately branched, up to 10 in. high ± herbaceous, stem and branches hairy; L. almost united, ovate or oblong, *c.* ½ in. long, *c.* ⅕ in. broad and thick, green; F. in terminal false umbels, small, white.



FIG. 46.—Crassula deltoidea Thbg. ⅔ nat. size.

Cr. eendornensis Dtr. (fig. 45), S.W. Africa. Similar to *Cr. obvallata*; F. rounder, ciliate hairs on the surface of the leaf also.

Cr. ericoides Haw., S. Africa. Low semi-shrub, up to 12 in. high, with woody, loosely branched stems; L. crowded, oblong, acute, erect, slightly rolled back along the edge, pale green; inflorescence with short stalk.

Cr. falcata Willd. (*Cr. obliqua* Andr., *Larochea falcata* Haw., *Rochea falcata* DC.), Cape Province. Semi-shrub, up to 3 ft. high; stem fleshy, erect, little branched; L. very fleshy, united at the base, spreading, taking an almost vertical position, 3–4 in. long, 1⅛–1½ in. wide, oblong, obliquely sickle-shaped, blunt, grey-green; F. in much-branched clusters of false umbels, brilliant scarlet to orange red, sometimes paler, in summer. Strikingly beautiful plant useful for room cultivation and for growing in quantity. Propagation by seed, cuttings or leaf cuttings.

Cr. gracilis hort. = *Cr. Schmidtii* Rgl.

Cr. hemisphaerica Thbg., S.W. Africa. Forming clumps; stem short, with 8–10 opposite leaves, united at the base; these flat, rounded, or with a short tip, with fine white ciliate hairs; F. white, in spring. Likes a bright, warm position.

Cr. Hookeri hort. = *Cr. Schmidtii* Rgl.

Cr. imbricata Ait. = *Cr. lycopodioides* Lam.

Cr. impressa N. E. Br. = *Cr. Schmidtii* Rgl.

Cr. jasminea Sims = *Rochea jasminea* DC.

Cr. Justus Corderoy Dtr. (fig. 47), S. Africa. Forming clumps; L. numerous, *c.* $\frac{7}{8}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, lanceolate, fleshy, upper side flat, roundish on the back, dark green, flecked with red, the whole surface covered with short white hairs, which are arranged in distinct longitudinal rows; F. reddish. Slow growing.



FIG. 47.—Crassula Justus Corderoy Dtr. (Photo, K. Josefsky.)

Cr. lactea Ait. (fig. 42). Semi-shrubby, 12–24 in. high; stem curved, prostrate, short; L. united at the base, narrow obovate, acute or tapering, narrowed at the base, fleshy, flat, bare, edge entire, green, dotted; F. white, scented, December–March. Good plant for rooms. Should be put out of doors in summer. Likes rich, sandy soil. Propagation by cuttings in summer, breaks easily if cut back.

Cr. lucida Lam. = *Cr. spathulata* Thbg.

Cr. lycopodioides Lam. (fig. 40) (*Cr. muscosa* Thbg., *Cr. imbricata* Ait., *Tetraphyle littoralis* Eckl. et Zeyh., *T. lycopodioides* Eckl. et Zeyh., *T. proquinqua* Eckl. et Zeyh., *T. polypodacea* Eckl. et Zeyh.), Cape Province. Semi-shrubby, up to 12 in. high; stem slender, erect, irregularly branched, straight or curved, with four rows of closely packed leaves the whole length of the stem; L. small, scale-like, imbricate, triangular-oval, short-tipped, green; F. minute, in the axils of the leaves, yellowish-white, spring to summer. Easy growing plant for room cultivation, suitable for growing in quantity. Easily increased by cuttings.

Cr. lycopodioides Lam. **v. viridis** Bgr. Similar to the foregoing, growing more erect; L. acuter, pale green.

Cr. marginalis Soland. (*Cr. profusa* Hook. f., *Cr. centauroides* Harv.), Cape Province. Shrub, 12–24 in. high; stem prostrate and rooting; L. united at the base, broadly oval, rather tapering, $\frac{1}{2}$–$\frac{3}{4}$ in. long, flat, fleshy, both sides slightly convex, green, with a brown edge, dotted; F. white, numerous, in spring.

Cr. mesembrianthemopsis Dtr. (fig. 48), Great Namaqualand (S.W. Africa). Forming clumps; roots tuberous; stems very short, with a rosette of 4–5 pairs of leaves, becoming smaller towards the centre; L. fleshy, with truncated, triangular-ovate, blunt tips, whitish grey-green; F. crowded into a head in sessile false umbels, white, October–November. In their habitat

the plants are buried in the soil to the tips of their triangular leaves. Grows in winter, in summer should be kept dry. Requires a bright greenhouse, not below 60° F. Likes sandy soil with the addition of chalk.

Cr. montis draconis Dtr., Great Namaqualand. Shrub, up to 16 in. high, woody, usually many stemmed, little branched; L. slightly united, 1–1$\frac{1}{8}$ in. long, about $\frac{1}{2}$ in. broad, $\frac{1}{3}$–$\frac{2}{5}$ in. thick, boat-shaped, upper side slightly convex in the lower part, concave above, edges distinct, lower side semi-cylindrical, yellowish-green, bare, tip blunt, somewhat curved back; inflorescence stout, terminal; F. numerous, yellow. Flowering in winter with us.

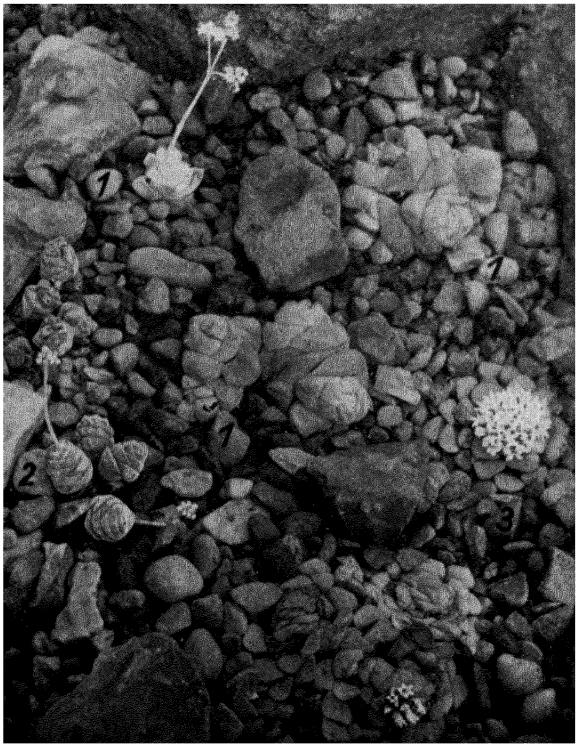


FIG. 48.—1. Crassula deceptrix Schönl. 2. Cr. arta Schönl. 3. Cr. mesembrianthemopsis Dtr. $\frac{1}{2}$ nat. size.

Cr. montis Moltkei Dtr., Hereroland. Plants forming clumps, 8 in. ϕ, 6 in. high, with numerous erect stems, unbranched, stem 6 in. high, $\frac{5}{8}$ in. thick, with grey hairs; L. short, united, pointing upwards, $\frac{1}{3}$–$\frac{1}{2}$ in. long, $\frac{1}{12}$ in. thick, subulate, slightly keeled; inflorescence with *c.* 15 F., these *c.* $\frac{1}{2}$ in. long, white.

Cr. multicava Lem. (*Cr. quadrifida* Bak., *Cr. punctata* hort.), Cape Province. Spreading shrub or semi-shrub, freely branched, up to 12 in. high; L. oval, heart-shaped at the base, blunt, crenulate, almost as long as broad, grass green, often with a reddish tinge, finely pitted; F. pinkish-white, in spring and summer. Adventitious buds in the axils in the inflorescence, which root easily.

Cr. muscosa Thbg. = *Cr. lycopodioides* Lam.

Cr. obliqua Ait. = *Cr. argentea* Thbg.

Cr. obliqua Andr. = *Cr. falcata* Willd.

Cr. obvallata L. (*Cr. torquata* Bak.), S.W. Africa. Succulents with thick stems, little branched from the base, close, almost forming a rosette; L. oblong lanceolate or obliquely knife-shaped, blunt or acute, flat on both

sides, green, bare, leaf edges with horny cilia; F. in false umbels, small, white.

Cr. odoratissima Andr. = *Rochea odoratissima* DC.

Cr. orbicularis L., Cape Province. Like *Cr. rosularis* Haw. but smaller; L. spatulate, obovate.

Cr. pachyphylla Schönl. = *Cr. congesta* N. E. Br.

Cr. Pearsonii Schönl. (fig. 49) (*Cr. brevifolia* Harv.), Namaqualand. Branched semi-shrub with woody stems; L. on young branches, ½ in. long,

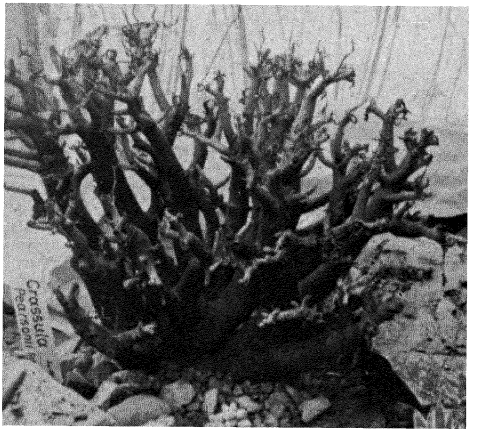


FIG. 49.—Crassula Pearsonii Schönl. ¼ nat. size.

joined together, cylindrical, ovate-oblong, blunt, smooth, falling during the resting period. To be kept entirely dry during the resting period. Grow in rather lighter, sandy soil.

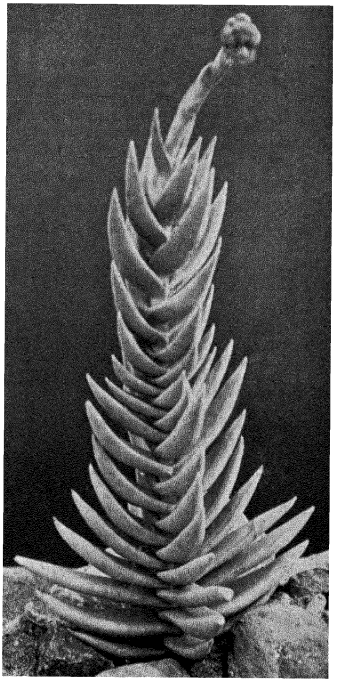


FIG. 50. Crassula perfoliata L. (Photo, K. Josefsky.)

Cr. perfoliata L. (fig. 50) (*Rochea perfoliata* DC.), Cape Province. Similar to *Cr. falcata* Willd. L. lanceolate, tapering, 4–6 in. long, erect, straight, not curved like a sickle, concave above; F. scarlet.

Cr. perfoliata L. **v. albiflora**. Like the foregoing; F. white.

Cr. perforata L. f., Cape Province. Shrub, up to 24 in. high; stem hardly branched, ± erect; L. broadly united at the base, oval, short-tipped, ascending, ⅝–1 in. long, ⅓–½ in. broad, pale grey-green, with numerous small red dots especially at the edge, with 5 horny cilia; F. small, April–May.

Cr. perfossa Lam. = *Cr. rupestris* Thbg.

Cr. portulacea Lam. = *Cr. argentea* Thbg.

Cr. profusa Hook. f. = *Cr. marginalis* Soland.

Cr. pseudolycopodioides Dtr. et Schinz. Similar to *Cr. lycopodioides*

Lam. Stem thicker and stouter; L. blunter, grey-green, and with many short shoots in the axils.

Cr. punctata hort. = *Cr. multicava* Lem.

Cr. pyramidalis L. f. (fig. 44), Karroo, S. Africa. Shrub, stem 1–3 in. high, leaves in four rows; L. flat, close adpressed one over the other, broadly triangular with rounded sides, green, with white hairs on the edge when young, almost $\frac{3}{8}$ in. broad; F. at the end of the stalk, in wide, flat false umbels, white. Desirable rarity. This species is very difficult to keep, as it usually dies after the ripening of the seed. Grow in a bright greenhouse. Likes very sandy soil.

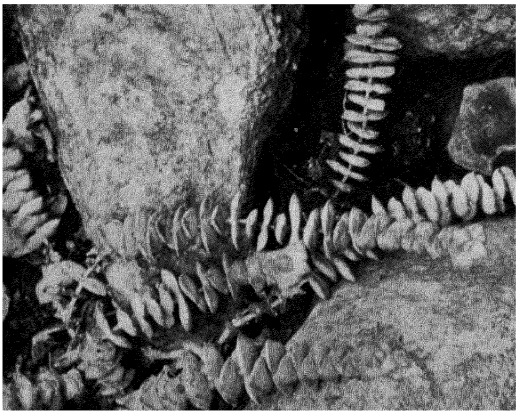


FIG. 51.—Crassula rupestris Thbg. $\frac{1}{4}$ nat. size.

Cr. Portulacaria L. = *Portulacaria afra* Jacq.

Cr. quadrangularis Schönl., Karroo. Small, succulent plant, freely branched; L. closely crowded, forming a short 4-sided column $1\frac{1}{2}$–2 in. high and wide; L. broadly ovate, more or less acute, slightly folded, bare on both sides, papillate and ciliate on the edge, green; inflorescence terminal, short stalked, with many flowers; F. *c.* $\frac{1}{3}$ in. ϕ, snow white. Charming little plant. Increase by seed.

Cr. quadrifida Bak. = *Cr. multicava* Lem.

Cr. remota Schönl. (fig. 45), Central and Western Cape Province. Small stiffly branched plant; leaf pairs separated by distinct internodes; L. somewhat oblong ovate, $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. wide, $\frac{1}{6}$–$\frac{1}{5}$ in. thick, sessile, obliquely pointed, upper surface grey-green, rather scaly, hardly distinguishable, fine hairy, leaf margins reddish in the upper part.

Cr. rhomboidea N. E. Br. = *Cr. deltoidea* Thunb.

Cr. rosularis Haw., Cape Province. Shrub; shoots with flat, basal rosettes, producing side shoots; L. crowded, linear-spatulate, rather tapering $2\frac{1}{2}$–3 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. wide, not very fleshy, flat, shining green, with fine, white horny cilia; F. white, February–March. Easy growing.

Cr. rubicunda hort. = *Cr. Schmidtii* Rgl. (see also *Rochea coccinea* DC.!).

Cr. rupestris Thbg. (fig. 51) (*Cr. perfossa* Lam.), Cape Province. Bush, stem prostrate, dichotomously branched; L. fleshy, united at the base, roundish or oval, $\frac{3}{8}$–1 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. wide, bare, grey-green, with brown dots and margin; F. small, yellowish, April–May. Easily grown plant for a room, useful for baskets.

Cr. Schmidtii Rgl. (fig. 42) (*Cr. gracilis* hort., *Cr. Hookeri* hort., *Cr. im*

pressa N. E. Br., *Cr. rubicunda* hort.), Cape Province. Shrub; making many shoots, forming clumps; stem erect or ascending, 3–4 in. high, green or ± red, with erect hairs; L. compressed at the base, united, linear-lanceolate, 1$\frac{1}{8}$–1$\frac{1}{2}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. wide, upper side flat, green, pitted, convex on the back, reddish, with white hairs along the edge; F. in loose, short-stalked false umbels 2–2$\frac{1}{2}$ in. wide, brilliant, dark carmine or rose, winter to spring. Easily grown plant for cold house or living room, valued as a winter bloomer. Recommended for raising in quantity. Cuttings after rooting should be wintered in a bright cold house, rather dry. Later grow on in pots in open frames in full sun, protect from too much moisture during heavy rain. Likes good rich soil.



FIG. 52. –Crassula tecta Thbg. (Photo, R. Graessner.)

Cr. Simiana Schönl. Similar to *Cr. corallina*; roots tuberous; L. larger, closely overlapping.

Cr. spathulata Thbg. (*Cr. cordata* Lodd., *Cr. lucida* Lam.), Cape Province. Shrub; stem slender, prostrate, slightly 4-angled; L. stalked, broadly heart-shaped, short tipped, finely crenate, bare, about the size of a farthing, shining green; F. numerous, flesh coloured, winter to spring. Useful plant for baskets, valuable winter flowerer. Propagation by cuttings, which can be struck in the basket.

Cr. tabularis Dtr., Hereroland. Low plants, with fleshy tuberous roots; L. in a cruciforme rosette, *c.* $\frac{5}{8}$ in. high, 2–2$\frac{1}{2}$ in. ϕ, imbricate, up to 1$\frac{1}{8}$ in. long, oval lanceolate, acute, $\frac{3}{8}$–$\frac{5}{8}$ in. broad, *c.* $\frac{1}{12}$ in. thick, dotted with dark green, papillae in close rows, scattered dots on the lower surface, edges closely set with transparent cilia. Rosettes reaching flowering size in two years and then forming a terminal spike 6 in. high; F. small, white.

Cr. tecta Thbg. (fig. 52) (*Cr. decipiens* N. E. Br.), Western Cape Province, Karroo. Shrub, branched from the base and forming clumps; L. numerous, thick, semicircular, green, closely covered with thick white hairs; flowers in close round heads. Likes a bright greenhouse, and rich sandy soil.

Cr. teres Marl. (fig. 45). Similar to *Cr. columnaris* L. f., forming a short, slender column; L. with transparent edge, possibly a hybrid: *Cr. pyramidalis* × *Cr. columnaris*.

Cr. tetragona L., Cape Province. Erect shrub, up to 3 ft. high; branches slender, as thick as a finger, roundish, bare; L. fairly close together, united at the base at first, 1–1$\frac{1}{8}$ in. long, $\frac{1}{4}$ in. wide, $\frac{1}{5}$ in. thick, almost cylindrical, only slightly flattened on the upper surface, tapering, green; F. small, white, April–May.

Cr. tomentosa Schönl., S.W. Africa. Low, succulent shrub; L. nearly

or quite basal, almost forming a rosette, broadly oval, $\frac{3}{4}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in wide flat, green, with a few scattered hairs, hairy on the edge; inflorescence terminal with a few acute leaves along it

Cr. torquata Bak = *Cr obvallata* L

Cr. trachysantha Harv (*Sphaeritis trachysantha* Eckl. et Zeyh.), Cape Province. Semi-shrub, up to 12 in. high, with slender, rough-haired branches L. cylindrical, tapering, closely set with short, pointed, white bristles, turned backwards; F. whitish-yellow, in summer

Cr. versicolor Burch. = *Rochea versicolor* DC.

Crassulaceae (Family). Genera described. *Aeonium*, *Adromischus* *Aichryson*, *Bryophyllum*, *Byrnesia*, *Cotyledon*, *Crassula*, *Dudleya*, *Echeveria* *Greenovia*, *Kalanchoe*, *Lenophyllum*, *Monanthes*, *Oliveranthus*, *Orostachys* *Pachyphytum*, *Petrophyes*, *Rhodiola*, *Rochea*, *Rosularia*, *Sedum*, *Sempervi* *vella*, *Sempervivum*, *Stylophyllum*, *Umbilicus*, *Urbinia*.

Decabelone, see *Tavaresia*.

Dioscorea, see *Testudinaria*.

Dioscoreaceae (Family). Genera described: *Dioscorea*, *Testudinaria*.

Diplocyatha N. E. Br.

Family: Asclepiadaceae.

Diplocyatha ciliata N. E. Br. (*Stapelia ciliata* Thunb.), Karroo S. Africa. Succulent plants, closely allied to the genus Huernia cultivation the same. Forming clumps, branches rooting at the base ascending, 1–2 in. long, 4-sided, with acute, conical teeth, bare tinged with dusky red; F. with $\frac{5}{8}$-in. long stalks, 3–$3\frac{1}{4}$ in. ϕ, with short bell- to funnel-shaped tube and erect, ovate, acute lobes, almost white, with long, white, clavate hairs, with a cup-shaped, roughly tuberculate ring with thickened edge in the throat of the tube. In conspicuous, evil-smelling. Rare, beautiful species!

Dudleya Cotyledon Br. et Rose = *Echeveria Cotyledon* Nels et Macb.

Dudleya farinosa Br. et Rose = *Echeveria farinosa* Lindl.

Dudleya pulverulenta Br. et Rose = *Echeveria pulverulenta* Nutt.

Duvalia Haw.

Family: Asclepiadaceae.

Occurrence: S. Africa, S.W. Africa.

Succulent plants, allied to the *Stapelias*, stems prostrate, hardly ascending, forming clumps, 4–6-angled, short and thick, angles blunt with short teeth and protuberances, often divided into tubercles by transverse grooves. F. solitary or several together, on the young stems, or stalks $\frac{5}{8}$–$1\frac{1}{8}$ in. long, small or medium sized, tube ring-shaped fleshy, the limb deeply 5-cleft, the lobes usually pierced along the edge

and in the angles, often hairy within, variously coloured. Growing freely. Position and cultivation as for Stapelia.

D. dentata N. E. Br. = *D. polita* N. E. Br.

D. elegans Haw. (*D. Jacquiniana* Sweet, *Stapelia elegans* Mass., *St. Jacquiniana* Roem. et Schult., *St. radiata* Jacq.), Cape Province. Stems prostrate, rooting, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, the angles blunt and rounded, toothed, reddish; F. 1–3, $\frac{3}{4}$ in. ϕ, smooth outside, bare, inside blackish-violet, with long, purple hairs.

D. Jacquiniana Sweet = *D. elegans* Haw.

D. Pillansii N. E. Br. (fig. 53), Eastern Cape Province. Many-stemmed; stems short, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, *c.* $\frac{3}{8}$ in. thick, 4-angled, almost cylindrical, angles

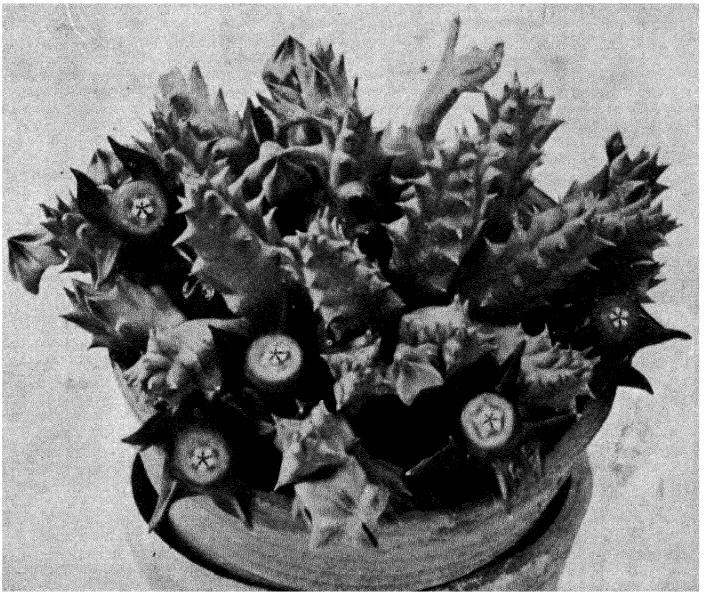


FIG. 53.—Duvalia Pillansii N. E. Br. (Photo, K. Josefsky.)

with a few stout teeth, green, reddish at the tips; F. numerous, with stalks $\frac{1}{4}$–$\frac{1}{3}$ in. long, *c.* $\frac{3}{4}$ in. ϕ, lobes triangular, deeply furrowed at the back, the tips somewhat recurved, greenish outside, velvety purple-brown within, the ring yellowish, the edge up to the middle with reddish hairs.

D. polita (*D. dentata* N. E. Br.), S.W. Africa. Stems prostrate, rooting, $2\frac{1}{2}$–3 in. long, up to $\frac{3}{4}$ in. thick, 6-angled, forked, angles blunt, and rounded, teeth with long, deciduous tips, with transverse grooves above the teeth, dark green or brownish; F. 1–$1\frac{1}{8}$ in. ϕ, with a pale hairy ring in the middle, lobes broad, triangular, smooth, dark brownish-red, greenish outside, ciliate in the sinus.

Echeveria DC.

Family: CRASSULACEAE.

Occurrence: Southern N. America, northern S. America.

Succulent plants, much branched and forming clumps, or small bushes with short stems. Leaves usually in rosettes, spirally arranged, of various shape, edge entire, usually with a short tip, often covered with wax, ± easily broken. Inflorescence from the leaf axils a raceme, panicle, spike or false umbel, often branched, the tips arching



FIG. 54.—1. Echeveria agavoides Lem. 2. E. farinosa Lindl. ⅓ nat. size.

over and the stalked or sessile, pitcher- or bell-shaped flowers open in turn, white, yellow, red, in summer and sometimes in winter also.

Beautiful, easily grown succulents, specially suitable for growing in a room. Most species like a position out of doors, in full sun in summer, planted out in groups or in the rock garden. They should be wintered in a cold house or cool room, not above 50° F., fairly dry. Propagation easy by cuttings; rosettes, leaves, pieces of stem and occasionally of flower stalk will all strike, after being well dried. Easily raised from seeds. Sow in warmth, in sandy soil, in spring or autumn. Especially recommended for growing in quantity. Large stocks may be wintered in frost-free cold frames.

E. adunca Otto = *Pachyphytum Hookeri* Bgr.

E. agavoides Lem. (fig. 54) (*Cotyledon agavoides* Bak., *Urbinia agavoides* Rose), Mexico. Shrubs; rosettes very close; L. 1½–2½ in. long, 1⅛–1½ in

wide, tapering, with sharp, brown tip, upper side often concave, lower side and edges roundish, very fleshy, pale grey-green; F. reddish-yellow, in spring. Slow growing, resistant species. Propagation from seed recommended for quantities.

E. argentea Lem. = *E. pulverulenta* Nutt.

E. arizonica hort = *Sedum Weinbergii* Rose.

E. Bergeriana Willy Muller = *Pachyphytum pachyphytoides* Bgr.

E. Bernhardiana Forst. = *E. gibbiflora* DC.

E. bracteosa Lindl. et Paxt. = *Pachyphytum bracteosum* Link, Klotzsch et Otto.

E. californica Bak. = *E. Cotyledon* Nels. et Macb.

E. carnicolor Morren (*Cotyledon carnicolor* Bak.), Mexico. Shrub; rosettes $2\frac{1}{2}$–3 in ϕ, loose, making offsets, L flat on the upper side, convex below, very fleshy, flesh-coloured, with slight waxy coating, and metallic tinge; inflorescence with 10–20 cinnabar red flowers, January–March, free-growing species. Likes leaf mould Useful plant for baskets. Beautifully coloured, recommended as a winter flowerer and for growing in quantity

E. Cotyledon Nels. et Macb (*Cotyledon californica* Bak., *Dudleya Cotyledon* Br. et Rose, *E. californica* Bak., *Sedum Cotyledon* Jacq), California. Shrub, rosettes close, L. linear, $2\frac{1}{4}$–4 in. long, up to $\frac{3}{4}$ in. broad, pointed above, with dense white waxy covering; F. whitish-yellow. Likes a bright position under glass.

E. cuspidata Rose, Mexico. Shrub, rosettes close; L. 4 in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. broad, oblanceolate, above triangular and pointed, with a stout, spiny tip, bluish-white, margin and tip reddish, F. red with yellow tips, May–June

E. densiflora Bgr. (fig. 55) (*Cotyledon nudicaule* Abrams, *Stylophyllum densiflorum* Rose), South California. Shrub or low bush, branched or forming clumps; L. in rosettes, 2–3 in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. thick, cylindrical, pointed at the end, curved rather outwards, powdered bluish-white; F. white, in summer. Likes a bright position under glass.

E. Derenbergii J A. Purp., Mexico. Makes offsets freely, shrub forming clumps, rosette close, round, $2\frac{1}{2}$–3 in. ϕ; L. fleshy, broadly spatulate, rounded above, with red spiny tip, $1\frac{1}{8}$–$1\frac{1}{2}$ in long, $\frac{3}{4}$–1 in. broad, flat on the upper side, convex on the back, pale green, with white waxy covering; F. reddish-yellow, pale yellow inside, in spring

E. Desmetiana L de Smet = *E Peacockii* Croucher.

E. edulis Bgr. (*Cotyledon edulis* Brewer, *Sedum edule* Nutt , *Stylophyllum edule* Br et Rose), Southern California Similar to *E. densiflora*; L. 4–6 in. long, with a short tip, frosted white; F yellowish-white.

E. elegans Bgr. (*Cotyledon elegans* N. E. Br., *Oliveranthus elegans* Rose), Mexico Smaller, much branched semi-shrub, with soft hairs; L. lanceolate-spatulate, acute, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, in loose rosettes; F. red with yellow tips, April–May.

E. elegans Rose = *E. perelegans* Bgr.

E. farinosa Lindl. (fig. 54) (*Cotyledon farinosa* Bak., *Dudleya farinosa* Br. et Rose), California. Shrub; often short stemmed and with many close rosettes; L. lanceolate, tapering upwards, $2\frac{1}{2}$–3 in. long, $\frac{5}{8}$–$\frac{7}{8}$ in. wide, with thick, white meal; F. yellow, in spring. Requires a very light position under glass.

E. fulgens Lem. (*Cotyledon fulgens* Bak.), Mexico. Small, little branched shrub, rosettes loose; L. 4 in. long, about half as much wide, above bluntly triangular, with short tip, the edge often crenulate, grey, sometimes reddish; F. red, in winter.

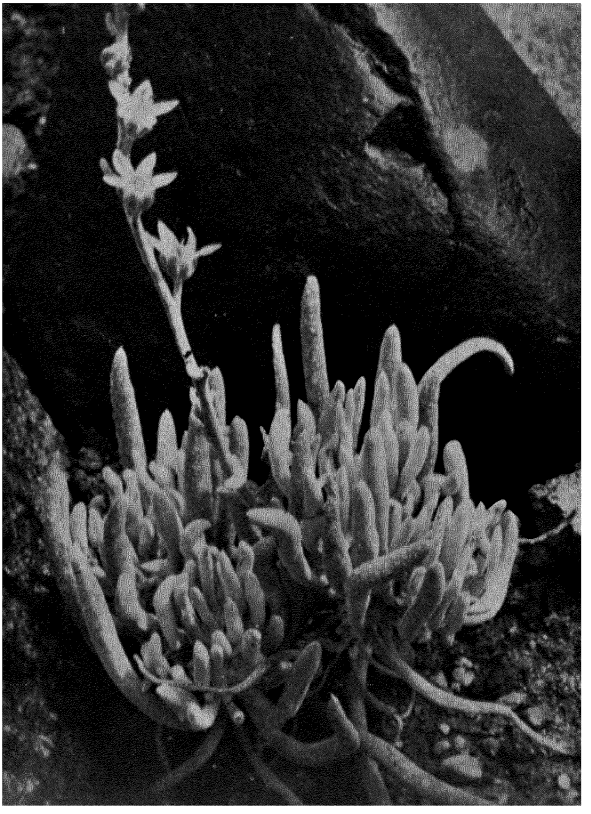


FIG. 55. Echeveria densiflora Bgr. $\frac{2}{3}$ nat. size.

E. gibbiflora DC. (*Cotyledon gibbiflora* Bak., *E. Bernhardiana* Forst.), Mexico. Semi-shrub, little branched, making new rosettes at the base of the thick stem when old; rosettes close, 10–14 in. ϕ; L. usually twice as long as broad, rounded above and with a short tip, keeled on the under side, grey-green, rather reddish and with a thin waxy coating; F. numerous, pale red, autumn to winter.

E. gibbiflora DC. **v. carunculata** hort. Like the foregoing, rather whiter, with curious, tubercular outgrowths on the upper surface of the leaf.

E. gibbiflora DC. **v. metallica** Lem. Like the type; L. coloured a metallic bronze, waxy covering thicker.

E. gigantea Rose et Purp., Mexico. Semi-shrub; stems thick; rosettes close, up to 20 in. ϕ; L. up to 10 in. long, 6 in. wide, roundish above, short-tipped, reddish, with red margin; F. numerous, red, September–November. Needs very rich soil!

E. gigantea Rose et Purp. **v. crispata.** Like the preceding; L. with wavy edge.

E. glauca Bak. (*Cotyledon glauca* Bak., *E. secunda* Booth. *v. glauca*

hort.), Mexico. Making offsets freely, shrub forming clumps, rosettes saucer-shaped, *c.* 4 in. ϕ; L. $\frac{3}{4}$ in. wide, rounded above with a short tip, thin, pale grey, the margins often reddish; F. orange red, yellow inside, in spring. Very easy to grow.

E. imbricata Deleuil (fig. 56) (Hybrid: *E. glauca* × *E. gibbiflora v. metallica*). Rosettes saucer-shaped; L. roundish obovate, with a spiny tip, keeled on the back, grey-green or almost white, often reddish.

E. leucotricha J. A. Purpus (fig. 56). Shrub or semi-shrub branched and covered with brown felty hairs; rosettes 4–6 in. ϕ; L. lanceolate, close, densely covered with white hairs, and brown hairs at the tip; F. cinnabar red, in spring. Keep under glass!

E. linguaefolia Lem. (fig. 56) (*Cotyledon linguifolia* Bak., *Pachyphytum Lingua* hort.), Mexico. Shrub or small semi-shrub; L. in loose rosettes, 2–2$\frac{1}{2}$ in. long, 1 in. broad, very convex on the back, pale green; F. yellow, May–July.

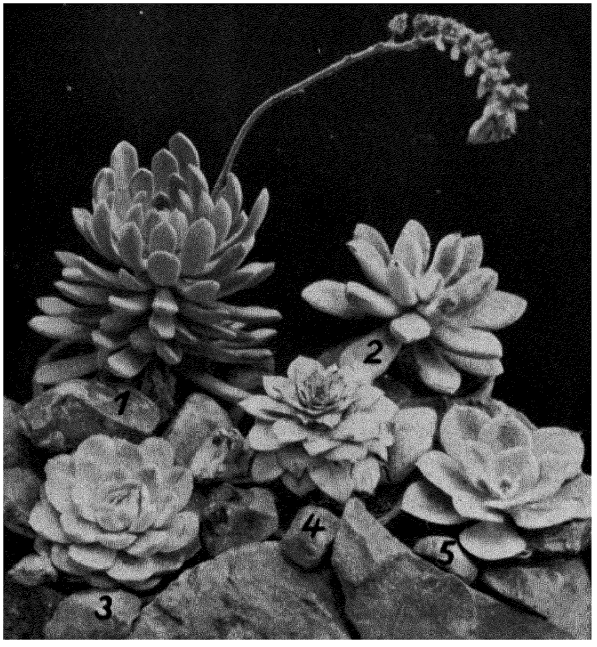


FIG. 56.—1. Echeveria linguaefolia Lem. 2. E. leucotricha J. A. Purp. 3. E. perelegans Bgr. 4. E. Peacockii Croucher. 5. E. imbricata Deleuil. $\frac{1}{4}$ nat. size.

E. lutea Rose, Mexico. Shrub; rosettes close; L. 3–4 in. long, concave on the upper side, tapering to the tip and ending in a spine, fleshy, pale green; F. lemon yellow.

E. Pachypterum Mor. = *Pachyphytum bracteosum* Link, Klotzsch et Otto.

E. pachyphytoides L. de Smet = *Pachyphytum pachyphytoides* Bgr.

E. Peacockii Croucher (fig. 56) (*Cotyledon Peacockii* Bak., *E. Desmetiana* L. de Smet), Mexico. Shrub; rosettes 4–6 in. ϕ; L. wide, short triangular, tapering, 2–3 in. long, 1–1$\frac{1}{8}$ in. wide, flat, with a striking bluish-white waxy coating, the margins reddish; F. red, May–July.

E. perelegans Bgr. (fig. 56) (*E. elegans* Rose), Mexico. Shrub, producing offsets; rosettes 3–4 in. ϕ; L. numerous, obovate, alabaster white with translucent margin; F. red with yellow tips, in summer. Beautiful species.

E. pulverulenta Nutt. (*E. argentea* Lem., *Dudleya pulverulenta* Br. et Rose), Southern California. Shrub; close, cup-shaped rosettes on short stems; L. 6 in. long, 2–3¾ in. wide, tapering, drooping above, with white meal; F. reddish-yellow, May–June. Requires a bright position under glass and moderate amount of water.

E. pulvinata Rose (*Cotyledon pulvinata* Hook. f.), Mexico. Little branched, small semi-shrub; rosettes loose; L. 1½–2 in. long, about half as wide, ⅖ in. thick, blunt above with a short tip and, like the branches, covered with soft white hairs; F. on horizontal branches with a few leaves, red, March–April. Under glass.

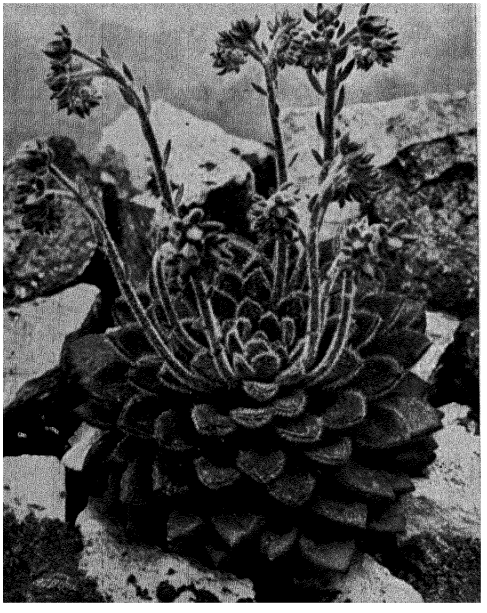


FIG. 57.—Echeveria setosa Rose et Purp. (Photo, K. Josefsky.)

E. Purpusii K. Schum. = *E. Purpusorum* Bgr.

E. Purpusorum Bgr. (*E. Purpusii* K. Schum., *Urbinia Purpusii* Rose), Mexico. Similar to *E. agavoides*, rosettes smaller; L. 8–12, grey-green, finely dotted; F. red, with greenish-yellow tips; under glass.

E. retusa Ldl. (*Cotyledon retusa* Bak.), Mexico. Similar to *E. fulgens* Lem. Smaller in all its parts. Flowers in winter.

E. retusa Ldl. × **E. gibbiflora** DC. **v. metallica** Lem. Good hybrid, which has the stiff habit of *E. retusa*; L. bluish-green; F. brilliant orange red, winter. Good plant for nurserymen; propagation from seed.

E. rigida Bgr. (*Cotyledon pulverulenta* Bak.), California. Low shrub; L. 2–3 in. long, 1 in. wide, oblong, tapering rapidly above, whitish-grey; F. red, April–May.

E. Scheideckeri L. de Smet. (Hybrid: *E. secunda* Booth. × *Pachyphytum bracteosum* Link, Klotzsch et Otto.) Short stemmed; L. in rosettes, 2½–3 in. long, ¾ in. wide, ¼ in. thick, slightly concave on upper surface, roundish on the back, fleshy, with whitish-grey waxy covering; F. orange red, with yellow tips, in spring.

E. secunda Booth. (*Cotyledon secunda* Bak.), Mexico. Shrub producing many offsets; rosettes 3¼–4 in. ϕ; L. half as broad as long, rounded above, with a small tip, upper side hollow, green often with beautiful reddish coloration, especially in a cool place; F. red, in spring. Extraordinarily free growing.

E. secunda Booth. **v. glauca** hort. = *E. glauca* Bak.

E. setosa Rose et Purp. (fig. 57), Mexico. Shrub, little branched;

rosettes sessile, close; L. 3–3¼ in. long, clavate-spatulate, convex on both sides, with blunt tip, dark green, both sides covered with close, white, bristly hairs; F. reddish-yellow, April–July. Beautiful, free-growing species. Recommended for growing in quantity from seed.

E. spathulata Deleuil. (Hybrid: *Pachyphytum bracteosum* Link, Klotzsch et Otto × *E. gibbiflora* DC.) Large rosettes like *E. gibbiflora*. L. rather narrower, very fleshy, grey-green, with thick white waxy coating; F. red.

Echidnopsis Hook. f.

Family: ASCLEPIADACEAE.

Occurrence: North-eastern Africa, Arabia.

Succulent plants. Stiffly branched, ascending, the tip growing on, 6–10-angled, the ribs divided into oblong, hexagonal tubercles, with small, deciduous leaflets, rather rough, grey-green. Flowers small, 2–4, at the ends of the stems, like those of *Trichocaulon*, yellow, brown or red. Easily grown plant for room or greenhouse. Cultivation as for Stapelia.

E. cereiformis Hook. f. (fig. 58) (*Apteranthes tessellata* Decne., *E. tessellata* K. Schum., *Piaranthus fascicularis* hort., *Stapelia cylindrica* hort.), Southern Arabia. Stems up to 12 in. long, ⅝–1 in. thick, 8-angled, ribs blunt, dull dark green, often brownish, finely tuberculate, with white dots; F. expanded, ⅜ in. ϕ, outside brownish, inside pale yellow, summer to autumn.

E. Dammanniana Sprenger, Eritrea. Similar to the foregoing; stems up to 8 in. long, ⅜–¾ in. thick, 8–10-sided, angles sharp; F. brown, roughish.

E. tessellata K. Schum. = *E. cereiformis* Hook. f.

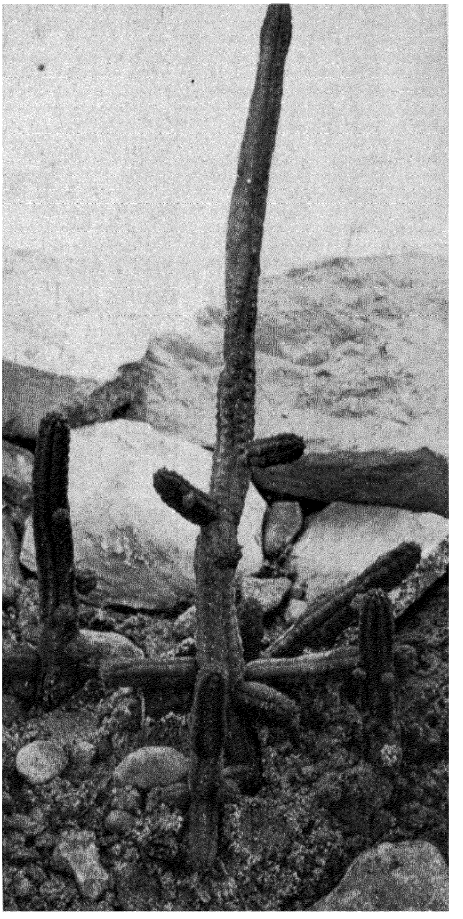


FIG. 58.—Echidnopsis cereiformis Hook. f. (Photo, K. Josefsky.)

Euphorbia L.

Family: EUPHORBIACEAE.

Occurrence: S. Africa, Madagascar, Arabia, Morocco, Canary Islands, E. Indies and a few in America.

Of the 900 species included in this genus, only the succulent types are of interest here and of these only the ones that can be grown fairly readily. Readers who are interested are referred to the specialised literature, of which the most important is the small work by Alwin Berger, *Sukkulente Euphorbien*. The Euphorbias are of very varied habit; many bear a superficial resemblance to cacti, and are often mistaken for them. *Euphorbia splendens* and *E. Bojeri* have striking red flowers. The flowers of the other species are brownish or greenish and inconspicuous, and therefore need not be considered further. The wealth of forms amongst the succulent Euphorbias is enormous. There are thorny, fleshy shrubs as well as plants with slender branches, as thick as a pencil, some with columnar stems, with few or many ribs on stem and branches, spherical plants and all the intermediate forms. Only a few species have conspicuous leaves. As a rule the leaves are reduced, or are small and soon fall off. Whilst a few Euphorbias are spineless, the majority have strong thorns from the leaf bases. Many bear undeveloped inflorescences, which become thorns. (When not otherwise mentioned below, the leaves are small and soon fall.)

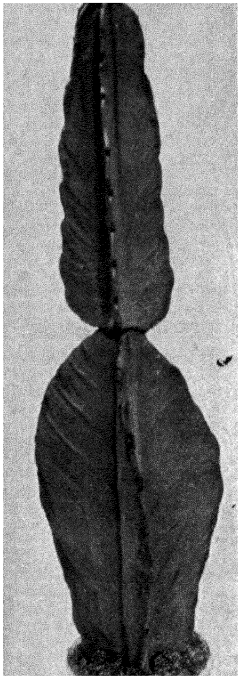


FIG. 50.—Euphorbia abyssinica Raeusch. (Photo, K. Josefsky.)

Most Euphorbias grow easily, and may be grown in a room. In fact the dry atmosphere of a room suits them well. Large specimens should be planted out in the greenhouse, where they soon attain a considerable size. The Euphorbias need a very sunny and airy position, in winter not over 50–55° F. (a few species require more warmth). Whilst the foliose types may be watered freely in summer, the more succulent types must be treated with more caution; in winter great care must be taken with the watering. Complete dryness does little harm, whilst too much water results in rotting. The soil should be sandy and porous, yet nourishing. The quick-growing varieties especially require a rich compost. The addition of crushed charcoal and soft broken brick is advantageous. Propagation is by cuttings in early summer or seeds in spring. Cuttings should be

taken with a sharp knife and dried in the sun for a day or two till the cut surface is fully hardened. They can then be rooted in a propagating frame in a mixture of fine peat, sand and powdered charcoal. Many species are suitable for propagation in quantity. The milky juice of the Euphorbias is very poisonous. If it gets into a wound or the eyes it can cause serious illness. According to Herre, of Stellenbosch, a few species of Euphorbia, e.g. *E. esculenta, E. hamata*, may be used as food for cattle!

E. abyssinica Raeusch. (fig. 59), Abyssinia. Tree-like, up to 30 ft. high in its native habitat; branches in whorls, 5–8-angled, in 4–12-in. long joints, pale or dark green, angles broadly winged and compressed, not much curved, rather sinuate; sides much sunken, with distinct, double veins; spine pairs

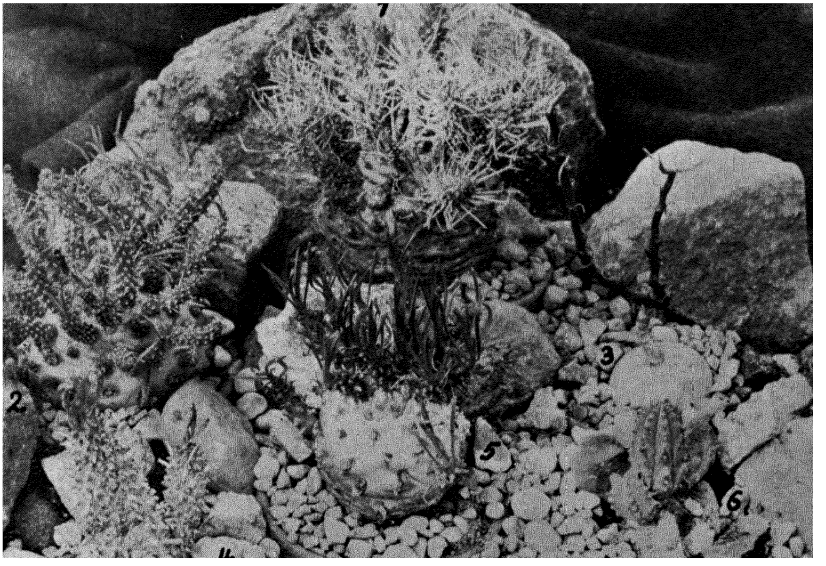


FIG. 60.—1. Euphorbia argillicola Dtr. 2. E. namibensis Marl. 3. E. aequoris Bgr. 4. E. orabensis Dtr. 5. E. rugosa Marl. 6. E. tubiglans Marl. $\frac{2}{3}$ nat. size.

c. $1\frac{1}{8}$ in. apart, $\frac{1}{8}$ in. across, almost black, strong, sunk in grooves; L. small, soon falling. Free growing, striking species. Seedlings at first have large leaves.

E. aequoris Bgr. (fig. 60), S.W. Africa. Forming a round tuber, which is mostly buried in the soil; from the centre a small, little-branched stem the thickness of a pencil; leaf cushion elongated and somewhat projecting, with linear-lanceolate leaves.

E. aggregata Bgr. (*E. enneagona* Bgr.), Cape Province. Freely branched shrub up to 12 in. high; stem short, branches whorled, 8–9-angled, $1\frac{1}{8}$–$1\frac{3}{8}$ in.

thick, angles divided by deep grooves, broader than high, almost straight, hardly toothed; thorn-like flower stalks numerous, $\frac{3}{8}$ in. long, reddish, later black.

E. alcicornis Bak. (fig. 61), Madagascar. Shrub or tree-like when old; stem stout, 5-angled, up to 3 in. thick, green, later grey-edged with $\frac{1}{8}$–$\frac{1}{6}$-in. long dark spines, often branched from the base up; branches cylindrical at the bottom, then triangular, above flat and 2-sided, in 2–3 ranks or pinnately branched, sinuate, toothed, with brown spines $\frac{1}{8}$–$\frac{1}{6}$ in. long; dark green, often lightly striped.

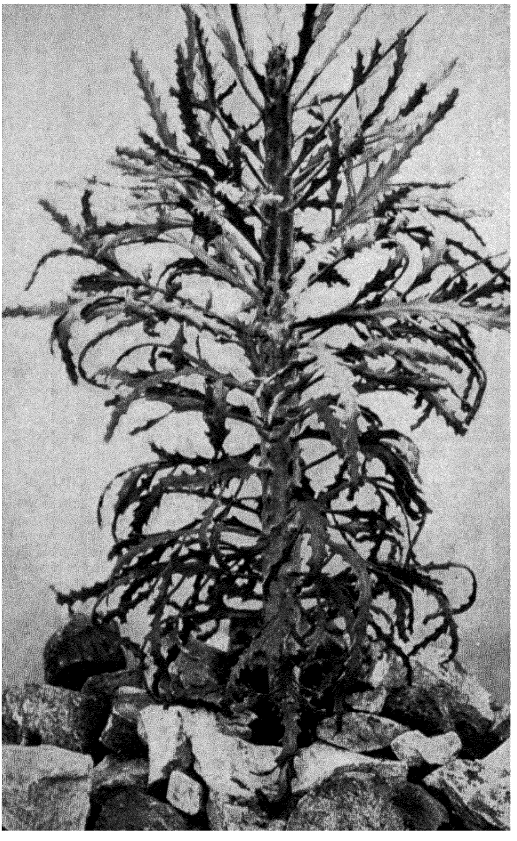


FIG. 61.—Euphorbia alcicornis Bak.
(Photo, K. Josefsky.)

E. Ammak Schweinf. (*E. officinarum* L. *v. arboreum* Forsk.), Southern Arabia. When old, up to 30 ft. high with a short stem; branches spreading, up to 6 in. across, usually 4- sometimes 5-angled, angles winged, dark green, with slightly raised veins diverging outwards, edge with teeth about $\frac{3}{8}$ in. apart, spines on prominent shields, stout, $\frac{3}{8}$ in. long, horizontal.

E. anacantha Haw. = *E. tridentata* Lam.

E. aphylla Brouss. (fig. 62), Grand Canary. Freely branched shrub; branches jointed, cylindrical, dichotomously branched or in whorls, curved upwards, about $\frac{1}{4}$ in. thick, grey-green.

E. argillicola Dtr. (fig. 60), S.W. Africa. Plants stout club-shaped with a long taproot, up to 12 in. high and $4\frac{3}{4}$–6 in. thick (type like *E. namibensis*). Branches cylindrical, lasting 2–3 years, 2–4 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. thick; L. compressed into a tuft, blue-green, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad, folded together to form a channel, with a soft tip at the end, with bristly teeth spread along the edge; flower stems 3–4 partite, arising from the leaf axils, generally $\frac{3}{8}$–$1\frac{1}{8}$ in. long, thorn-like. Cannot withstand stagnant moisture!

E. Bergeri N. E. Br. (fig. 76) (*E. caput-medusae* Lam., *E. fructus-pini* Sweet, *E. parvimamma* Bgr.), S. Africa. Similar to *E. caput-medusae* L., stem short, almost spherical; branches thinner, $\frac{5}{8}$–1 in. thick; leaf cushions rhomboidal or hexagonal oblong.

E. Bergeriana Dtr., S.W. Africa. Up to 16 in. high, hemispherical shrub, dichotomously or pseudo-dichotomously branched; branches supple, bluish-green, internodes $\frac{3}{4}$–$1\frac{1}{2}$ in. long; L. thick, opposite, $\frac{1}{4}$–$\frac{2}{5}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, ovate, sessile, with a small tip; dioecious; female plant stronger; less branched than the male plant.

E. Bojeri Hook. (*Sterigmanthe Bojeri* Kl. et Garcke), Madagascar. Similar to *E. splendens*, but daintier and more bushy; L. smaller, with small

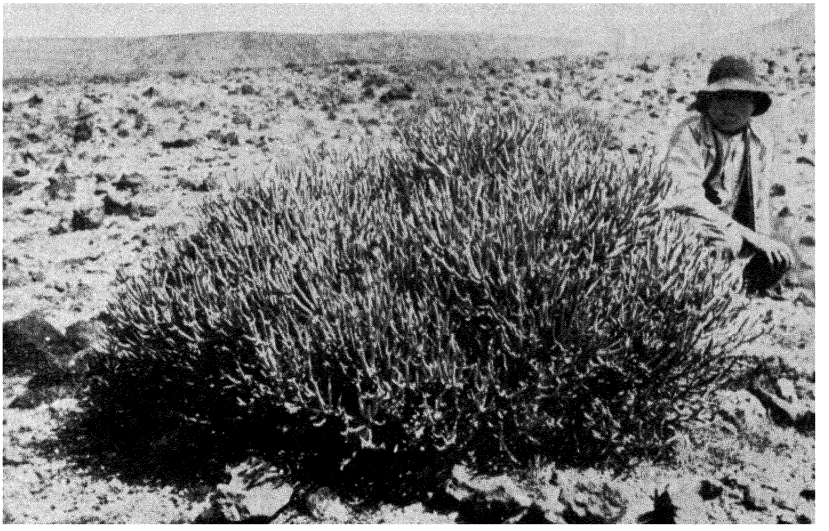


FIG. 62.—Euphorbia aphylla Brouss. (Photo, Dr Burchard.) (From B.Z.O.u.B.G.K.)

spiny tips. Involucral leaves smaller, dark red. Cultivation as for *E. splendens*.

E. bubalina Boiss. (*E. oxystegia* Bak.), S. Africa. Stem erect, little branched, 12–16 in. high, up to $\frac{3}{4}$ in. thick below, thicker above, green, later greyer; leaf cushions long, flat, rhomboidal; L. at the tips of the branches, 3–4 in. long, lanceolate, blunt above with a short tip, narrowed below with a broad stalk, soft, thin, pale green, falling in winter. Grows quickly from seed; needs a cool place in winter, out of doors in summer.

E. bupleurifolia Jacq. (fig. 63), Cape Province. Stem simple, very thick, rather ovate, 4–5 in. high, 3–$3\frac{1}{4}$ in. thick; leaf cushions 4-sided, brown, scaly, in a double spiral; L. in summer at the tip 4–6 in. long and more, lanceolate, tapering, narrowed into the long stalk, pale green; F. long stalked. Requires a warm moist position, never in full sun, and leaf mould; in winter should be kept quite dry. Propagation by seed.

E. canaliculata Lam. = *E. clava* Jacq.

E. canariensis L. (fig. 2), Canary Islands. Large shrub, branched from the base, in its habitat up to 50 ft. high, branches numerous, ascending,

usually 5-, occasionally 4- or 6-angled, fresh green, sides flat, angles sharp, with small crenulations; spines in pairs, *c.* $\frac{5}{8}$ in. apart, $\frac{1}{6}$–$\frac{1}{5}$ in. long, thin. Slow growing.

E. caput-medusae L. (fig. 64) (*E. Commelini* DC., *E. fructus-pini* Mill., *E. medusae* Thunb., *E. tessellata* Sweet), S. Africa. Stem short, thickened above, up to 8 in. ϕ; branches numerous, radiating, serpentine, $1\frac{1}{8}$–2 in. thick, up to 30 in. long, grey-green; leaf cushion 4–5-angled, with deep grooves between them; L. $\frac{5}{8}$–1 in. long, linear-lanceolate, later falling; F. numerous at the tips of the young branches, stalked, flower stalks persisting. In summer requires sun and warmth, in winter 55–60° F. Propagation by seed, cuttings of the lateral branches grow one-sidedly.

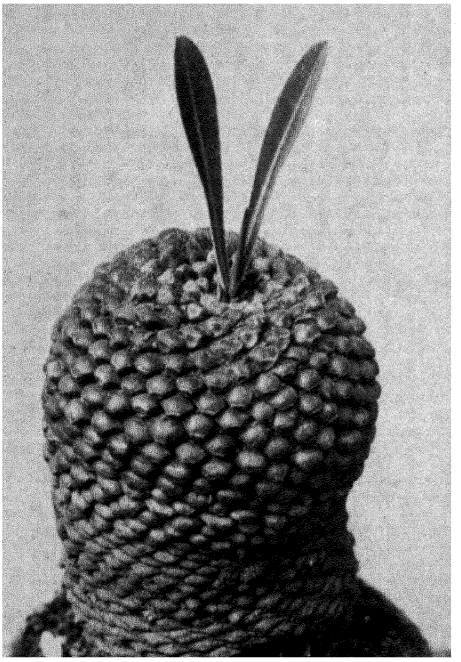


FIG. 63.—Euphorbia bupleurifolia Jacq. (Photo, E. Hahn.) (From V.P.B.)

E. caput-medusae Lam. = *E. Bergeri* N. E. Br.

E. carinata Lodd. = *Pedilanthus carinatus* Spr.

E. cereiformis L. (*E. erosa* Willd. (according to Dr N. E. Brown of Kew)), S. Africa. Stems up to 3 ft. high, branched from the base, dark green; ribs up to 9–13, but usually 11, occasionally spirally compressed, divided by deep grooves, with a few reflexed teeth; thorn-like flower stalks solitary, $\frac{3}{8}$–$\frac{5}{8}$ in. long. Free growing.

E. cereiformis L. **v. submammilaris** = *E. submammilaris* Bgr.

E. cervicornis Boiss., S.W. Africa. Hemispherical bush, 1 ft. high, pale green, many-stemmed, from a tuberous root; stem at first as thick as a finger, 2-sided, flat, compressed, soon branching; L. alternate, $\frac{7}{8}$ in. long, $\frac{5}{8}$ in. broad, oval, acute, folded above, with a red edge; the nascent podaria (leaf cushions) $\frac{3}{8}$–$\frac{3}{4}$ in. long, at the base $\frac{1}{5}$–$\frac{2}{5}$ in. thick, forming projecting, decurrent teeth. Dioecious.

E. clava Jacq. (*E. canaliculata* Lam., *Tithymalus aizoides* Comm.), Cape Province. Stem up to 10 in. high, cylindrical, up to $1\frac{1}{2}$ in. ϕ, often thickened above, usually unbranched; leaf cushions little raised; several leaves on the head, these 4–5 in. long, $\frac{1}{5}$–$\frac{2}{5}$ in. wide, linear, tapering, channelled, pale green, later falling off; flower stalks shorter than the leaves, becoming woody, persisting. Requires more moisture.

E. coerulescens Haw. (*E. virosa* Willd. *v. coerulescens* Haw.), Cape

Province. Allied to *E. virosa* and very like it. Hardly more than 20 in. high, branches many and close, 5-angled, light blue, angles slightly crenulate, horny band thinner, spines weaker.

E. Commelini DC. = *E. caput-medusae* L.

E. confluens Nel, Little Namaqualand. Very succulent plant about 4 in. high, $1\frac{1}{8}$–$1\frac{3}{8}$ in. wide, with obconic main stem, which is partly buried in the soil, the upper half covered with branching shoots; outer shoots curved upwards, 7–$7\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. thick, with small, thin side shoots, inner branches erect, unbranched, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, cylindrical; podaria 6-angled, projecting, $\frac{3}{8}$ in. wide, with a white leaf scar; L. at the ends of the branches $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{12}$ in. wide, falling later; flower stems solitary from the axils of the podaria, 6–8 at the ends of the branches, up to $1\frac{3}{8}$ in. long, persisting for many years on the plant; F. small. Interesting new species.



FIG. 64.—Euphorbia caput-medusae L.

E. Dinteri Bgr. (fig. 69), S.W. Africa. Allied to *E. virosa* and possibly a sub-species of it. Shrubby, branched from the base; stem and branches 6–8-angled, angles of the stem spirally twisted, the others straight, rather crenulate and sinuate, grooved between the angles, grey, with dark, curved lines, the edge with a broad horny band; spines in pairs, $\frac{1}{4}$ in. apart, projecting, $\frac{3}{8}$–$\frac{3}{4}$ in. long, brown, later grey.

E. Echinus Hook. f. et Coss., S. Morocco. Shrub, *c.* 20 in. high, freely branched, stem $1\frac{1}{2}$–2 in. thick; branches ascending, 6- or 7-angled, sides slightly depressed, with darker lines, becoming flat later, dull pale green, angles hardly toothed, spines in pairs, $\frac{1}{5}$–$\frac{1}{4}$ in. apart, $\frac{1}{25}$ in. long, reddish, later pale grey, on elongated, grey, coalescing shields.

E. eendornensis Dtr., Namaqualand. Stem stout, clavate, with a

stout taproot, 6–8 in. wide and high, brownish-grey, closely covered with branches 2–3 in. long, $\frac{3}{8}$–$\frac{1}{2}$ in. thick; at the rounded ends a tuft of minute, short, lanceolate, rudimentary leaves.

E. enneagona Bgr. = *E. aggregata* Bgr.

E. enneagona Haw. = *E. fimbriata* Scop.

E. enopla Boiss. (*E. heptagona* L.), Cape Province. Stem erect; branches whorled, $1\frac{1}{8}$–$1\frac{1}{2}$ in. thick, with 6, 7–10 ribs, angles broader than high, grooves



FIG. 65.—1. Euphorbia pseudobrachiata Dtr. 2. E. lignosa Marl. $\frac{1}{3}$ nat. size.

sharp, straight or slightly sinuous, the edges straight or slightly curved; with orange red, thorn-like flower stalks $\frac{5}{8}$–1 in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. apart.

E. erosa Willd. = *E. cereiformis* L.

E. falsa N. E. Br. Like *E. meloformis*. Thorn-like flower stalks persisting; making numerous offsets.

E. fasciculata Thbg. (fig. 68), S. Africa. Thick, club-shaped; part above the soil as large as a fist or more; the surface divided into hexagonal, projecting, spirally arranged areas with prominent leaf cushions, resembling stout spines; inflorescence exceptionally strong, forms $1\frac{1}{8}$ in. long, more or less curved thorns. Desirable species! Very sensitive to excess moisture!

E. fimbriata Scop. (*E. enneagona* Haw., *E. mammillaris* Bgr.), Cape Province. Low shrub, stem and branches $\frac{3}{4}$–$1\frac{1}{8}$ in. thick, cylindrical, much thickened, 7–12-ribbed, with lateral and irregular branching, at first pale green, later pale grey or brownish, ribs low, divided into areas, usually hexagonal, with white leaf scars, stepped, with numerous thorn-like inflorescences from the transverse grooves. Sensitive to excess moisture!

E. Fournieri hort. (Garden name) = *E. lophogona* Lam.

E. Friedrichiae Dtr., S.W. Africa. Stem clavate, 6–8 in. high above the soil level, covered with close, repeatedly forked branches; bluish-green;

leaves along the branches, up to 1½ in. long, ¾ in. broad, channelled, margins red and with weak, red teeth, on the younger branches shorter; leaves at the tips of the youngest branches.

E. fructus-pini Mill. = *E. caput-medusae* L.

E. fructus-pini Sweet = *E. Bergeri* N. E. Br.

E. Gilbertii Bgr. = *E. micrantha* Boiss.

E. globosa Sims (fig. 4) (*E. glomerata* hort., *Dactylanthes globosa* Haw.), Cape Province. Low semi-shrub; branches in round joints, lower joints rounder, ⅝–¾ in. long, the younger ones often more ovate, up to 1½ in. long, dark green, later grey, grooved, the leaf cushions rather prominent and spirally arranged; inflorescences from the young joints, up to 4 in. long, repeatedly forked, thin, woody, persisting a long time.

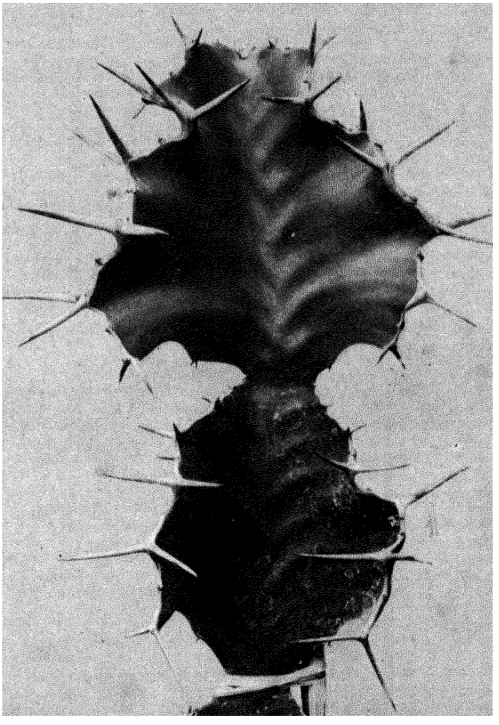


FIG. 66.—Euphorbia grandicornis Goebel. (From V.P.B.)

E. glomerata hort. = *E. globosa* Sims.

E. gorgonis N. E. Br., S. Africa. Stem club- or top-shaped, with sunken crown, with numerous, 4-6-sided, prominent leaf cushions and white leaf scars; branches short, stout, with spirally arranged leaf cushions. Rare, new introduction. Needs more heat. Propagation by seeds.

E. grandicornis Goebel (fig. 66). Tree-like in age; stems and branches 3-angled, branches stepped, erect, ascending, angles broadly winged, deeply constricted into more or less elongated joints, edges undulate, with a horny border, green at first, later grey-green; spines very stout, in pairs, ¾–2 in. long, light brown, later grey.

E. grandidens Haw., S. Africa. A tree up to 30 ft. high when old; stem roundish, 6-angled, with whorled branching in stages; branches up to 6, 3–4-angled, often spirally twisted, fairly long, erect, later more pendent, wavy, toothed; spines in pairs, ⅙–¼ in. long, brownish. Free growing.

E. grandis Lem. = *E. neutra* Bgr.

E. Grantii Oliv. = *Synadenium Grantii* Hook. f.

E. handiensis Burch. (fig. 1), Fuerteventura (Canary Islands). Cactus-like plant, even when young freely branched from the base; stems and branches

erect, 3–3½ ft. and more high, *c.* 2½–3¼ in. thick, 8-, 12- or more angled, the angles separated by deep grooves; bright green; on the ribs close-set, raised, white, heart-shaped spine-shields, with about 2 erect, sharp thorns ¾–1⅛ in. long; shields and thorns crowded at the ends of the branches when young, red, later brownish, finally white.

E. heptagona Bgr. = *E. pentagona* Haw.

E. heptagona L. = *E. enopla* Boiss.

E. Hermentiana Lem. (fig. 67), W. Africa. Becoming shrub- or tree-like with age; branches erect, 3–4-angled, 1½–2½ in. ϕ, constricted into joints 6–10 in. long, angles almost winged, with small crenulations, dark green, irregularly marbled with white, spines ⅙–⅕ in. long, reddish-brown; L. 1⅛–2 in. long, spatulate, short tipped, remaining on for a long time. Good species for growing in quantity.

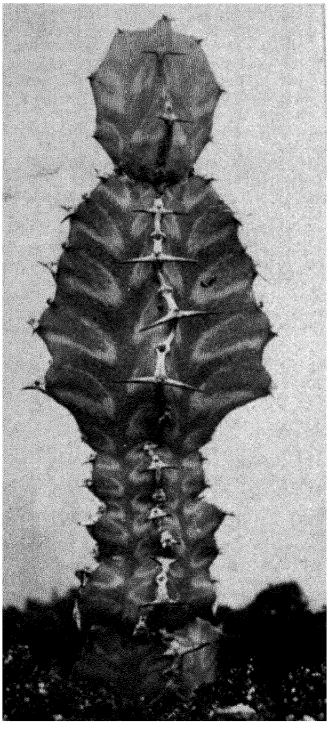


FIG. 67.—Euphorbia Hermentiana Lem. (Photo, F. Hanburg.) (From V.P.B.)

E. hopetownensis Nel, Great Karroo. Low, succulent, leafless plant, about 2 in. ϕ, branches in three series ± erect, leaving in the middle a somewhat sunken, bare spot *c.* ⅝ in. across, the outer branches about 1 in. long and ⅜ in. thick, the inner ones rather shorter, covered with small crescent-shaped podaria, arranged in distinct rows; inflorescences ⅜ in. long at the ends of the branches; F. small. Interesting new species.

E. horrida Boiss. (fig. 76), S. Africa. Stem very low, little branched from the base, 2½–5 in. thick or more, with 12–14 or more narrow ribs, separated by deep grooves; edges notched, with ⅜–¾-in. long, thorn-like inflorescences, usually three together. Requires a very bright, warm position; keep cooler in winter and very dry. Propagation by seed, cuttings easily die off. The plant is dioecious. In S. Africa the shoots always grow on the northern, *i.e.* the sunny side. In northern latitudes it is recommended to give the plant a southern aspect.

E. hottentotta Marl. (fig. 79). Closely allied to *E. virosa* (sub-species?); attractive variety.

E. inermis N. E. Br., also Mill. = *E. viperina* Bgr.

E. lactea Haw., East Indies. When old, shrub- or tree-like; stems and branches 3-angled, 1⅛–2 in. ϕ; sides almost flat, dark green, with white bands in the middle, and similar coloured lines running from them to the notches; edges wavy; spines thick, *c.* ⅕ in. long, brown. Slow growing.

E. Laro Drake, Madagascar. Shrub with $\frac{1}{5}$–$\frac{1}{4}$-in. thick, round branches in whorls; branches curved ascending, dark green, grooved lengthwise, with light dots and stripes in the grooves.

E. Ledienii Bgr., Cape Province. Shrub-like, up to 6 ft. high; branches ascending, 5-angled, grey-green, joints 3–8 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. ϕ, smaller above, angles somewhat compressed, crenulate, the sides rather channelled, flatter later; spine pairs up to $\frac{3}{4}$ in. apart, $\frac{1}{3}$ in. long, brown, later grey, on elongated grey shields, which $\pm$ coalesce into a horny band.



FIG. 68. 1. Euphorbia fasciculata Thbg. 2. E. Monteiroi Hook. f. 3. E. Schaeferi Dtr. $\frac{1}{8}$ nat. size.

E. lignosa Marl. (fig. 65), Great Namaqualand. Roundish, low, half-shrub, hardly more than 20 in. high; stem very short and solid, forming many stout branches, forked in threes, as thick as a finger, whitish grey-green; the branches ending in thorns. Beautiful, rare species. Dislikes stagnant moisture.

E. Lombardensis Nel, Great Karroo. Very succulent, erect, unbranched plant, 2–3 in. high, 2–4 in. ϕ; ribs not very prominent, with distinct transverse divisions; on the prominent tubercles is a small shield with a pair of thorns at right angles to each other $\frac{1}{6}$–$\frac{1}{4}$ in. long; tubercles with reddish dots and separated by greenish lines; inflorescences terminal, short stalked; F. small.

E. lophogona Lam. (*E. Fournieri* hort.), Madagascar. Shrub up to 20 in. high, branches in whorls; stem and branches thickened above, angled, the angles reddish, covered with pectinate stipules; L. at the ends of the shoots long-oval, narrowed into the long, reddish stalk, 5 in. long, 2 in. wide, with a short tip, emerald green, with white feathered veins. Needs a warm position; propagation easy from seed.

E. mammillaris Bgr. = *E. fimbriata* Scop.

E. mammillaris L., Cape Province. Rare in cultivation. (According to Dr N. E. Brown of Kew, this species is described as *E. erosa* Willd. in A. Berger's book, *Sukkulente Euphorbien.*)

E. Marlothii Pax. = *E. Monteiroi* Hook. f.

E. mauritanica L., Cape Province ("Milkbosch" of the Boers). Shrub, freely branched from the base, up to 3 ft. high; branches elongated, erect,

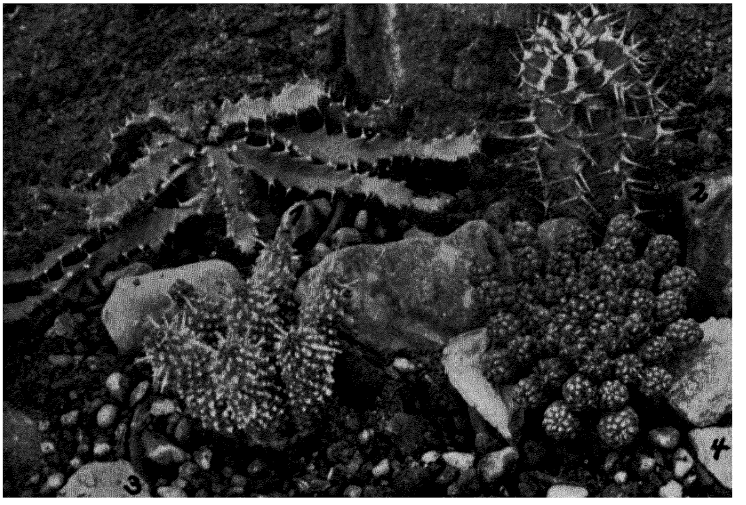


FIG. 69. 1. Euphorbia stellata Willd. 2. E. Dinteri Bgr. 3. E. Rangeana Dtr. 4. E. truncata N. E. Br. $\frac{1}{3}$ nat. size.

as thick as a pencil, leaf-cushions rather prominent; L. linear-lanceolate *c.* $\frac{1}{2}$–$\frac{5}{8}$ in. long, soon falling, leaving broad scars.

E. medusae Thunb. = *E. caput-medusae* L.

E. meloformis Ait. (fig. 70), Cape Province. Plant body spherical, often 3–4 in. ϕ, usually wider than high, with a thick taproot, ribs 8–10, or even 12, vertical or slightly spiralled, ± deeply grooved, crown sunken, green or grey-green, the sides with paler or redder transverse bands, with roundish leaf scars on the edge; the woody inflorescences repeatedly forked, erect or bent downwards, later falling off. Plants dioecious. Propagation by seed.

E. Meyeri Nel, Little Namaqualand. Low plant, *c.* 6 in. high, with erect, tuberculate stem, 1–1$\frac{1}{8}$ in. thick, above with numerous erect ascending, $\frac{5}{8}$–1$\frac{1}{8}$-in. long, bare, clavate branches; inflorescences terminal, usually four, 1$\frac{1}{8}$–1$\frac{3}{8}$ in. long, soon falling off; F. small.

E. micrantha Boiss. (*E. Gilbertii* Bgr., *E. tetragona* Bak.), S. Africa. Stem short, conical, with thick, tuberous root, not projecting far above soil level, above with radiating, 3–4-angled, prostrate, sinuous or spirally twisted branches, 2$\frac{1}{2}$–5 in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, green, edges wavy, sides little depressed;

spines in pairs, *c.* $\frac{1}{8}$ in. long, thin, sharp, grey-brown. Needs more heat. Propagation by seeds.

E. Milii Desm. = *E. splendens* Bojer.

E. Monteiroi Hook. f. (fig. 68) (*E. Marlothii* Pax.), S.W. Africa. Stem erect, simple, or with 2–3 erect branches from the base, up to 3 ft. high when old, 4–6 in. thick, round; stem and branches with leaf cushions spirally arranged; in summer there appear near the top a number of umbellate, leafy, herbaceous shoots, which also bear the flowers, and fall off in autumn, or drying up, persist. Wants complete rest in winter.

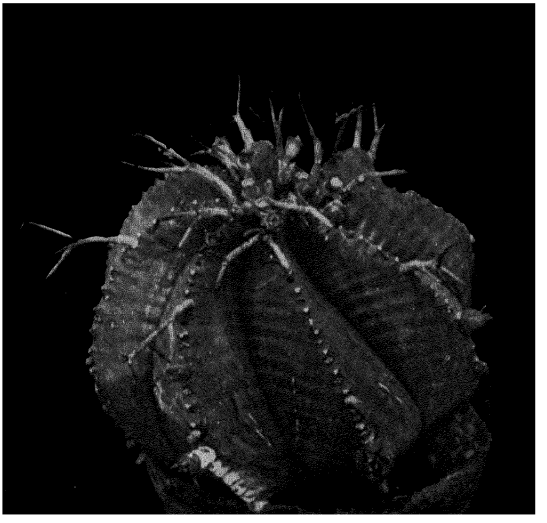


FIG. 70.—Euphorbia meloformis Ait. (From V.P.B.)

E. Morinii Bgr., Cape Province. Similar to *E. cereiformis*. Angles 5–8, smoother, little notched, thorns shorter and less numerous.

E. namibensis Marl. (fig. 60), Namib. Plant stout, club-shaped with a thick taproot the size of a full-grown carrot, becoming 12–14 in. long in all, weight up to 2 lbs.; head up to 6 in. ϕ, closely covered with spreading branches as thick as a pencil, about $1\frac{1}{8}$ in. long; leaves in a tuft, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, about $\frac{1}{12}$ in. wide, curved in to form a channel, with a soft tip at the end, with bristles along the notched edge; inflorescences from the leaf axils, $\frac{1}{2}$ in. long, unbranched, becoming thorny. Much dislikes stagnant moisture! Should be kept completely dry in winter.

E. natalensis hort. = *E. similis* Bgr.

E. neriifolia L. (fig. 71), East Indies. Tree-like in old age; weakly 5-angled, later round; branches arranged more or less in whorls, slightly spiralled, 5-angled, thick, pale green, later grey, with short black spines; L. 3–$4\frac{1}{2}$ in. long, obovate, tapering, fleshy, leathery, pale green, falling in autumn.

E. neutra Bgr. (*E. grandis* Lem.). Similar to *E. abyssinica*. Stems and branches 5–6-angled, jointed, the joints smaller above, the winged angles more marked, hardly wavy; pairs of spines $\frac{3}{8}$–$\frac{5}{8}$ in. apart, $\frac{1}{6}$–$\frac{1}{5}$ in. long.

E. Nivulia Haw., East Indies. Similar to *E. neriifolia*. Stem and branches rounder; smaller.

E. obesa Hook. f. (fig. 72), Cape Province. Stem simple, unbranched, spherical, or rather taller than broad, $3\frac{1}{4}$–$4\frac{3}{4}$ in. ϕ; ribs broad, about 8, vertical, with very small, brownish, blunt notches; grooves distinct, hardly deeper at the crown; plant body pale grey-green with reddish-brown longitudinal and

transverse stripes, which are especially marked at the crown. Propagation only by seed. Keep moderately damp in summer, in winter fairly warm and dry. Likes sandy soil. Plant dioecious.

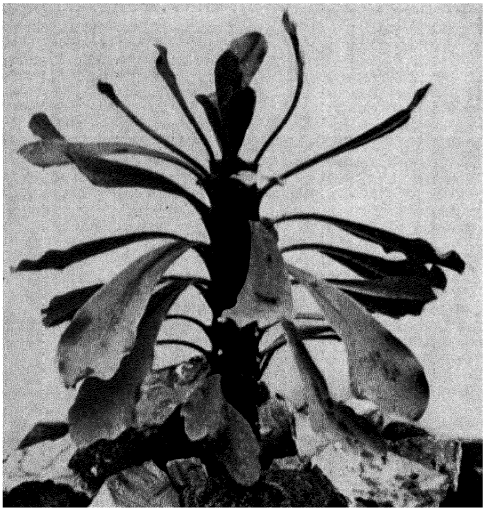


FIG. 71. Euphorbia neriifolia L. (Photo, K. Josefsky.)

E. obesa Hook. f. × **E. meloformis** Ait. A recent artificially raised hybrid.

E. officinarum L., Morocco. Up to 3 ft. high, little branched, in whorls, $2\frac{1}{2}$–3 in. ϕ, 9–13-angled, but usually 11-angled, sharp but only slightly grooved, angles almost straight, hardly wavy, whitish-grey, with horny edge, spines in pairs, $\frac{1}{5}$–$\frac{5}{8}$ in. long, whitish-grey, often pointing downwards.

E. officinarum L. **v. arboreum** Forsk. = *E. Ammak* Schweinf.

E. orabensis Dtr. (fig. 60), S.W. Africa. (Type like *E. namibensis*.) Plants slenderly clavate, with longer taproot, in all about

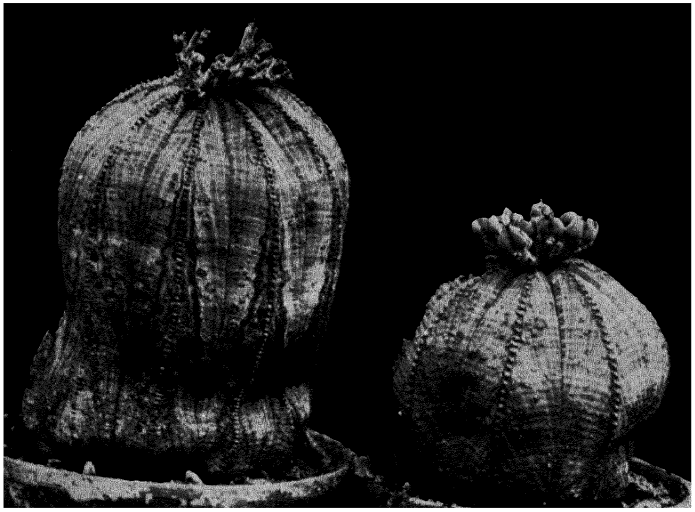


FIG. 72.—Euphorbia obesa Hook. f. Left, male; right, female plant. (From V.P.B.)

6 in. long, the head *c.* 2 in. ϕ, often with branches $1\frac{1}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick; L. green, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{12}$ in. broad, channelled, the edge without bristles; inflorescences not becoming woody. Very poisonous! Dislikes stagnant moisture.

E. Ornithopus Jacq. (*Dactylanthes patula* Haw., *E. patula* Sweet), Cape Province. Similar to *E. globosa*. Joints as long as a finger, *c.* $\frac{3}{4}$ in. thick, fresh green, leaf cushions like small, conical tubercles; F. on elongated, dichotomously branched stalks.

E. oxystegia Bak. = *E. bubalina* Boiss.

E. parvimamma Bgr. = *E. Bergeri* N. E. Br.

E. patula Sweet = *E. Ornithopus* Jacq.

E. pendula Boiss. (*Tithymalus pendens* Haw.), Cape Colony. Shrub, freely branched, with long, decumbent, $\frac{1}{5}$–$\frac{1}{4}$-in. thick branches, jointed and dichotomously branched; joints 2–3 in. long, dull green, with fine white dots; L. small scale-like, soon drying up. Most of the plants in cultivation under this name are really *Sarcostemma viminale*. (Can easily be recognised by microscopical examination of the milky sap; the starch grains of the Euphorbia are dumb-bell shaped!)

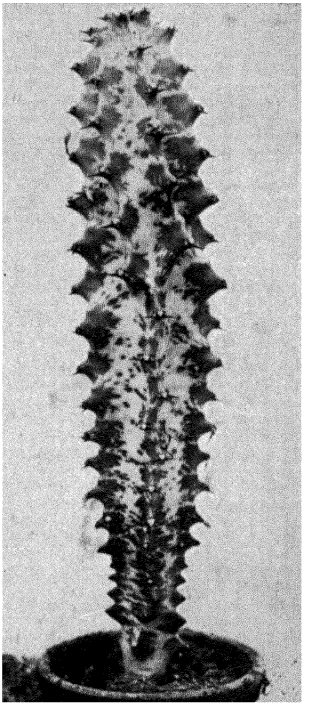


FIG. 73.—Euphorbia pseudocactus Bgr. (Photo, F. Hanburg.) (From V.P.B.)

E. pentagona Haw. (*E. heptagona* Bgr.), Cape Province. Shrub, up to 6 ft. high; stem erect, $1\frac{1}{8}$–$1\frac{1}{2}$ in. thick, branching irregular or in whorls; branches erect, shining, bright green, later greyer, 5–8-angled, angles $\frac{1}{5}$–$\frac{1}{6}$ in. high, separated by deep grooves, edges with teeth pointing downwards or only weakly notched, with small transverse grooves in the notches, from which here and there arise stout, $\frac{5}{8}$–$\frac{3}{4}$-in. long, yellowish, thorn-like inflorescences.

E. polygona Haw., S. Africa. Stem up to 2 ft. high, usually less in cultivation, dark green, branched from the base up, 10–13-ribbed, grooves deep, angles straight or spirally twisted, little notched on the edge; thorn-like inflorescences not numerous, *c.* $\frac{3}{8}$ in. long. Needs more heat; dislikes excess moisture.

E. procumbens Meerbg. = *E. stellata* Willd.

E. procumbens Mill. (*E. pugniformis* Boiss.), Cape Colony. Plant body like *E. caput-medusae*. Stem thick, round; crown low and wide, covered with ovate, spherical, or conical leaf cushions; branches as thick as a finger, radiating, leaf cushions somewhat elongated, when young with linear-lanceolate leaves $\frac{1}{8}$–$\frac{1}{6}$ in. long; F. from the crown of the stem. Rare species!

E. pseudobrachiata Dtr. (fig. 65) (*E. brachiata* E. Meyer), Cape Province, near the Gari River at Ebenezar. Low half-shrub, roots tuberous; branches forked in twos or threes, as thick as a quill, grey-green, the ends, especially of the short side branches, ± thorny; F. very small, triangular.

E. pseudocactus Bgr. (fig. 73). Stem erect, usually 3-angled at the base,

above 4- or 5-angled, jointed; joints 4–6 in. long, up to 2 in. thick, sides slightly hollowed, with coarse notches and a distinct horny band, pairs of spines stout, up to $\frac{1}{2}$ in. long, brown, later grey; sides somewhat hollowed, later flat, green, with marked, yellowish-green, U-shaped lines.

E. pseudoglobosa Marl., Cape Province. From thick, tuberous roots appear numerous, roundish-oval shoots, about $\frac{3}{4}$ in. long, $\frac{5}{8}$ in. thick, almost smooth, with five grooves towards the tip, the angles marked by a few round leaf scars, brownish-green. Needs heat.

E. pugniformis Boiss. = *E. procumbens* Mill.

E. pulvinata Marl. (fig. 74), S. Africa. Branched from the base, with numerous shoots of equal length, forming a low, slightly convex cushion, up to 20 in. ϕ; shoots $1\frac{1}{8}$–$2\frac{1}{2}$ in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, usually with 7 ribs, often 6 or 8, the angles slightly sinuate, height of the angles $\frac{1}{4}$–$\frac{1}{3}$ in., with numerous wine red or purple thorn-like inflorescences $\frac{3}{8}$–$\frac{5}{8}$ in. long, all about the same height.

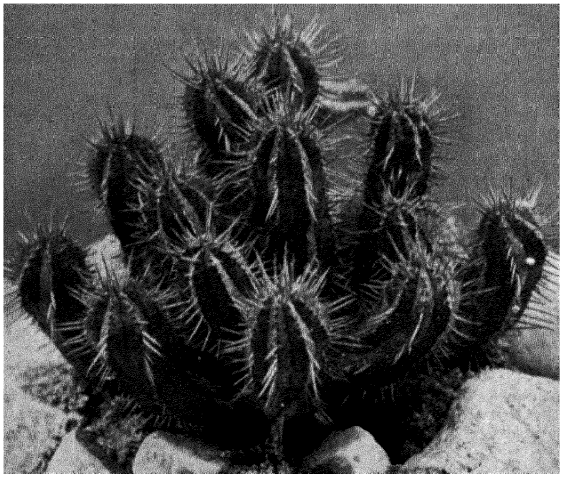


FIG. 74.—Euphorbia pulvinata Marl. (Photo, K. Josefsky.)

E. Rangeana Dtr. (fig. 69), S.W. Africa. Root thick, almost turnip-like; branched from the base upwards; branches 2 in. long, $\frac{5}{8}$ in. thick, leaf cushions 5–6-angled, very prominent, with round, projecting leaf scars; L. $\frac{5}{8}$ in. long, nearly $\frac{1}{8}$ in. wide at the end, with a short tip, grooved; inflorescence solitary, $\frac{3}{8}$ in. long, becoming thorny.

E. resinifera Bgr. (fig. 75) (*E. San Salvador* hort.), Morocco. Shrub, in cultivation hardly more than 20 in. high; freely and irregularly branched from the base, branches ascending, pale grey-green, 4-angled, the sides rather hollowed when young, later flat, angles slightly notched, spines in pairs, $\frac{1}{5}$–$\frac{2}{5}$ in. apart, $\frac{1}{5}$–$\frac{1}{4}$ in. long, brownish. Free-growing species.

E. rhipsaloides Lem. = *E. Tirucallii* L.

E. rugosa Marl. (fig. 60), Griqualand. Stems about 3 in. high, $\frac{3}{4}$ in. thick, branches lateral, erect ascending, closely covered with spirally arranged, irregular, 4-sided, projecting, ± thorn-like leaf cushions; L. $\frac{5}{8}$–$\frac{3}{4}$ in. long, narrow; inflorescence $\frac{1}{3}$–$\frac{2}{5}$ in. long, thorn-like.

E. San Salvador hort. = *E. resinifera* Bgr.

E. sarcostemmatoides Dtr. (fig. 76), S.W. Africa. Erect shrub, branched from the base, with $\frac{1}{5}$–$\frac{1}{4}$-in. thick, pale green branches; internodes about $\frac{1}{5}$ in. long; L. opposite, small, scale-like, soon drying up.

E. Schaeferi Dtr. (fig. 68), S.W. Africa. Low, hemispherical shrub, irregularly branched, branches soft, blue-green, about $\frac{1}{3}$ in. thick; L. on the spine-like, projecting leaf cushions, oval, $\frac{1}{4}$–$\frac{1}{3}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. broad, with small, spiny tips.

E. scolopendria Don. = *E. stellata* Willd.

E. similis Bgr. (*E. natalensis* hort.). Similar to *E. abyssinica*. Angles even thinner, winged, slightly wavy, with downward-pointing notches on which are short spines.

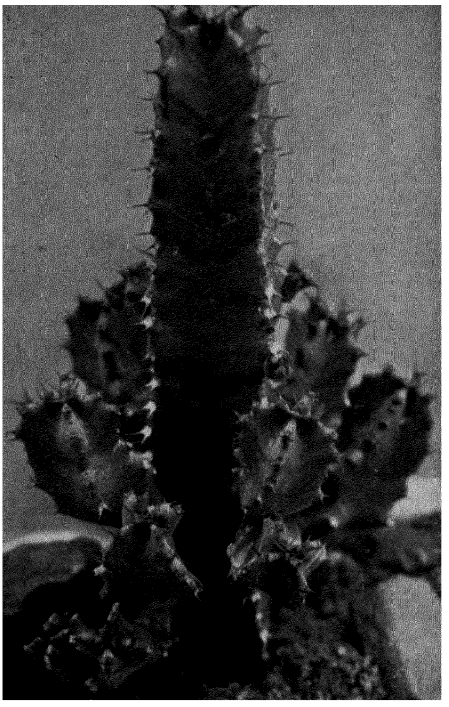


FIG. 75.—Euphorbia resinifera Bgr. (Photo, K. Josefsky.)

E. spartiaria Dtr., S.W. Africa. Half-shrub, branched from the base, few, bluish grey-green, about 12 in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. thick, internodes $1\frac{1}{8}$–$1\frac{1}{2}$ in. long; L. opposite, minute.

E. spec. nova 672 (Triebner, Windhoek) (fig. 76). Club shaped, with stout taproot; head almost round, crown sunken, with lateral branches as thick as a finger symmetrically arranged; solitary inflorescence becoming thorny. Desirable novelty; much dislikes stagnant moisture.

E. splendens Bojer (fig. 77) (*E. Milii* Desm., *Sterigmanthe splendens* Kl. et Garcke). Shrub, up to 6 ft. high; stem with spreading branches, almost angled, little grooved, with long black spines; L. chiefly at the ends of the young shoots obovate, acute above, $1\frac{1}{2}$–2 in. long, $\frac{3}{4}$ in. wide, smooth, leathery, pale green; F. on repeatedly forked stems, with long sticky stalks, small, with two round, bright red involucral leaves, *c.* $\frac{3}{8}$ in. across. Flowers almost throughout the year, but chiefly in the spring. One of the most beautiful flowering shrubs for room or greenhouse. Propagation in spring by cuttings. Grow in a warm frame in sandy, loamy soil. Later without glass in full sun. The plants should be cut back at first so as to make them bushy.

E. squarrosa Haw., Cape Province. Seems to be identical with *E. stellata* Willd. Newly introduced plants have shorter branches, about 2–$2\frac{1}{2}$ in. long and up to $\frac{3}{8}$ in. across.

E. stapelioides Boiss., S. Africa. Stems very low, *c.* $3\frac{1}{4}$ in. high, little branched at the base, constricted into somewhat flattened joints, green, rather reddish. Rare species requiring a warm position.

E. stellaespina Haw., S. Africa. Stems cylindrical, usually making

a truncated cone, branched from the base, 2–3 in. thick, with 10–14 or even 16 low ribs, with cross-grooves on the angles, the leaf bases bent downwards like a hook; L. up to $\frac{3}{8}$ in. long, narrow, deciduous; thorn-like inflorescences usually branched several times in zones, grey.

E. stellata Willd. (fig. 69) (*E. scolopendria* Don., *E. univinata* DC.), Cape Province. Stems small, conical, truncated, grey-skinned, with a thick swollen root, from the crown radiate prostrate, curved, flat, 2-angled, jointed branches; these are up to 12 in. long, $1\frac{1}{8}$ in. wide, grooved above, convex below, the angles notched, with small grey-brown pairs of spines; sides green, with paler stripes. Rare species.

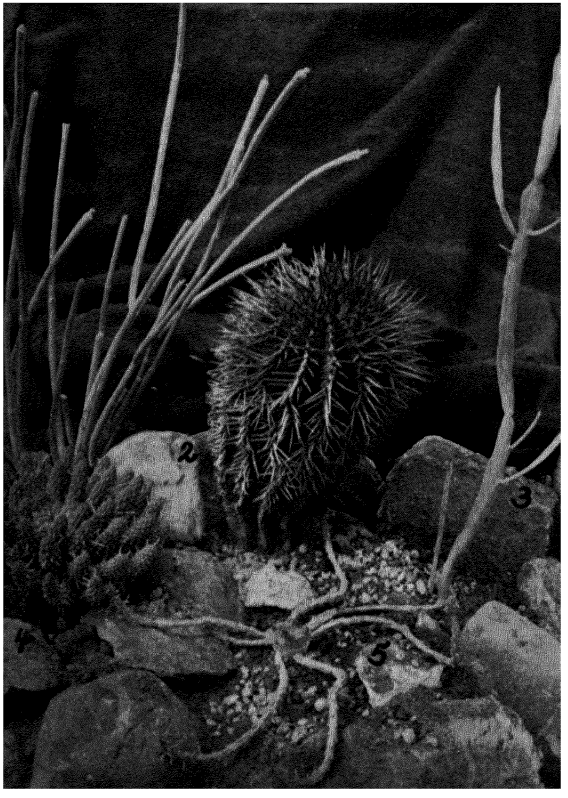


FIG. 76.—1. Euphorbia sarcostemmatoides Dtr. 2. E. horrida Boiss. 3. E. xylophylloides Brogn. 4. E. spec. 672 (Triebner). 5. E. Bergeri N. E. Br. $\frac{1}{3}$ nat. size.

E. submammillaris Bgr. (*E. cereiformis* L. *v. submammillaris* Bgr.), Cape Province. Stems irregularly branched at the base, *c.* $1\frac{1}{8}$ in. thick, green, slightly grey, roundish, thickened above, 9–10-angled, branches rather thinner, erect, 5–8-angled; the angles $\frac{1}{6}$–$\frac{1}{5}$ in. high, deeply grooved between, divided by deep transverse grooves into areas about $\frac{1}{4}$ in. across, these areas projecting like a tooth with a small leaf scar; thorn-like inflorescences numerous, but entirely lacking on some shoots, up to $\frac{3}{4}$ in. long, slender, red at first, later brown. Dislikes excess moisture.

E. Suzannae Marl. (fig. 78), Cape Province. Stem short, smooth, roundish, up to 3 in. across, or obovate with turnip-like root, 16-ribbed; ribs running vertically, rather prominent, separated by distinct grooves; leaf cushions prominent, up to $\frac{3}{8}$ in. long, stout and hook-like, and turned downwards; usually with a dry tip; plant body greyish blue-green. Needs more heat.

E. tessellata Sweet = *E. caput-medusae* L.

E. tetragona Bak. = *E. Gilbertii* Bgr.

E. tetragona Haw., S. Africa. Tree-like when old; stem 6–7-angled, up to 6 in. ϕ, short, constricted into joints, whorled branched in layers, branches usually 4-angled, ¾–1½ in. ϕ, flat-sided, dark green; angles almost straight, little curved, spines in pairs, *c.* ⅝ in. apart, ⅜ in. long, thin, brown. Grows easily.

E. Tirucallii L. (*E. viminalis* Mill., *E. rhipsaloides* Lem.), Tropical East Africa. Tree-like in age, branching forked or whorled, jointed; joints 3–4 in. long, round, about ¼ in. thick, pale green, with lighter longitudinal lines; young shoots with ⅙–⅝-in. long, 1/25–⅛-in. wide linear-lanceolate leaves which soon fall. Very poisonous!

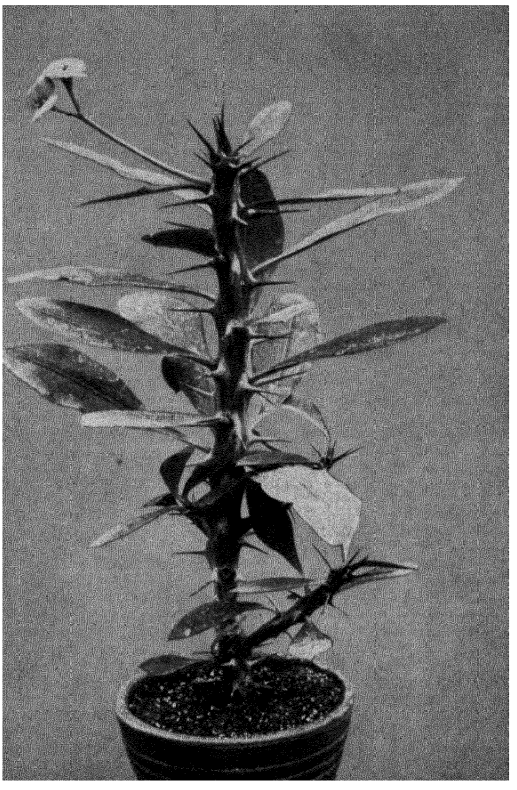


FIG. 77.—Euphorbia splendens Bojer. (From V.P.B.)

E. triangularis Desf., S. Africa. Tree-like in old age; at first 6-angled, later round; branches wide-spreading, in layers and whorls, erect ascending, 3–5-angled, green, jointed, branched repeatedly, angles com-

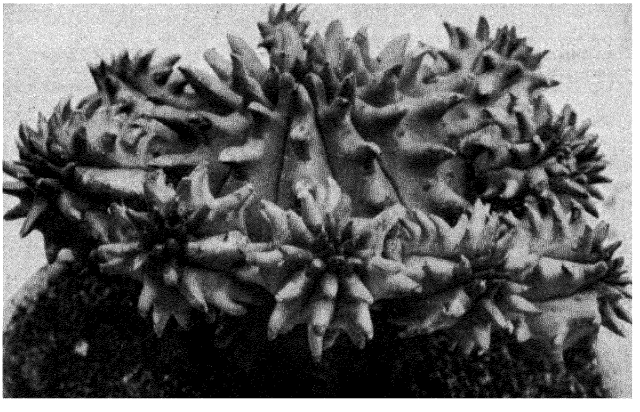


FIG. 78.—Euphorbia Suzannae Marl. Almost nat. size. (Photo, R. Graessner.)

pressed and wing-like, rather wavy, slightly curved; spines in pairs, $\frac{1}{3}$–$\frac{3}{4}$ in. apart, $\frac{3}{8}$ in. long.

E. tridentata Lam. (*Dactylanthes anacantha* Haw., *E. anacantha* Ait.), Cape Province. Only differing from *E. Ornithopus* in the stalks of the flowers at the tips of the branches, which are short or wanting.

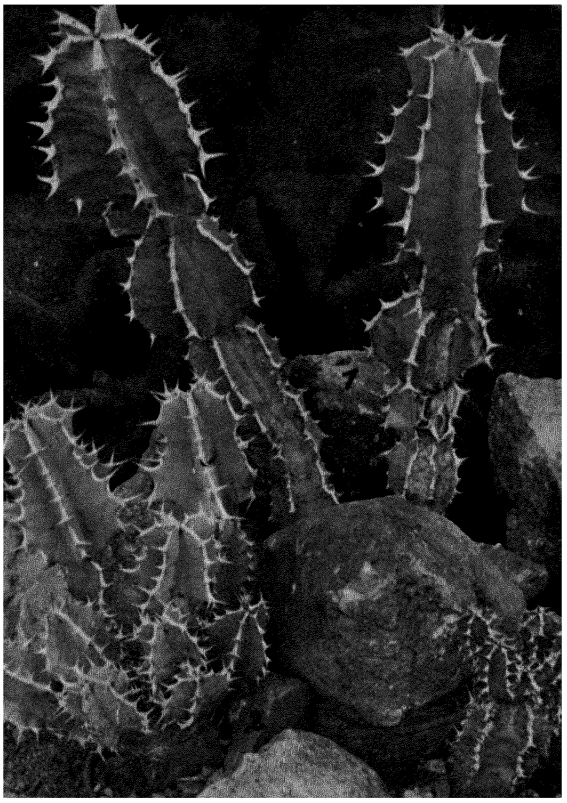


FIG. 79.—1. Euphorbia virosa Willd. 2. E. virosa Willd. v. striata. 3. E. hottentotta Marl. $\frac{1}{4}$ nat. size.

E. trigona Haw., East Indies. Tree-like when old; branches 3-angled; angles compressed, deeply crenulate, pale green; leaf cushions projecting; spines 2–4, about $\frac{3}{8}$ in. long; L. $2\frac{1}{2}$ in. long, 1–$1\frac{1}{8}$ in. wide, oval-spatulate, round above with a small tip, soon falling. Free growing.

E. truncata N. E. Br. (fig. 69), S.W. Africa. Clavate, with a long taproot, head closely covered with short lateral branches $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. thick; L. $\frac{1}{8}$–$\frac{1}{6}$ in. long, $\frac{1}{25}$ in. wide, grooved, with a small spiny tip; inflorescence not thorny. Dislikes stagnant moisture.

E. tubiglans Marl. (fig. 60), S.W. Africa. Shoots 5–7-angled, sides somewhat hollowed, divided by a groove; angles $\frac{1}{8}$–$\frac{1}{6}$ in. apart, notched, slightly wavy; with no spines, blue-green; F. sessile.

E. uncinata DC. = *E. stellata* Willd. The division of the section Uncinatae of the genus Euphorbia obviously still presents difficulties with regard to the specific names belonging to this group: *E. Gilbertii* Bgr., *mammillosa*, *micrantha* Boiss., *procumbens* Meerbg., *radiata*, *scolopendria* Don., *squarrosa* Haw., *stellata* Willd., *tetragona* Bak., *uncinata* DC., a few certainly belong to the same species. The species which may be retained for the present are: *E. micrantha* Boiss. and *E. stellata* Willd.

E. valida R. A. Dyer, Cape Province. Similar to *E. meloformis*. With-

out a tuberous root; plant body spherical when young, later cylindrical, the inflorescences very woody, persisting for several years on the plant.

E. viminalis L. = *Sarcostemma viminale* R. Br.

E. viminalis Mill. = *E. Tirucalli* L.

E. viperina Bgr. (*E. inermis* N. E. Br., *E. inermis* Mill. (according to Dr N. E. Brown of Kew this name is the oldest)), S. Africa. Similar to *E. caput-medusae* L. Stem short and thick; branches very numerous, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, up to 12 in. and more long, often twisted like snakes; leaf cushions in 6–8 spiral rows, elongated 6-angled; L. small, soon falling, leaving a white scar; F. at the ends of the branches. Cuttings of the lateral branches occasionally produce plants of typical habit, but usually grow one-sidedly.

E. virosa Willd. (fig. 79), Cape Province. In their native habitat almost tree-like; stems 4–5-angled; branches numerous, arranged in whorls, spreading and ascending, 3-angled in the lower part, 4–5-angled above, *c.* 2 in. ϕ, grey-green, $1\frac{1}{2}$ in. long, constricted into joints; sides grooved when young, later flatter, angles irregular and curved almost at right angles, bent, with horny edge; spines projecting, stout, about $\frac{1}{2}$ in. long. Slow growing.

E. virosa Willd. **v. coerulescens** Haw. = *E. coerulescens* Haw.

E. virosa Willd. **v. caespitosa**. Closely branched, constricted in growth.

E. virosa Willd. **v. striata** (fig. 79). Like *E. virosa*; marked with curved yellowish lines.

E. xylophylloides Brogn. (fig. 76), S. Africa. Stem erect, up to 20 in. high, often shooting from the base, irregularly branched higher up, stem and branches 2-angled, very flat, compressed, pale green, jointed; joints *c.* 20 in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. wide, in the middle $\frac{1}{8}$ in. thick, the angles thin, crenulations few and distant. Needs more heat, likes more moisture.

Euphorbiaceae (Family). Genera described: *Euphorbia*, *Jatropha*, *Pedilanthus*, *Synadenium*.

Fockea Endl.

Family: ASCLEPIADACEAE.

Fockea capensis Endl. (fig. 80) Karroo. Root turnip-like (in its native habitat occasionally up to 10 ft. diameter!). Almost

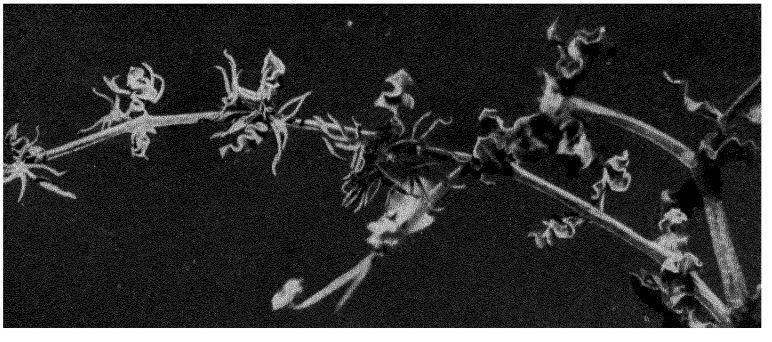


FIG. 80.—Fockea capensis Endl. (Photo. H. Herre.) (From V.P.B.)

entirely buried in the earth. Branches ± tendril-like, prostrate; L. opposite, oval-acute, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. wide, shining dark green; F. 3–5 in the spring, $1\frac{1}{8}$–$1\frac{1}{2}$ in. large, grey-green, with small, brown markings. Rare, dioecious plant, which needs to be kept completely dry in winter in the resting period; bright, warm position. Grow in porous, stony soil, with moderate supply of water; propagation from seed.

Gasteria Duval

Family: LILIACEAE.

Occurrence: S. Africa.

Small, usually stemless plants, producing offsets, forming clumps, L. generally in two rows, more rarely in a rosette, tongue-shaped, edge entire, of firm texture, fleshy, dark green, often reddish, with white flecks or tubercles. Flowers in loose spikes or racemes, tubular, swollen at the base, generally hanging, red, often with green tips. Flowering at almost any time. Popular plants for rooms, easily grown; suitable for growing in quantity. During winter keep in a room at not more than 55° F. or in a greenhouse, fairly dry. In summer not in full sun, cultivation as for *Aloe*. Propagation by leaf cuttings or offsets. Since the *Gasterias* hybridise freely amongst themselves, propagation by seed is not recommended.

G. acinacifolia Haw. (*Aloe acinacifolia* Jacq.). Leaves in a rosette, 14 in. long, $2\frac{1}{2}$ in. broad, sword-shaped, flattened on one side, smooth, shining dark green, with white dots.

G. angulata Haw. (*Aloe angulata* Willd., *G. disticha* Haw *v. angulata* Bak.). L. in two rows, 8–10; 8–10 in. long, 2 in. broad, edges bordered, blunt, pointed, green, decorated with pits in transverse lines.

G. Armstrongii Schonl. Stemless or short-stemmed; L. 2–4, arranged definitely in two rows, erect when young, spreading when older, $1\frac{1}{8}$–2 in. long, $1\frac{1}{8}$ in. broad, tongue-shaped, rounded at the top, with an abrupt, spiny tip, upper side sheathed at the base, deeply trough-shaped, somewhat convex above, with small, not very prominent white tubercles in transverse lines; almost smooth at the edge, under side almost smooth, slightly tubercled towards the tip.

G. Bowieana Schult. = *G. picta* Haw.

G. candicans Haw. (*Aloe candicans* Roem. et Schult.). L. in a rosette, 8–12 in. long, 3 in. wide, concave above, lower side strongly keeled, shining green with fine, white dots in indistinct rows.

G. carinata Haw. (*Aloe carinata* Mill.). L. in a spiral rosette, lanceolate, triangular, blunt or pointed, $4\frac{1}{2}$–5 in. long, grooved above, strongly keeled below, dark green, with raised white dots in transverse rows, the edges rough.

G. colubrina N. E. Br. Up to 14 in. high; L. in two rows, spiralled in

age, upper side usually convex, one side wedge-shaped, dark green, with oval markings more or less coalescing.

G. disticha Haw. = *G. lingua* Bgr.

G. disticha Haw. **v. angulata** Bak. = *G. angulata* Haw.

G. formosa Haw. = *G. picta* Haw.

G. lingua Bgr. (*Aloe lingua* Thbg., *G. disticha* Haw.). L. in two rows,

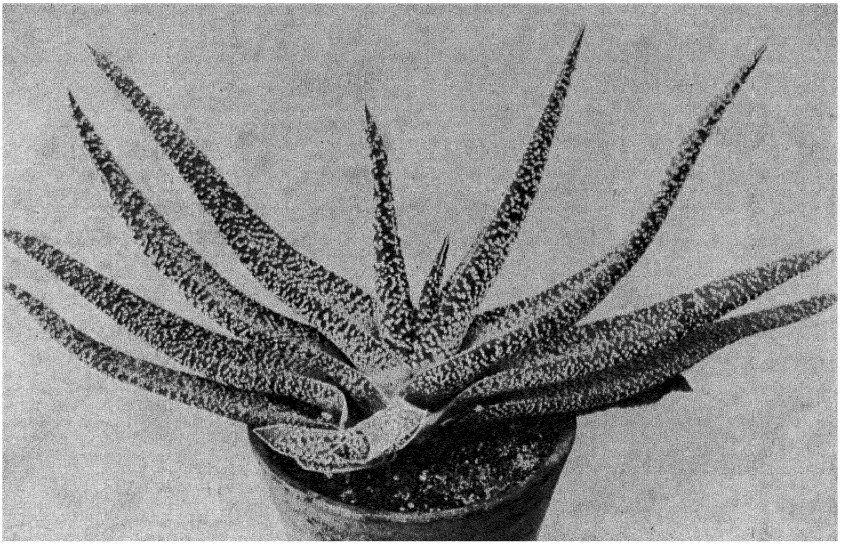


FIG. 81.—Gasteria verrucosa Haw. (From V.P.B.)

closely set, thin, rather wavy, irregularly marked with white, edge horny, with white teeth.

G. maculata Haw. (*Aloe maculata* Willd., *A. obliqua* Haw.). L. more or less in two rows, linear-linguiform, unequal sided, triangular, tip blunt, with horny terminal spine, edge entire, flecked.

G. Neliana von Poelln. L. 4–6, in two distinct rows, ± erect, linguiform, *c.* 7–8 in. long, 1½–1¾ in. wide at the base, ¼–⅓ in. thick, bluntly triangular at the tip, with a small spine, both sides slightly convex, upper surface rather rough, emerald green, reddish at the base, with ± coalescing, roundish, whitish-green flecks on both sides, arranged in ± distinct transverse lines, the edge with a pale, toothed, horny margin about $\frac{1}{12}$ in. broad, edge entire only in the upper third. Beautiful species!

G. nigricans Haw. (*Aloe nigricans* Haw., *A. obliqua* Jacq.). L. in two rows, linguiform, spreading, stiff, edge entire and horny, blackish-green, indistinctly marked.

G. nitida Haw. (*Aloe nitida* S. D.). L. in several rows, in a spiral rosette, broadly lanceolate, upper side grooved, under side keeled, pointed, with horny edge, smooth, shining green, indistinctly marked with white.

G. obtusa Haw. = *G. trigona* Haw.

G. picta Haw. (*G. Bowieana* Schult., *G. formosa* Haw.). Short stemmed when old; L. in two rows, spirally twisted, 10–14 in. long, 1½–2 in. broad, upper side slightly rounded, lower side very convex, edge entire, only the triangular tip toothed, blackish-green, shining, marked with transverse bands of coalescing, round, white flecks.

G. pulchra Haw. (*Aloe pulchra* Jacq., *A. obliqua* DC.). L. almost in two rows, close together, strong, linear, sword-shaped, unequally triangular, tapering, smooth, dark green, with white markings.

G. subcarinata Haw. (*Aloe subcarinata* S. D.). L. in several rows, almost forming a rosette, spreading, lanceolate, unequally triangular, concave above, convex below, the tip blunt, rather oblique, edges horny, serrulate, green with low, white tubercles.

G. trigona Haw. (*Aloe trigona* Roem. et Schult., *G obtusa* Haw.). L. spirally arranged, 6–8 in. long, concave above, lower side keeled, bluntly tipped, green, with white dots in lines, edges and keel tubercled.

G. verrucosa Haw. (fig. 81) (*Aloe verrucosa* Mill.). L. in two rows, linguiform, tapering, dark green, closely covered with whitish-grey tubercles

Geraniaceae (Family). Genera described: *Geranium*, *Pelargonium*, *Sarcocaulon*.

Geranium, see *Pelargonium*.

Greenovia W. B.

Family: CRASSULACEAE.

Occurrence: Mountainous regions of the Canary Islands.

Perennial plants usually low shrubs, similar to *Aeonium*, without the tall stem, producing offsets; L. in rosettes which die after flowering. L. broad, spatulate, thin, usually bluish-green, the older ones often a beautiful red, the leaves remaining on the stem when dead. Inflorescence leafy and dichotomously branched; F. bright yellow, April to May. In its native habitat the rosettes close up during the hot period like bulbs or in the form of a cylinder.

Like Aeonium, easy for cultivation in rooms especially. Do best out of doors in summer, in winter in a light greenhouse not above 50° F. Propagation easy by seed. Sow in sandy soil. Quicker by cuttings which root very easily. The plants need rich but very sandy, stony soil, with plenty of water in the growing season, and fairly dry in winter.

Gr. Aizoon Bolle (*Gr. quadrantalis* Webb , *Sempervivum Aizoon* Christ.). Much branched; rosettes 2–2½ in. ϕ; L. acute oval, pale green, with close white hairs; like stony soil. Suitable for planting in scree in the greenhouse or in summer in the rock garden.

Gr. aurea W. B. (*Sempervivum aureum* C. Sm., *S. calyciforme* Haw.). Low, procumbent shrubs, forming close cushions; rosettes in their native

habitat up to 16 in. ϕ, cup-shaped; L. thin, erect, obovate, spatulate, bluntly rounded, with blue-green waxy coating; F. dark golden yellow. Beautiful species, requiring plenty of water during the growing period.

Gr. gracilis Bolle (fig. 82) (*Gr. dodrantalis* W. B., *Sempervivum gracile* Christ.), Teneriffe. Dainty, little shrubs, prostrate on the ground, forming cushions, rosettes small, numerous; L. broad, saucer-shaped, bright grey-green, with waxy covering.

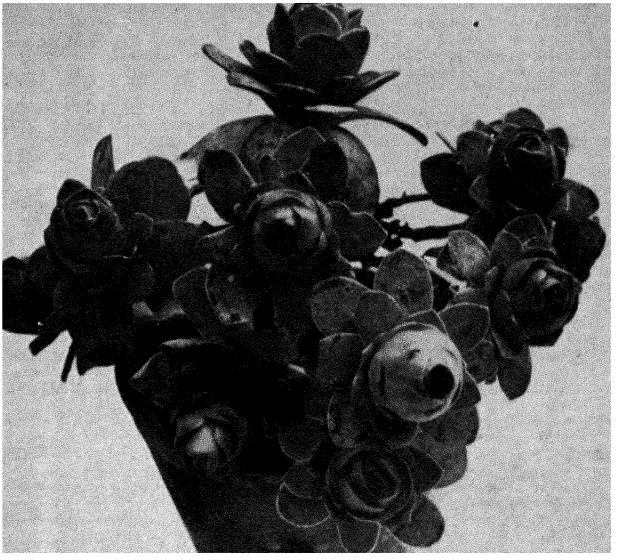


FIG. 82.—Greenovia gracilis Bolle. (Photo, K. Josefsky.)

Haworthia Duval.

Family: LILIACEAE.

Occurrence: S. Africa.

Low plants, with or without a short stem, L. in rosettes or closely overlapping, arranged in several rows, seldom in two rows, short, blunt, pointed, or even truncate, fleshy, often covered with pearly tubercles, or even ± transparent. F. in long, loose racemes, small and inconspicuous, whitish-green. Flowering almost any time.

Attractive little succulents, which grow easily, especially suitable for room culture, as well as for growing in quantity. Cultivation as for Gasterias, or, better, for Aloes. Need to be under glass, in winter not above 55° F. Rather liable to sunburn. Water freely in summer, rather less in winter, but the pots should not be dried out for too long. Propagation easy by means of the numerous offshoots. May easily be raised from seed, but this is not recommended on account of hybridisation.

H. altilinea Haw. (fig. 86) (*Aloe altilinea* Roem. et Schult., *H. polyphylla* Bak.), Southern Cape Province. Rosette stemless; L. numerous, 2–2½ in. long, *c.* ¾ in. broad, thicker above, oblanceolate, tapering and ending in a ⅜-in. long, fine bristle, convex on both sides, keeled towards the tip on the back, edges and keel finely toothed. Needs a warm position. The rosettes close right up in the resting period.

H. arachnoides Haw. (*Aloe arachnoidea* Mill., *A. arachnoides* Thunb.),

South-western Cape Province. Rosettes stemless, $1\frac{1}{8}$ in. ϕ; L. about $\frac{5}{8}$ in. long, oblong, ending in a bristly tip $\frac{1}{4}$ in. long; both sides convex, upper half of back keeled; pale green, the upper third translucent on both sides, with darker lines running through; keel and edges with distant, symmetrically placed $\frac{1}{12}$ in. apart, transparent, bristly teeth $\frac{1}{12}$ in. long.

H. asperula Haw., Southern Cape Province. Rosettes low, $\frac{3}{4}$ in. ϕ; L. in three, rather compressed rows, triangular-acute, $\frac{5}{8}$ in. long, $\frac{1}{2}$ in. broad at the base, concave on the upper side, sharply keeled at the tip on the back, dark green, rather sticky, minutely roughened.

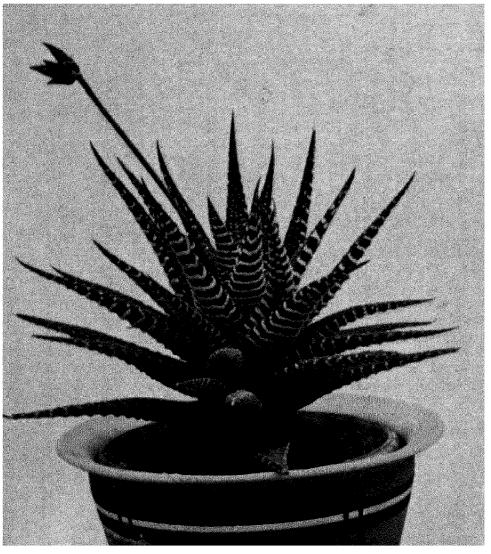


FIG. 83.—Haworthia fasciata Haw. (From V.P.B.)

H. atrovirens Haw. (fig. 86) (*Aloe atrivirens* DC., *A. herbacea* Mill., *H. pumila* Haw.). Rosettes stemless, forming clumps, 10 in. ϕ; L. numerous, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, erect, lanceolate, tapering slowly, convex on upper side, round on the back and keeled towards the tip, dark green, translucent above, with darker longitudinal and transverse veins, with whitish tubercles on the back, edges and keel with horny teeth.

H. attenuata Haw. (*Aloe attenuata* Haw., *A. radula* Salm., *Apicra attenuata* Willd.). Similar to *Haw. fasciata*. (Hybrid: *Haw. fasciata* × *Haw.* ?) L. rather longer, upper side convex, minutely roughened with small tubercles.

H. attenuata Haw. **v. clariperla** Haw. (*H. clariperla* Haw.). White tubercles on the back well developed, coalescing into white, transverse lines when old. Striking variety!

H. Bolusii Bak., Southern Cape Province. Similar to *H. altilinea* Haw. Fine, wavy bristly teeth on keel and edges more numerous, so that the plant appears to be shrouded in white bristles. Dislikes stagnant moisture!

H. clariperla Haw. = *H. attenuata* Haw. *v. clariperla* Haw.

H. coarctata Haw. (fig. 84) (*Aloe coarctata* Roem. et Schult.). Rosettes elongated like stems up to 8 in.; stems shooting at the base; L. in a close spiral, erect, curved inwards, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{5}{8}$ in. wide, triangular slowly tapering, dark green, very convex on the back and with small tubercles on raised longitudinal lines.

H. concava Haw. = *H. cymbiformis* Haw.

H. Cooperi Bak., Southern Cape Province. Similar to *H. pilifera* Bak. L. rather longer.

H. cymbiformis Haw. (fig. 86) (*Aloe cymbiformis* Haw., *A. cymbaefolia* Schrad., *Apicra cymbifolia* Willd., *H. concava* Haw.). Rosettes stemless, making offsets freely, 3–4 in. ϕ; L. numerous, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. broad, obovate, broader above, abruptly tapering, upper side flat, lower side very convex, edge entire, with soft flesh, sap green, translucent towards the tip and veined.

H. cymbiformis Haw. **v. planifolia** Bak. = *H. planifolia* Haw.

H. dentata. Stem-like rosettes about 2 in. high, $1\frac{1}{2}$–2 in. ϕ; L. triangular, about $\frac{3}{4}$ in. wide at the base, curved outwards at the tip and ending in a point, upper side hollow on account of the incurved edges, rounded on the back; green, smooth on upper side, with darker markings towards the tip, with coarse, whitish warts ± closely and irregularly set on the back; the edges with stout, $\frac{1}{25}$-in. long or even shorter, irregularly placed, whitish teeth set pointing downwards.

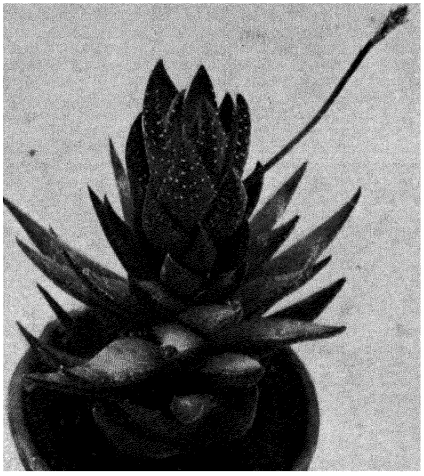


FIG. 84.—Haworthia coarctata Haw. (Photo, K. Josefsky.)

H. Engleri Dtr., Southern Namaqualand. Rosettes $1\frac{1}{2}$ in. high, $1\frac{1}{8}$–$1\frac{3}{4}$ in. ϕ; L. about 9, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{3}{4}$ in. wide at the base, $\frac{1}{3}$ in. thick, curved outwards at the tip, the under side closely covered with transverse lines and tubercles, becoming whitish towards the edge; upper side flat, rather concave towards the tip, smooth, dark green, with 2–3 greenish-white longitudinal lines and greenish-white transverse veins; edges with blunt, horny, white teeth.

H. fasciata Haw. (fig. 83) (*Aloe fasciata* Salm., *Apicra fasciata* Willd.). Rosettes stemless, making many offsets; L. numerous, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, up to $\frac{1}{2}$ in. broad, triangular-lanceolate, upper side usually flat, smooth, with firm flesh, green, rather shiny, with elongated, pearly tubercles, which coalesce into transverse lines on the back.

H. foliolosa Haw. = *Apicra foliolosa* Willd.

H. gigas v. Poelln. Rosettes very close, up to 4 in. ϕ; L. oblong-lanceolate, 2–$2\frac{1}{2}$ in. long, $\frac{1}{3}$ in. wide, $\frac{1}{12}$ in. thick, upper side slightly concave, round on the back, with 1 or 2 distinct keels, terminating in a $\frac{5}{8}$–$\frac{3}{4}$-in. long, thin, transparent bristly tip; dark olive green to bluish-green; edge and keel with $\frac{1}{4}$-in. long transparent, ± recurved bristles, $\frac{1}{8}$ in. apart.

H. granata Haw. = *H. margaritifera* Haw. *v. granata.*

H. limifolia Marl. (fig. 86). Rosettes $2\frac{1}{2}$–$3\frac{1}{4}$ in. ϕ; L. $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, about $\frac{3}{4}$ in. broad at the base, oval lanceolate, tapering, dark green, both sides with 15–20 raised, wavy transverse lines.

H. major Duval = *H. margaritifera* Haw.

H. margaritifera Haw. (fig. 85) (*Aloe pumila* L. *v. margaritifera*, *Aloe margaritifera* Mill., *H. major* Duval). Rosette stemless, making many offsets, up to 6 in. ϕ; L. at first erect and curved inwards, later spreading, 3–3$\frac{1}{4}$ in. long, up to 1$\frac{1}{8}$ in. wide at the base, triangular-ovate, tapering, flesh thick and firm, upper side flat or slightly convex, lower side keeled towards the tip, both sides with large, roundish pearly tubercles.

H. margaritifera Haw. **v. granata** Bak. (*Aloe granata* Roem. et Schult., *H. granata* Haw.). Similar to the foregoing, but smaller throughout, pearl-like tubercles more numerous and arranged in transverse rows.

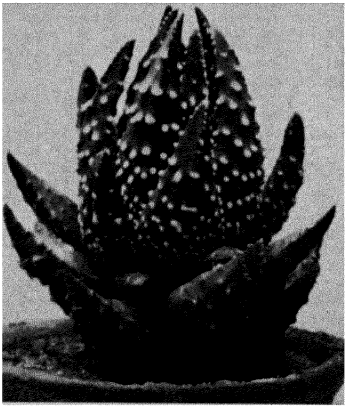


FIG. 85.—Haworthia margaritifera Haw. (Photo, C. Backeberg.)

H. Maughanii v. Poelln. (fig. 87), Little Karroo. L. in rosettes, about 1 in. long, semicylindrical, $\frac{5}{8}$ in. wide at the base, the ends looking as if cut off level, $\frac{3}{8}$–$\frac{1}{2}$ in. broad, $\frac{1}{3}$–$\frac{2}{5}$ in. thick, grey-green, often reddish-brown, rough, the truncated ends ± distinctly window-like. In its natural habitat the plant is buried in the soil up to the tips of the leaves, so as to evade the scorching rays of the sun. Rare new species. Needs a bright, warm position.

H. minima Bak., Southern Cape Province. Rosette stemless, 1 in. ϕ; L. $\frac{5}{8}$ in. long, oblong-lanceolate, $\frac{1}{8}$–$\frac{1}{6}$ in. wide at the base, ending in a fine bristly tip, both sides slightly convex, keeled on the back in the upper third; pale green, often reddish, with small, distinct, green longitudinal lines; keel and edges symmetrically covered with $\frac{1}{25}$-in. long, triangular, transparent bristly teeth.

H. pallida Haw. (*Aloe pallida* Roem. et Schult.). Rosettes stemless, with many leaves, forming clumps; L. $\frac{3}{8}$–1 in. long, $\frac{1}{3}$ in. wide, erect, lanceolate, acute, upper side flat, back keeled towards the tip, pale green, not very transparent, ending in a whitish bristle, edges and keel with fine, horny teeth.

H. paradoxa v. Poelln., Cape Province. Rosettes stemless, 1$\frac{1}{2}$ in. ϕ; L. $\frac{3}{4}$–1 in. long, oval, $\frac{3}{8}$–$\frac{1}{2}$ in. wide, the upper third curved backwards and triangular tapering and ending in a bristle; upper side flat or slightly concave, back rounded at first, then keeled; upper surface smooth, dark green or even coppery red, with translucent red, clear or whitish dots, the triangular leaf ends with 6 or 7 simple, pale green, longitudinal lines, these, like the edges and keel also, with $\frac{1}{25}$-in. long, transparent teeth.

H. pentagona Haw. = *Apicra pentagona* Willd.

H. pilifera Bak., southern coast of Cape Province. Rosettes stemless, 1$\frac{1}{8}$–1$\frac{1}{2}$ in. ϕ; L. $\frac{3}{4}$–1 in. long, oval, convex on both sides, back keeled towards the tip, abruptly tapering, ending in a 2–2$\frac{1}{2}$-in. long, fine bristle, edges and keel

with fine, transparent teeth; pale green, in the upper third of both sides clear and transparent with dark, simple lines running through.

H. planifolia Haw. (fig. 86) (*Aloe planifolia* Roem. et Schult., *H. cymbiformis* Haw. *v. planifolia* Bak.). Similar to *Haw. cymbiformis*. L. flat, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, 1 in. wide, ovate, with short tips somewhat recurved, with fine bristly tip, flesh soft, tip transparent, with darker veins.



FIG. 86.—1. Haworthia cymbiformis Haw. 2. H. limifolia Marl. 3. H. planifolia Haw. 4. H. retusa Haw. 5. H. tessellata Haw. v. parva Bak. 6. H. limifolia Marl. 7. H. tessellata Haw. 8. H. atrovirens Haw. 9. H. turgida Haw. 10. H. altilinea Haw. $\frac{1}{2}$ nat. size.

H. polyphylla Bak. = *Haw. altilinea* Haw.

H. pumila Haw. = *H. atrivirens* Haw.

H. radula Haw. (*Aloe radula* Jacq., *Apicra radula* Willd.). Rosettes stemless, forming clumps; L. erect, $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, $\frac{3}{4}$ in. wide at the base, suddenly narrowing and tapering slowly, upper side flat, often keeled, green, both sides minutely roughened with small, white "pearls."

H. Reinwardtii Haw. (*Aloe Reinwardtii* Haw.). Rosettes elongated, 4–6 in. high, $1\frac{1}{2}$–2 in. wide; L. $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, upper side with a few tubercles in a longitudinal line, on the back with 9–11 longitudinal lines and numerous, soft tubercles arranged in regular transverse lines. Beautiful species!

H. reticulata Haw., Southern Cape Province. Similar to *H. altilinea*. L. especially in the upper part very fleshy and keeled, terminating in a $\frac{3}{8}$-in. long bristle, edges with horny teeth; sap green, the upper third almost trans-

parent, only traversed by a few, thin, green, longitudinal veins. Needs a very bright position.

H. retusa Haw. (fig. 86) (*Aloe retusa* L.). Rosettes stemless, forming clumps when old; L. very fleshy, $1\frac{1}{8}$–2 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. wide, ± erect, the upper half cut off horizontally, triangular, almost transparent, with darker tip; edges smooth or finely toothed. Plants in their native habitat completely buried in the soil, with only the upper, transparent leaf tops exposed to the sun.

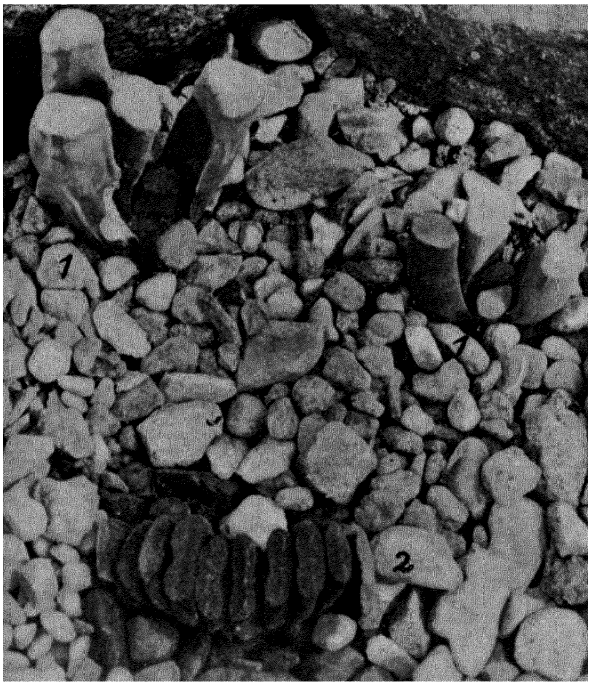


FIG. 87.— 1. Haworthia Maughanii v. Poelln. 2. H. truncata Schönl. *c.* nat. size.

H. scabra Haw. (*Aloe scabra* Roem. et Schult.). Rosettes stemless, with few leaves; L. triangular-ovate, 2 in. long, $\frac{3}{4}$–1 in. wide at the base, darker green, with cross-markings and tubercles.

H. Schmidtiana v. Poelln. (fig. 88), Cape Province. Stem-like rosettes 3–$3\frac{1}{4}$ in. high, $1\frac{1}{8}$ in. ϕ; L. in 3 not very close rows, triangular, tapering slowly, $\frac{3}{4}$ in. long, at the base almost $\frac{5}{8}$ in. broad, the tip curved outwards, upper side concave, back round at first, distinctly keeled towards the tip; upper surface dark green, rather sticky, covered closely with tubercles, greenish at first, brownish later, in distinct transverse lines.

H. setata Haw. (*Aloe setosa* Roem. et Schult.). Rosette stemless, *c.* 2 in. ϕ; L. 30–40, $\frac{3}{4}$–1 in. long, $\frac{3}{8}$–$\frac{1}{2}$ in. wide at the base, oval-lanceolate, ending in a long, transparent bristle, with 1 or even 2 keels on the back. L. green, edges and keel with $\frac{1}{12}$–$\frac{1}{8}$-in. long, snow-white bristles.

H. spiralis Haw. = *Apicra spiralis* Bak.

H. tessellata Haw. (fig. 86) (*Aloe tessellata* Roem. et Schult.), Cape Province. L. in three series, in stemless rosettes, triangular-ovate, shortly tapering, somewhat recurved, upper side almost transparent, with darker transverse and longitudinal veins, back green, or even reddish, the edges finely toothed.

H. tessellata Haw. **v. parva** Bak. (fig. 86) (*Aloe tessellata* Roem. et Schult. *v. parva*). Similar to the foregoing, somewhat smaller.

H. tortuosa Haw. (*Aloe tortuosa* Haw.). Rosette elongated up to 5 in., stems branching from the base; L. arranged in three, spiral, overlapping rows, erect, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, ovate-lanceolate-acute, upper side concave, convex at the back, keeled towards the tip, green, rough, edges and keel roughly tuberculate.

H. truncata Schönl. (fig. 87), Cape Province. L. arranged in two rows, ± erect, curved inwards, 6–8, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, in the middle *c.* $\frac{5}{8}$ in. broad, linear, sharply truncate above, looking as if cut off, dark green to brownish, both sides rough with tubercles, the truncated ends somewhat transparent when young, the plant in nature buried up to the tops of the leaves, to evade the scorching rays of the sun. Rare species. Needs a very warm position.

H. turgida Haw. (fig. 86) (*Aloe turgida* Roem. et Schult.). Rosettes elongated, stemless, making many offsets; L. very thick, *c.* $\frac{1}{3}$–$\frac{3}{8}$ in. thick, much curved, edge entire; almost transparent.

H. viscosa Haw. (*Aloe viscosa* L.). Rosette up to 8 in. long, $1\frac{3}{8}$ in. ϕ, stems making offsets at the base; L. in three rows, overlapping, erect, upper side concave, acute, sharp, sooty green, finely roughened.

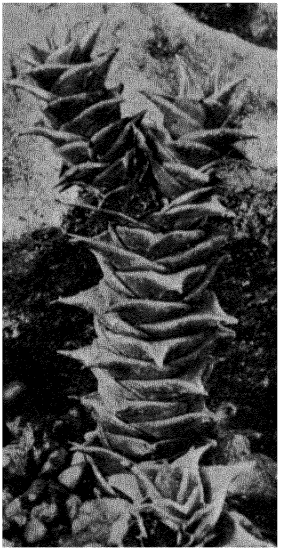


FIG. 88.—Haworthia Schmidtiana v. Poelln. *c.* nat. size.

Heurnia R. Br.

(The genus is named after Justus Heurnius; unfortunately the name was originally mis-spelled Huernia and, by the Rules of Botanical Nomenclature, this is the spelling which should be adhered to; on the Continent the spelling given above is more commonly used.)

Family: ASCLEPIADACEAE.

Occurrence: South and East Africa, Abyssinia, Arabia.

Plants with low stems, hardly more than 4 in. high, 4–7-angled, fleshy, angles prominent, with large teeth, grey-green, often reddish, bare, branched from the base, forming clumps; F. at the base of the young stems, in short-stalked umbels, corolla bell-shaped at the base, 5-angled or broadly 5-lobed, with smaller lobes in the notches between the lobes, so that the limb appears to be 10-partite, a ring-like inner corolla in the centre; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, fleshy, ± tuberculate, variously coloured and marked, smelling slightly of carrion, in summer and autumn.

Most species are suitable for growing in a room. Cultivation and position as for *Stapelia*, but watering should be done more carefully, especially in winter! Too large pots should not be used.

With regard to literature, see under *Stapelia*.

H. aspera N. E. Br., E. Africa. Stems prostrate, 4–6 in. long, $\frac{3}{8}$ in. thick, irregularly branched, branches spreading and ascending, angles 5,

flat, stems therefore almost cylindrical, pale green, somewhat reddish; teeth short, erect, brown; F. wide bell-shaped, $\frac{3}{4}$–1 in. ϕ, reddish-brown outside, inside deep purple-brown, both sides with whitish papillae.

H. barbata Haw. (fig. 89) (*H. crispa* Haw., *Stapelia barbata* Mass.), Cape Province. Stems numerous, erect, $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, 4–5-angled; angles sharp, curved, teeth erect, grey-green; F. bell-shaped, *c.* 2 in. ϕ, lobes triangular, with slender tips, ± recurved, smooth outside, pale, inside sulphur yellow or pale brownish, with blood-red markings which in the lower part coalesce into transverse lines, covered with long, blood-red hairs up to the upper third of the lobe.

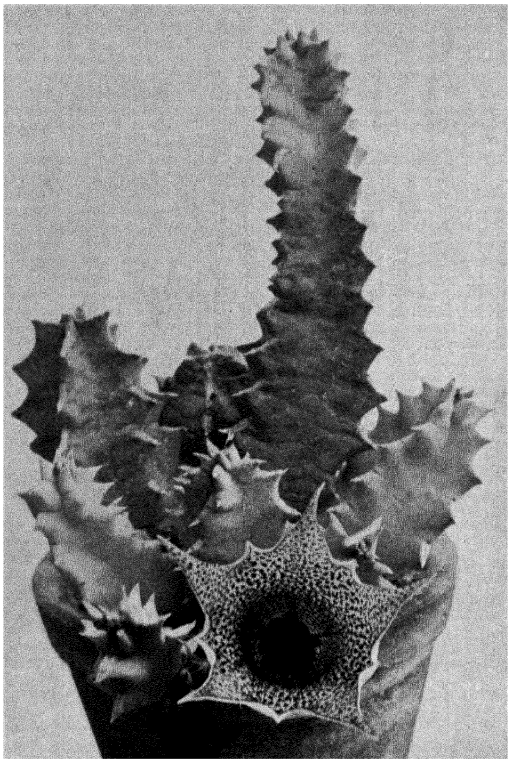


FIG. 89.—Heurnia barbata Haw. (Photo, K. Gielsdorf.) (From Gartenflora.)

H. Blackbeardae R. A. Dyer. Much branched; stems 5-angled, more rarely 4-angled, 2–$3\frac{1}{4}$ in. high, up to $1\frac{1}{2}$ in. thick, angles usually weakly compressed, toothed, grey-green; F. 5-lobed, with small intermediate lobes, these usually bent backwards, 3–$3\frac{3}{4}$ in. ϕ, blood-red with sulphur yellow stripes; ring raised, shining blood-red; not evil smelling.

H. brevirostris N. E. Br., Eastern Cape Province. Stems numerous, $1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. thick, 4–5-angled, angles thick, crenulate, grey-green, faintly marked with brown, teeth acute; F. $1\frac{3}{8}$ in. ϕ, the larger lobes triangular, tapering, the smaller ones very small, pale green outside, inner pale sulphur yellow, with a red border, with blood-red markings, the base blood-red; not evil smelling.

H. crispa Haw. = *H. barbata* Haw.

H. Hystrix N. E. Br. (*Stapelia Hystrix* Hook. f.), Eastern Cape Province. Branches erect, 2–$4\frac{3}{4}$ in. high, *c.* $\frac{1}{3}$ in. thick, 5-angled, angles bluntly toothed, teeth stout, erect, with deciduous tip, grey-green; F. $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, bell-shaped, pale green outside, with three prominent nerves in the lobes, lobe triangular tapering, the edges somewhat rolled back, yellow inside, with red transverse lines, from the throat of the tube up covered with $\frac{1}{8}$–$\frac{1}{5}$-in. long, fleshy, red-tipped papillae.

H. macrocarpa Sprenger = *H. Penzigii* N. E. Br.

H. ocellata R. et Sch. (*Stapelia ocellata* Jacq.), Cape Province. Stems erect, 2–4 in. high, fairly thick, grey-green, 4–5-angled, angles sinuate-toothed; F. bell-shaped, flesh-coloured outside, traversed by ten green nerves, yellow inside, with round, blood-red flecks, tube with stiff hairs.

H. oculata Hook., S.W. Africa. Similar to *H. Penzigii*, but the base of the corolla white.

H. Penzigii N. E. Br. (*H. macrocarpa* Sprenger), Abyssinia, Eritrea. Stems numerous, 2–3 in. high, rather thicker above, 5–7-angled, with broad,

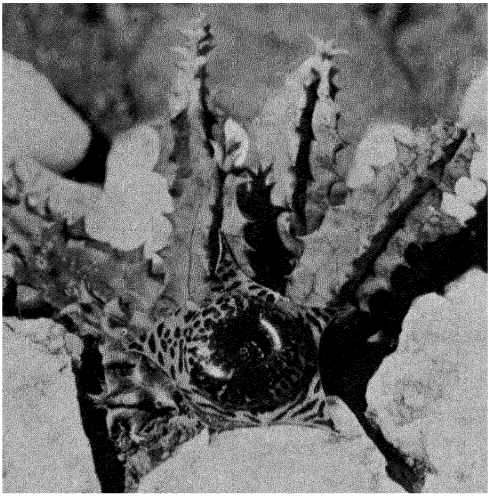


FIG. 90.—Heurnia zebrina N. E. Br. (Photo, W. Triebner.)

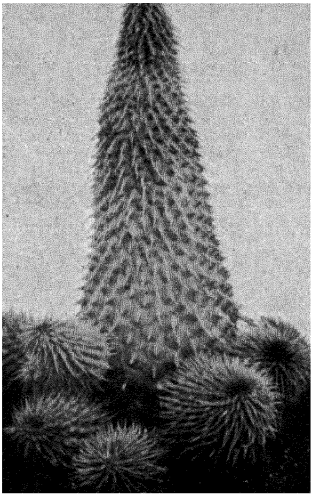


FIG. 91.—Heurnia Pillansii N. E. Br. Almost nat. size. (Photo, R. Graessner.)

stout teeth, pale green, with reddish markings; F. $\frac{3}{4}$ in. ϕ, inside deep blackish-red, tubercled, inner corolla, black.

H. Pillansii N. E. Br. (fig. 91), Cape Province. Stems close, $\frac{3}{4}$–$1\frac{1}{2}$ in. high, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, at first almost spherical, closely covered with tubercles arranged in spiral lines, the tubercles ending in fine, $\frac{1}{8}$–$\frac{1}{6}$-in. long hairs, dark green, often reddish. F. bell-shaped, *c.* $1\frac{1}{8}$ in. ϕ, lobes expanded, recurved, triangular, tapering gradually, bare outside, inside covered with reddish papillae, pale yellow, with small red markings, tube reddish-cream coloured, with reddish flecks. Dislikes excess moisture!

H. primulina N. E. Br., Eastern Cape Province. Stems compressed, erect, $1\frac{1}{8}$–$3\frac{1}{4}$ in. high, $\frac{3}{8}$–$\frac{1}{2}$ in. thick, 4–5-angled, rather thinner above, angles sinuate-toothed, tips of the teeth soon falling off, pale grey-green, with reddish markings; F. 1–$1\frac{1}{8}$ in. ϕ, waxy flesh, inside yellowish-white, with reddish markings round the blackish-brown inner corolla, ground colour often golden yellow without flecks, autumn and winter. One of the most beautiful!

H. reticulata R. Br. (*Stapelia crassa* Donn., *S. reticulata* Mass.). Stems

crowded, erect or ascending, 2–4 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, 5-angled, angles sharp and sinuate, teeth erect, green, with red markings; F. pendent, bell-shaped, *c.* 2 in. ϕ, outside grey-green, inside blackish-purple, marbled in yellow, the throat shining blood-red, with thick hairs, surrounded by a thick, dark flecked ring; evil smelling.

H. Schneideriana Bgr., East Africa. Stems numerous, loosely arranged, slender, 8 in. high, 5–7-angled, little notched, pale green; F. bell-shaped, *c.* $1\frac{1}{8}$ in. ϕ, brownish outside, inside velvety black, the edges reddish-flesh coloured, bordered with brownish-red papillae, lobes recurved.

H. venusta R. Br. (*Stapelia venusta* Mass.), Cape Province. Stems erect, *c.* 5 in. high, $\frac{3}{4}$–1 in. thick, 4–5-angled, branched, angles sinuate-toothed; F. bell-shaped, $2\frac{1}{4}$ in. ϕ, outside pale yellow, inner yellow, dotted with red, ground dark, ring raised; evil smelling.

H. zebrina N. E. Br. (fig. 90), S.W. Africa (Southern Karasberge). Stems $2\frac{1}{2}$–$3\frac{1}{4}$ in. high, up to 1 in. thick, thinner above, 5-angled, with erect teeth $\frac{1}{6}$–$\frac{1}{5}$ in. long; inflorescences near the base; buds very broadly bell-shaped; F. *c.* $1\frac{1}{2}$ in. ϕ, pale yellowish-green, with transverse reddish-brown markings, ring shining tawny, *c.* 1 in. ϕ outside, $\frac{1}{6}$ in. thick, $\frac{1}{3}$–$\frac{2}{5}$ in. broad; upper side of lobes closely covered with fine papillae, lobes with a white border.

Heurniopsis N. E. Br.

Family: ASCLEPIADACEAE.

Heurniopsis decipiens N. E. Br. Occurrence: S.W. Africa. Succulent plants; stems prostrate, $1\frac{1}{8}$–3 in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, forming clumps by branching, 4–5-angled, angles rounded, with erect, acute teeth, with thorny tips which later dry up, two side teeth at the base, grey-green, faintly marbled with red; F. 1–3, on the upper part of young branches, short stalked, bell-shaped, 1 in. ϕ, lobes triangular, recurved, erect, bare, greenish outside, lightly flecked, inside dull purple, with yellow markings, the notches ciliate, evil smelling in the evening. Flowers in summer, grows easily and flowers freely, closely allied to the Huernias, cultivation the same as for these.

Hoodia Sweet.

Family: ASCLEPIADACEAE.

Occurrence: S. Africa, S.W. Africa to Angola.

Succulent plants, similar to *Stapelias*, stems in their native place up to 32 in. high, stout, many-angled, the angles with many thorn-like, hard, acute teeth, grey-green. F. 1–5, with $\frac{3}{8}$–$\frac{3}{4}$-in. long stems, towards the tip, from the grooves, large bell-shaped or flat, almost circular, yellowish.

Cultivation as for *Stapelia*. Likes full sun, in summer plenty of water, in winter on the contrary very careful watering and a position in a bright greenhouse or window, not below 65° F. Propagation

from seed, more difficult from cuttings. If the plants do not grow well, graft them on *Stapelia grandiflora*.

With regard to literature, see under *Stapelia*.

H. Bainii Dyer, Cape Province. Stems erect, cylindrical, tubercles crowded, spirally arranged, coalescing to form ribs and ending in $\frac{3}{8}$-in. long, woody, slightly curved spines, grey; F. $2\frac{1}{2}$–3 in. ϕ, deeply bell-shaped, almost circular, slightly 5-lobed, tips not very prominent, dull yellow, reddish when fading.

H. Barklyi Dyer, Cape Province. Stems many-angled, over 8 in. high, $1\frac{1}{2}$ in. thick, branched, with strong spines, erect or spreading; F. 2–$2\frac{1}{2}$ in. ϕ, notched, lobes blunt, with short tips, yellowish, at the base a circular zone of red dots.

H. Currori Decne. (*Scytanthus Burkei* Hook., *S. Currori* Hook.), S.W. Africa, Angola. Stems branched from the base, many-angled, divided by cross-grooves, spines sharp, ± curved downwards; F. towards the tips of the stems, with 2–$2\frac{1}{2}$-in. long, thick stalks, corolla $3\frac{3}{4}$–$4\frac{3}{4}$ in. ϕ, bell-shaped to rotate, 5-lobed, the five notches cut $\frac{3}{4}$ in. deep. Colour at first greenish yellowish-pink, later becoming yellowish-pink, with thick violet hairs; corolla tube *c.* $\frac{1}{4}$–$\frac{1}{3}$ in. ϕ, orange red, very hairy. The most beautiful species of the genus.

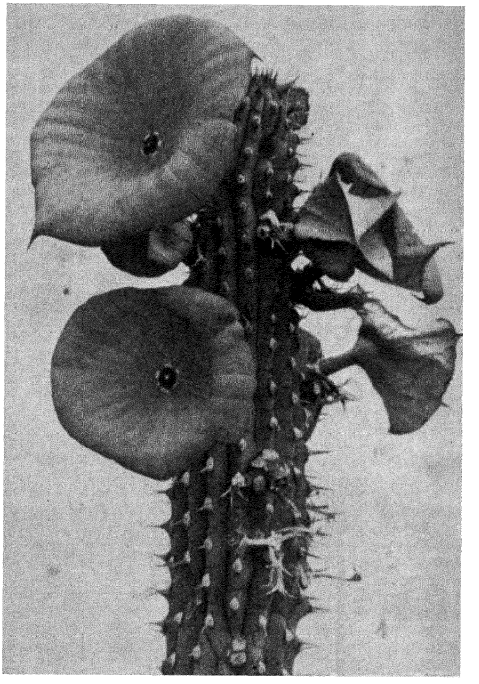


FIG. 92.—Hoodia Gordonii Sweet. (Photo, K. Gielsdorf.) (From M.d.d.K.G.)

H. Gordonii Sweet (fig. 92) (*Monothylaceum Gordonii* G. Don., *Stapelia Gordonii* Mass.), Great and Little Namaqualand. Stems numerous, from a common taproot, erect, not much branched, cylindrical with 12–14 ribs, on these distinct tubercles up to over $\frac{3}{8}$-in. long woody spines, grey-green; F. 4 in. ϕ, saucer-shaped, almost circular, the lobes not very obvious, the edges somewhat curved outwards, flesh coloured or brownish, traversed by longitudinal and transverse veins; papillate at the base; in summer.

H. Juttae Dtr., S.W. Africa. Freely branched, stems 8–10 in. high, $1\frac{1}{8}$–2 in. thick, 14–16 ribs, with $\frac{1}{3}$–$\frac{2}{3}$-in. long, at first blue-violet, later whitish spines; F. at the top of the branches, 1–4 from a groove, corolla quite smooth, about 1–$2\frac{1}{4}$ in. ϕ, almost circular, notches very slight, bare, outside pale yellow-brown, inside at first greenish yellow-brown, later dark red-brown, with darker veins.

H. macrantha Dtr., S.W. Africa. Stem up to 32 in. high, $3\frac{1}{4}$ in. thick; F. flat, saucer-shaped, *c.* 8 in. ϕ, almost circular, weakly 5-lobed, notches *c.* $1\frac{1}{8}$–$1\frac{1}{2}$ in. deep; at first pale purple, more yellow in the centre, later darker, with thick purple hairs, corolla tube *c.* $\frac{1}{4}$ in. ϕ, orange yellow inside.

H. Ruschii Dtr., Great Namaqualand. Many-stemmed when old; stems up to 20 in. high, *c.* $1\frac{1}{2}$ in. thick, ribs 22–24, with $\frac{1}{4}$-in. long spines wider at the base; F. numerous, with very short stalks, wide bell-shaped, *c.* $1\frac{1}{2}$ in. ϕ, lobes notched $\frac{1}{4}$ in., inside red-brown, in the centre yellow with fine papillose tubercles, these with very fine hairs $\frac{1}{50}$ in. long.

Hoodiopsis Luckhoff

Family: ASCLEPIADACEAE.

Hoodiopsis Triebneri Luckhoff, Great Namaqualand. Similar to *Hoodia*. Plants bare, spreading, forming clumps 12 in. ϕ, stems erect, branching at the base, $4\frac{3}{4}$–$6\frac{1}{2}$ in. long, $1\frac{1}{8}$ in. ϕ, with 7–9 high angles, these with prominent, crowded tubercles, with end in a minute tooth, purple striped; F. solitary, from the middle of the stem, with a 1-in. long, round stalk, calyx 5-partite, corolla in bud oval-rhomboidal, $1\frac{1}{8}$–2 in. long, when open $4\frac{1}{2}$ in. ϕ, consisting of a shallow tube 2 in. ϕ and five spreading lobes, these 1–$1\frac{1}{8}$ in. long, $1\frac{1}{8}$–$1\frac{3}{8}$ in. wide, slightly curved to one side at the tip; outside green or pale red, inside regularly papillose, rough, with five longitudinal alternating grooves and raised lines, dark wine red at the tip. Cultivation as for *Hoodia*.



FIG. 93.—Jatropha podagrica Hook.

Jatropha L.

Family: EUPHORBIACEAE.

Jatropha podagrica Hook. (fig. 93). Occurrence: Panama. Succulent shrub; stem *c.* 16–20 in. high, thickened at the base to an oval club, slender above, dichotomously branched, grey skinned, the skin peeling somewhat later; L. at the ends of the shoots in a head of 6–8 together, long

stalked, 3-lobed, *c.* 6–7 in. long and wide, thin, green, smooth, with a slight waxy covering; stipules converted into branched, thorny organs, green at first, later grey, long persisting; inflorescence repeatedly forked, *c.* 6 in. long; F. brilliant scarlet, in summer; needs to be in a warm position, in sandy, poor soil. In summer, moderate amount of water; in winter, when the leaves have fallen, complete rest.

Kalanchoe Adans.

Family: CRASSULACEAE.

Occurrence: Tropical Asia, Africa, America.

Shrubs or sub-shrubs, erect growing. Leaves opposite, sessile or stalked, fleshy, edge entire, notched or pinnate. F. terminal in paniculate, many-flowered false umbels, large, white, yellow or red. Easily grown plants for the cold house, keep in cold house in summer also. Some species suitable for growing in rooms; need a bright, airy position, in winter not above 50° F. The Kalanchoe require rich, porous soil, with much water in summer. Propagation easy from seed or cuttings. The branches which bear flowers die after flowering or when the seed is ripe, but new shoots are formed at the base. The seeds are very small and should not be covered with soil or sand.

K. Bentii C H. Wight = *K. teretifolia* Deflers.

K. Blossfeldiana v. Poelln. (fig. 94) (*K. globulifera* P. d. B. *v. coccinea* P. d. B.), Madagascar Shrub with crowded growth; stems erect, little branched, about 12 in high, bare and smooth throughout; L. with 1-in. long, channelled stalk, oblong or oval, about 3 in. long, 1½ in. wide, dark green, shining, edge red, edge entire at first, towards the centre or tip somewhat notched and wavy. F. often 60 in a capitose inflorescence, ⅓–⅖ in. ϕ, ½ in. long, scarlet, January–April

Plant well worth growing for the winter. Hence specially recommended for growing in quantity, propagate by seed in February. The pans, with sandy peat, should be covered with a pane of glass and kept very moist. Protect from sunshine till the seeds have germinated, then give more air. Grow in pots, in well-sieved leaf mould, turf or porous potting compost, to which has been added a little old mortar rubble and a good deal of sand, in airy, sunny frames; keep the lights on during rain and shade lightly when sunny. Towards the end of June cut the plants back to make them branch, the cuttings can easily be rooted and are saleable as small flowering plants. Winter at 40–50° F. in a light greenhouse or heated frame. In a really bright, cool situation the leaves become a beautiful red. Plants which have flowered do not break readily and are not worth using as mother plants for cuttings.

K. Blossfeldiana v. Poelln. **v. "Selekta"** hort. Valuable improvement on the foregoing; of neat habit and very free flowering. If sown early can be had in flower in December.

K. carnea Mast., S. Africa. Similar to *K. flammea*. Flowers pink or flesh coloured in winter. Good florist's plant.

K. crenata Haw., Tropical Africa. Shrubs; stems up to 3 feet high; L. long stalked, oval-lanceolate, doubly dentate, green; F. golden yellow, reddish or even red, in summer.

K. crenata R. Hamet = *Bryophyllum crenatum* Bak.



FIG. 94.—Kalanchoe Blossfeldiana v. Poelln. (Photo, R. Blossfeld.)

K. Daigremontianum R. Hamet et P. d. l. Bathie = *Bryophyllum Daigremontianum* Bgr.

K. delagonense Eckl. et Zeyh. = *Bryophyllum tubiflorum* Harv.

K. flammea Stapf., Somaliland (Africa). Shrub, with little branched, erect stems, 12–16 in. high; L. $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, 1–$1\frac{1}{8}$ in. wide, obovate, bluntly rounded above, narrowed into the stalk below, edge entire or notched, pale grey-green; false umbels many flowered; F. *c.* $\frac{3}{4}$ in. ϕ, brilliant orange red, winter to March. Plant worth growing for the winter. Grow like *K. Blossfeldiana*.

K. globulifera Perrier de la Bathie, Madagascar. Shrub, stems short, ascending, with greenish hairs, with 6–8 L.; these sessile, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, obovate-spatulate, bare, pale grey-green, edge entire or wavy; F. in many numerous flowered false umbels, yellow or bright red.

K. globulifera P. d. B. **v. coccinea** P. d. B. = *K. Blossfeldiana* v. Poelln.

K. grandiflora A. Rich. = *K. marmorata* Bak.

K. grandiflora Wight et Arn. (*K. Nyikae* Engl.), Tropical East Africa, East Indies. Stem erect; L. sessile, obovate, flat, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{8}$–$1\frac{3}{8}$ in. wide, notched and toothed, bare, blue-violet, with easily removed waxy coating; F. in beautiful false umbels, tubes $\frac{1}{2}$–$\frac{5}{8}$ in. long, yellow, beautiful species which, however, rarely flowers.

K. marmorata Bak. (fig. 95) (*K. grandiflora* A. Rich.), Abyssinia. Shrub, branched from the base; stems erect, often prostrate; L. obovate, the edge notched, *c.* 4 in. long, green with grey waxy coating, both sides with large

brown markings; F. on $1\frac{1}{8}$-in. long stalks, $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, white, in spring. Few flowered, beautiful species.

K. Nyikae Engl. = *K. grandiflora* Wight et Arn.

K. pinnata Pers. = *Bryophyllum pinnatum* Kurz.

K. prolifera K. Hamet = *Bryophyllum proliferum* Bowie.

K. pruinosa Dtr., Hereroland. Biennial. Stems $1\frac{1}{8}$–2 in. long, $2\frac{1}{2}$–3 in. thick, long elliptical, narrowed at both ends, with large notches, whitish blue-green; half the leaf curved upwards, at right angles, *c.* $\frac{1}{12}$ in. thick; flower stem *c.* 28 in. high, cylindrical, with 2–3 pairs of leaves; inflorescence 6 in. across; F. *c.* $\frac{5}{8}$ in. long, yellow-green, with orange-yellow tips.

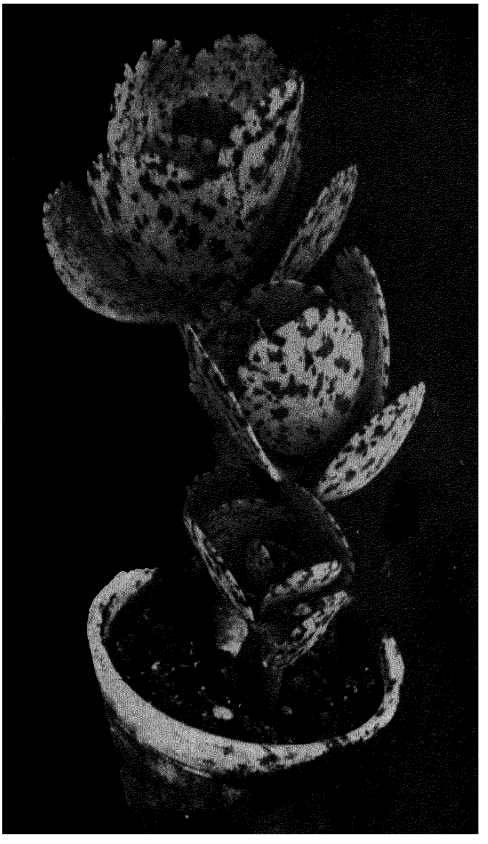


FIG. 95.—Kalanchoe marmorata Bak. (From V.P.B.)

K. rotundifolia Haw., S. Africa. Shrub; stem slender, up to 18 in. high, fairly leafy; L. 1–$1\frac{1}{8}$ in. long, $\frac{5}{8}$–1 in. wide, obovate, narrowed into the short stalk with blunt tip, edge entire, grey-green; F. $\frac{1}{2}$ in. long, cinnabar red, March–April.

K. somaliensis Bak., Somaliland (Africa). Shrub, branched from the base; stems very leafy; L. $6\frac{1}{2}$ in. long, up to 4 in. across, obovate, narrowed at the base, with down-turned auricles, irregularly serrate, notched, with whitish-grey waxy coating, and a few brown markings; F. *c.* $3\frac{1}{4}$ in. long, white, in April and May. Few flowered.

K. teretifolia Deflers (*K. Bentii* C. H. Wight), S. Arabia. Shrub, with stems 3 ft. high; L. almost cylindrical, 6–8 in. long, $\frac{5}{8}$ in. thick, acute, grey-green; F. $1\frac{1}{8}$ in. long, white, in spring.

K. thyrsiflora Harv. Shrub; stems up to 2 ft. high, very leafy; L. 4–6 in. long, 2–3 in. broad, bluntly rounded above, and like the stem with a thick, white waxy coating; F. $\frac{5}{8}$ in. long, yellow, in spring. Very beautiful as one- or two-year-old seedlings, the leaves then crowded into rosettes.

K. tubiflora R. Hamet = *Bryophyllum tubiflorum* Harv.

Kleinia L.

Family: COMPOSITAE.

Occurrence: S. and N. Africa, Canary Islands, East Indies.

Succulent shrubs, stems low or high with fleshy branches; L. fleshy or cylindrical, soon falling; F. terminal, solitary or in corymbs, white, yellow or red.

Easy growing, valued for growing in rooms. Some are cheap succulents for growing in quantity. Need bright position in greenhouse or window, in winter not over 50° F. Grow in rich, sandy soil in not too large pots. Propagation easy from cuttings, which root freely, or from seeds.

Only the best known species can be briefly described below. Those interested are referred to Alwin Berger's book *Stapelien und Kleinien*.



FIG. 96.—1. Kleinia Anteuphorbium DC. 2. Kl. articulata Haw. 3. Kl. repens Haw. 4. Kl. spec.; new, unknown.

Kl. acaulis DC. (*Cacalia acaulis* L. f.), Cape Province. Stems up to 2–3 in. high, $\frac{1}{3}$ in. thick, with tuberous root, producing offsets, very leafy, leaves half-clasping the stem, erect and curved inwards, awl-shaped, tapering slowly, $\frac{2}{5}$–$\frac{5}{8}$ in. long, $\frac{1}{12}$–$\frac{1}{6}$ in. thick, almost cylindrical, furrowed above, pale green, with reddish, spiny tip; F. solitary on a long stalk, yellowish, in spring.

Kl. Anteuphorbium DC. (fig. 96) (*Cacalia Anteuphorbium* L., *Senecio Anteuphorbium* Hook. f., *S. pteroneura* Hook. f.), S. Morocco, Cape Province. Shrub up to 5 ft. high, with erect, long-jointed branches; these $\frac{3}{8}$–$\frac{5}{8}$ in. thick, cylindrical, with rather prominent leaf cushions, frosted grey, with darker lines; L. distant, lanceolate, $\frac{5}{8}$–$1\frac{3}{8}$ in. long, $\frac{1}{5}$–$\frac{2}{5}$ in. broad, with short spiny tip, central nerve distinctly prominent; furrowed above, grey-green; F. numerous, yellowish-white; resting period in summer.

Kl. articulata Haw. (fig. 96) (*Cacalia articulata* L. f., *C. laciniata* Jacq., *C. runcinata* Lam., *Kl. Michelii* hort.), Cape Colony. Stems fairly erect,

12–24 in. high, branched, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, cylindrical, jointed; joints ± breaking off, 6 in. long, often swollen, with pale grey waxy coating and darker lines; L. distant, stalked, pinnatifid, or serrated, light grey; F. in slender-stemmed corymbs, yellowish. Popular, easily grown species. Readily propagated by means of the deciduous joints.

Kl. cana DC. (*Senecio quinquangulatus* Sch. Bip.), Cape Colony. Like *Kl. tomentosa*. L. ovate-acute, about $\frac{5}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick. Rare in cultivation.

Kl. ficoides Haw., Cape Province. Branches prostrate, up to 3 ft. long, rigidly branched, *c.* $\frac{5}{8}$ in. thick, pale green, with white dots and raised leaf scars and a few indistinct lines; L. narrow, tapering slowly, $3\frac{3}{4}$–6 in. long, $\frac{1}{4}$ in. thick, waxy covering markedly blue; F. numerous, whitish, in November.

Kl. fulgens Hook. is identical with *Senecio fulgens* Nich.

Kl. gomphophylla Dtr. (fig. 97), S.W. Africa. Forming clumps; branches creeping, rooting, cylindrical, herbaceous, ± branched; L. berry-



FIG. 97.—Kleinia gomphophylla Dtr. Nat. size.

shaped, up to $\frac{3}{4}$ in. long, $\frac{5}{8}$ in. thick, with a spiny tip, green, with a translucent stripe $\frac{1}{12}$–$\frac{1}{8}$ in. wide and numerous, *c.* $\frac{1}{50}$ in. wide, translucent lines, reddish when grown in a bright position. (The light stripes are assimilatory windows, see *Fenestraria*!) Needs a very bright position and moderate amount of water.

Kl. Grantii Hook. fil. (*Notonia Grantii* Oliv., also Hiern., *N. sempervirens* Aschers., *Senecio longipes* Bak.), East Africa. Similar *Kl. semperviva*. Stems 6–8 in. high; L. ± curved, ovate-spatulate, narrowed into the short stalk below, blunt tipped, 2–3 in. long, central nerve distinct, L. green; F. red.

Kl. Haworthii DC. = *Kl. tomentosa* Haw.

Kl. Michelii hort. = *Kl. articulata* Haw.

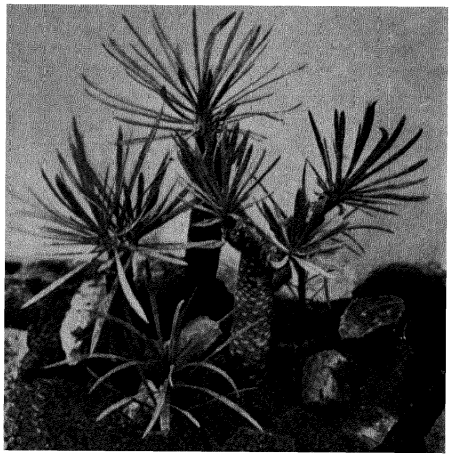


FIG. 98.—Kleinia neriifolia Haw. (Photo, K. Josefsky.)

thick; L. short stalked, $2\frac{1}{2}$–$3\frac{3}{4}$ in. long, $\frac{3}{4}$ in. broad, 3-veined.

Kl. pendula DC. (*Cacalia pendula* Forsk., *Notonia trachycarpa* Klotzsch, *Senecio Gunninsii* Bak., *S. pendulus* Sch. Bip.), S. Arabia. Stems jointed, curved, prostrate and becoming erect later, rooting, up to 12 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, covered with the dry remains of the leaves, somewhat compressed laterally, grey-green or brownish, with darker lines; L. linear, $\frac{3}{4}$ in. long, almost cylindrical; F. on a long stem, 1–2, orange or blood red.

Kl. repens Haw. (fig. 96) (*Cacalia repens* L., *Senecio succulentus* Sch. Bip.), Cape Colony. Low shrub, 8–12 in. high; branches $\frac{1}{5}$–$\frac{1}{4}$ in. thick,

Kl. neriifolia Haw. (fig. 98) (*Cacalia Kleinia* L.), Canary Islands. When old, up to 6–10 ft. high, freely branched, generally in whorls, stems as thick as an arm and jointed branches; joints easily breaking off, up to 16 in. long, with white waxy covering and dots, with darker lines; L. at the ends of the young shoots almost arranged in a rosette, long elliptical, short tipped, $3\frac{3}{4}$–6 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. wide, grey-green, with thick middle nerve; F. in corymbs, yellow. Free growing.

Kl. odora DC. (*Cacalia odora* Forsk., *Senecio odorus* Sch. Bip.), S. Arabia. Like *Kl. Anteuphorbium*, but taller, the joints 28 in. long, $\frac{3}{4}$–$1\frac{1}{8}$ in.

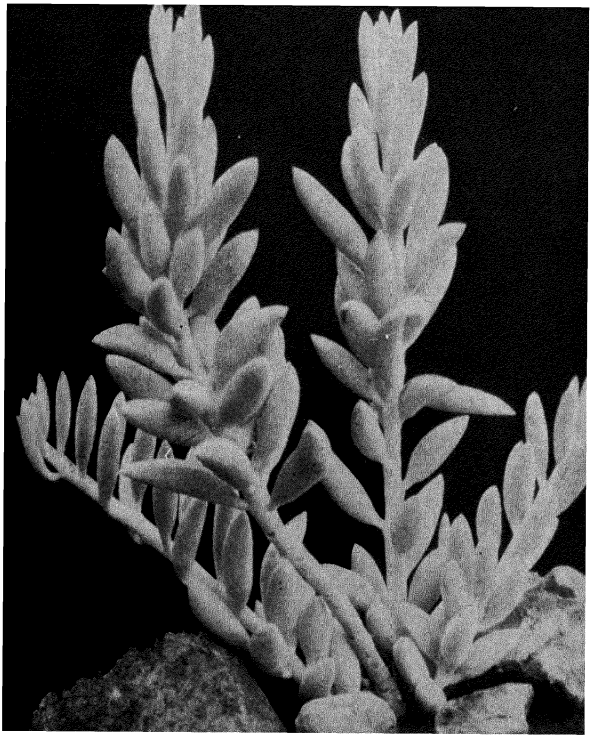


FIG. 99.—Kleinia tomentosa Haw.

with blue waxy coating; L. crowded at the tips of the branches, linear-oblong, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, bluntish with a small tip, roundish, slightly furrowed above, with blue waxy covering; F. numerous; white.

Kl. semperviva DC. (*Notonia semperviva* Forsk.), S. Arabia, Abyssinia. Stems erect, many, from a tuberous root, *c.* 4 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, smooth, with pale grey waxy coating; L. numerous, $2\frac{3}{4}$ in. long, 1 in. broad, oblanceolate, blunt tipped, middle nerve keel-like, green, reddish below; F. numerous, red.

Kl. tomentosa Haw. (fig. 99) (*Cacalia canescens* Willd., *C. Haworthii* Sweet, *C. tomentosa* Haw., *Kl. Haworthii* DC., *Senecio Haworthii* Hook.), Cape Province. Little branched shrub, up to 12 in. high, branches erect, or later prostrate; L. acute at both ends, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. thick, cylindrical, very short stalked, covered, like the branches, with thick white felt; F. yellow, rare. Keep almost completely dry in winter!

Lenophyllum Rose

Family: CRASSULACEAE.

Lenophyllum pusillum Rose, Mexico. Small plants, forming clumps; L. opposite, arranged in a rosette, $\frac{1}{3}$–$\frac{2}{3}$ in. long, narrow, acute, furrowed above, keeled below, fleshy, sooty reddish-green, falling off easily, and rooting; F. solitary, terminal, stalked, yellow, in summer. For greenhouse or room.

Lewisia Pursh.

Family: PORTULACACEAE.

Lewisia rediviva Pursh. (fig. 100). Western N. America. Stemless plant with thick root stock; L. in close, basal rosettes, oblong-linear, almost cylindrical, 2–$3\frac{3}{4}$ in. long, grey-green; F. 2–3, on $\frac{3}{4}$–2-in. long stalk, with 3–16 petals, 2–3 in. ϕ, pale pink or white, in summer. Useful for sunny positions in the rock garden. Propagation by seed.



FIG. 100.—Lewisia rediviva Pursh. (From V.P.B.)

Liliaceae (Family). Genera described: *Aloe*, *Apicra*, *Bowiea*, *Bulbine*, *Gasteria*, *Haworthia*, *Lomatophyllum*.

Lomatophyllum Willd.

Family: LILIACEAE.

Lomatophyllum borbonicum Willd. (*L. aloiflorum* Nichols., *Phylloma aloiflorum* Ker). Occurrence: Mauritius. Very similar to the *Aloes*, almost tree-like; stem erect, becoming woody, up to 6 ft. high; L. up to 32 in. long, linear-lanceolate, fleshy leathery, bright green, red edged and with horny teeth. Grow in a temperate house, like *Aloe*.

Mesembrianthemum L.

Family: AIZOACEAE.

The genus Mesembrianthemum, so rich in species, is the most interesting amongst the succulents. Whilst formerly the generic name Mesembrianthemum L. was used for all the species, the result of study in recent years has shown that division into a number of smaller genera is necessary. The new classification depends on special characteristics of flower and fruit, which will not be gone into more fully here. Noteworthy authors, such as Mrs L. Bolus, Cape Town; Dr N. E. Brown, Kew; Prof. Dinter, Bautzen; Dr R. Marloth, Cape Town; Dr von Poellnitz, Oberlödla; and last but not least, Dr G. Schwantes, Kiel, have interested themselves in the new nomenclature. Since the new genera may be distinguished from each other as a rule by the form of leaf or plant body, it is also easy for the gardener without botanical training and the amateur to recognise them. The generic name Mesembrianthemum (L.) Schwant. is only retained for a small group of shrubby species. The new names and the synonyms, as mentioned in the Foreword, are arranged in alphabetical order. The following list does not include anything like all the known species, but a selection of the most beautiful plants suitable for cultivation.

The measurements given below chiefly refer to imported plants. Deviations in either direction may occur in cultivated plants.

Cultivation.—The genus Mesembrianthemum with its many varied forms, which is split into a number of smaller genera, varies also in its cultural requirements. More detailed information on position, uses and treatment are added to the descriptions of the individual genera, so that here only general cultural directions will be given.

Position.—A large number of the shrubby species may be placed in an airy greenhouse or window in summer. Growing them out of doors is even better. The pots may be sunk above the rim in a very sunny place in the rock garden or other well-drained position. They then grow strongly and flower freely. If, during the course of the summer, they become so large that it is difficult to fit them into the

limited space in the greenhouse or room in autumn, then cuttings should be taken, if possible directly after flowering. The young plants are, as a rule, stronger next year than old plants that have come through the winter. If one wants to keep the old plants over the winter, they should be taken up in the pots before they are damaged by the first night frosts, the roots outside the pot cut off, and the plants put in a bright, frost-proof place, without much water.

The very succulent species are more particular as regards position. The ideal place is a light greenhouse with broad shelves, which are not more than 24–32 in. below the roof. Planting out the highly succulent types even in a greenhouse is not recommended, for the control of conditions is lost. Staging, covered 6–8 in. deep with medium-sized gravel or broken coke, is best for these plants. The pots are sunk up to the rims in this bed, which is kept slightly damp, without being really wet. In this way a uniform dampness or dryness of the pots is attained, without watering the plants themselves. The fine roots soon find their way through the drainage hole of the pots, a state of affairs which cannot be valued too highly, for in this way water is always available, without fear of damage from stagnant moisture.

The small greenhouses for rooms offered for sale are very suitable, so long as good ventilation is provided. A sunny window facing south or even west is very useful or, better still, a light veranda. It is not advisable to put these plants out of doors without the protection of a pane of glass for, on account of the usually large amount of rain in our latitudes, suitable treatment cannot be guaranteed. In winter, if the plants are not kept in a heated greenhouse, they must be taken into a bright, warm room. The temperature required varies with each species, about 50–60° F. or less. For growing them in quantity in a nursery it is best for all species to use a hot-bed frame or warm greenhouses. All species want full sun and, at the proper time, plenty of air. Plants grown too soft very easily rot off in winter.

In recent years repeated attempts have been made to improve the growth of the plants during the winter months by increasing the amount of light by means of 500-watt lamps. If these experiments have any result it is probably chiefly due to the heat given off by the lamps, though it cannot be denied that the light may have some influence. In any case the useful effect of this lighting, as far as it influences the power of assimilation, is too small in relation to the current used, for the effect of warmth can be obtained more cheaply by means of a hot-water heating system. It remains for the future to make experiments in radiation with cheaper "cold" light. For Mesembrianthemums which grow in winter these sources of light should not be undervalued, for by means of this radiation the power of assimilation of the plants is increased.

Watering is the most important operation, for only the correct use of water will lead to success. The resting period of the plant must be observed, when as a rule little or no water should be given. This is especially necessary with the very succulent types, which should not be watered according to the calendar but when the plants themselves indicate the beginning of a new growing period by pushing out new leaves. Earlier watering in order to induce an earlier growing period is useless, and only results in rotting. The amount of water given depends on the position of the plants. In a greenhouse where the sun can reach the plants without hindrance, the plants dry more quickly than when growing in a room; in winter, the heat maintained must also be taken into consideration. The plants themselves should not be watered, for it stands on them in drops, and may act as a burning-glass, which may lead to serious burning of the leaf surface. For watering a very fine rose or pointed spout which can be added to the can should be used. They should not be sprayed! Water should only be given on sunny days, so that the pots may be dried by the sun.

Soil.—The shrubby species are not very particular. They are content with any porous soil. But the right mixture must be used for all the very succulent types. The chief essential is good drainage. The following compost has proved suitable:—

$\frac{2}{12}$ old leaf mould;
$\frac{1}{12}$ old potting compost;
$\frac{1}{12}$ old soil from a hot bed;
$\frac{1}{12}$ old mortar rubble and fine brick dust.
$\frac{1}{12}$ old loam;
$\frac{6}{12}$ sharp, clean sand.

To each quart of soil add one teaspoonful of bone meal. A nitrogenous fertiliser improves the growth but renders the plants susceptible to rot. The quantity of sand may even be increased for the conical and some of the spherical species.

Repotting need not be carried out every year. Even plants whose roots are through the pots will make their new roots inside the pots, for, as a rule, the old roots die back during the resting period to the more or less fleshy main root. When repotting, the dead roots should be carefully removed, and any other dead part of the plant. The pots should not be larger than necessary. Lay a crock over the drainage hole, and cover with a layer of sand so that the excess water can run through easily. It is a good plan to cover the surface of the soil with a layer of small stones to prevent caking.

Propagation may be carried out by seed or cuttings. Reliable seed can be bought from specialist firms who obtain their seeds direct from the native countries of the plants. Good seeds which germinate

well are also produced over here. Since the Mesembrianthemums are self-sterile, two different plants, not obtained as cuttings from each other, are necessary for the production of seed. Pollination should not be left to chance or insects on account of the tendency to hybridisation, but should be carried out by means of a brush. The brush should be sterilised in alcohol or boiling water before each pollination to remove any pollen adhering to it. The best time to sow is March and April, though later in autumn is also a suitable time. The seed is sown in small pots or shallow pans, which are placed in an enclosed space or covered with a pane of glass. The soil should consist of $\frac{1}{3}$ fine, well-rotted leaf mould and $\frac{2}{3}$ washed sand. It should be



FIG. 101.—One-year-old seedlings of Mesembrianthemum in useful, square pans. $\frac{1}{6}$ nat. size.

sterilised to prevent the appearance of algae and moulds. The seeds should be evenly distributed and only lightly covered. To prevent disturbance of the seeds, the pots should not be watered overhead but placed in a shallow vessel of water, so that it soaks up through the soil. In a close atmosphere germination takes place in a few days, though some seeds will not come up for several weeks. The seedlings should be pricked out after a few days, when the cotyledons are so large that the plants can be picked up with a small wooden fork. The soil used can be that recommended earlier (see p. 120). The surface should be covered with a layer of washed sand to prevent it caking. The very succulent types, like *Lithops*, *Conophytum* and others, must be pricked out so far apart that they can remain for at least one year in the new receptacle, a shallow pan is best. Other species must be put into small pots later. The pricked-out seedlings should early be accustomed to air and light and treated like the others of their genus. In winter the seedlings should have a light position. Sowings made in autumn should not be pricked out till the following spring. See fig. 101 of pans of pricked-out seedlings.

As a protection against damage from moulds and bacteria, as

well as a general preventative when sowing, "Chinosol" has recently been recommended. "Chinosol" can be obtained in tablet form from chemists or specialist firms, and is used in a 1 : 2000 solution with water (0·5 gm. "Chinosol" in 1 litre water). The seed pans are either treated with this solution when first moistened, or seedlings that have been attacked may be sprayed with it. The plants are not damaged by the solution. It is also advisable to treat seeds suspected of harbouring fungi with the solution before sowing.

Propagation from cuttings is comparatively easy. Only shoots can be used; leaf cuttings will not grow. The bodies of *Lithops*, *Conophytum*, and similar species are shoots and can be treated as cuttings. The cuttings should be removed from the plant below a pair of leaves by means of a sharp knife and laid in the sun for a little while so that the cut surface dries. With *Lithops*, *Conophytum* and similar very succulent types leave a short bit of stem below the plant body and remove the skin cleanly from it. The cuttings are put in pots or shallow pans which are filled ¾ full with the compost previously mentioned and covered with washed sand. They will root in a few weeks in a close atmosphere. The shrubby species may be increased by cuttings at almost any time for very succulent species after the resting period.

Imported Plants, after their long journey, are often much shrivelled and dull looking. The dead portions of older plant bodies should be carefully cleaned off, and the roots cut with a sharp knife. After potting up, the plants should be protected from direct sunlight for a time, and very little water given at first. Since the new roots are often formed during the journey, imported plants generally grow on quickly.

Diseases and Pests.—The utmost care of Mesembrianthemums may not prevent decay of the roots and leaves, which occurs especially among the very succulent species. Usually the cause is too much moisture. Due regard to the resting period and moderate watering, as well as avoidance of over-moist air, are the best methods of preventing rot. Especially dangerous is a dry-rot often met with, which is recognised by the sudden shrivelling and drying up of the body, and is caused by certain bacteria. Such plants must be destroyed or the damaged parts cut off, to prevent the disease spreading. The yellow spots which appear on *Glottiphyllum* in autumn and winter have not yet been explained. Root bug can attack the plants badly, and kill them by sucking the roots. Chemical methods have so far produced no result; the best means is to renew the soil and thoroughly scour the roots with a bristly brush.

Acaulon rosulatum N. E. Br. = *Aistocaulon rosulatum* von Poelln.

Acrodon N. E. Br.

Low plants, forming clumps. L. crowded into a rosette, triangular, toothed at the edge or only at the tip; F. solitary, stalked, white, in summer. Allied to *Stomatium* and requiring the same cultivation. Occurrence: Cape Province.

A. bellidiflorus N. E. Br. (*Mes. bellidiflorum* L.). Rosettes dichotomously branched; L. crowded, alternate in form of a cross, erect and recurved, forming a sheath at the base, 1$\frac{1}{8}$–2 in. long, triangular, laterally compressed above, with a short tip, the edges with horny teeth, grey-green; F. on 2-in. long stalks, 1$\frac{1}{2}$ in. ϕ, white with a red edge.

A. subulatus N. E. Br. (*Mes. subulatum* Mill.). Similar to the foregoing, but smaller; L. erect, curved outwards, only the keeled edges at the truncated tip toothed; F. smaller.

Aethephyllum N. E. Br.

⊙. Cultivation like *Cryophytum*. Occurrence: Cape Province.

Aethephyllum pinnatifidum N. E. Br. (*Cleretum pinnatifidum* N. E. Br., *Mes. pinnatifidum* L. f.). Insignificant, pale yellow flowers in July and August.

Aistocaulon von Poelln. (nomen novum)

This genus has now been chosen by Dr von Poellnitz for *Acaulon*, since the genus *Acaulon* C. Müller must be retained for an older, universally recognised genus of Moss.

Aistocaulon rosulatum von Poelln. (fig. 102) (*Acaulon rosulatum* N. E. Br., *Aloinopsis rosulata* Schwant., *Mes. rosulatum* Kensit., *Nananthus rosulatus* N. E. Br.). Small, succulent plants with long, fleshy roots; forming clumps; L. 6–8, rather spreading, opposite, in a rosette, 1–1$\frac{1}{8}$ in. long, at the base *c.* $\frac{1}{5}$ in. wide, broadly spatulate above, up to $\frac{5}{8}$ in. wide, upper side flat or slightly concave, semicylindrical on the back at first, then roundish and keeled towards the tip, edges blunt, the blunt, rounded tip covered with whitish tubercles, shining, dark green; inflorescence with 1–3 F.; F. 1$\frac{1}{8}$–1$\frac{3}{8}$ in. ϕ, yellow. Cultivation as for *Nananthus*.



FIG. 102. Aistocaulon rosulatum v. Poelln. $\frac{3}{4}$ nat. size.

Aloinopsis Schwant.

Closely allied to the genus *Nananthus* and in fact only distinguishable by the form of flower and fruit. Cultivation as for *Nananthus*. Occurrence: S. Africa.

(The diversity of opinion of the authors of the genera *Acaulon*, *Aistocaulon*, *Aloinopsis*, *Nananthus* and *Rabiea* on the question of which species should be allotted to these genera, are not, in my opinion, yet clear. I do not consider myself authorised to decide, and have chosen the specific names in accordance with the (uncritical) work on the Aizoaceae in *Die Natürlichen Pflanzenfamilien*, by Engler-Harms, vol. 16*c*, Berlin, 1934.)

Al. albinota Schwant. = *Rabiea albinota* N. E. Br.

Al. albipuncta Schwant. = *Rabiea albipuncta* N. E. Br.

Al. aloides Schwant. = *Nananthus aloides* N. E. Br.

Al. Dyeri L. Bol. = *Nananthus rubrolineatus* N. E. Br.

Al. Jamesii L. Bol. L. 4–6, *c.* $\frac{5}{8}$ in. long, $\frac{1}{5}$ in. wide at first, widening to $\frac{1}{3}$ in. in the middle, long triangular, tapering, $\frac{1}{8}$ in. thick, upper side slightly concave, round at first on the back, then keeled, grey-green, rough with tubercles; F. $\frac{1}{4}$ in. ϕ, petals golden yellow, with a red middle nerve, December.



FIG. 103.—Aloinopsis Schooneesii L. Bol. (Photo. H. Herre.) (From M.d.d.K.G.)

Al. Orpenii L. Bol. (*Mes. Orpenii* N. E. Br.) (named after Mr Redmond Orpen, Campbell, Griqualand West, Africa). Forming thick clumps; L. much compressed, $\frac{5}{8}$–$\frac{3}{4}$ in. long, lanceolate, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, narrowed at the base, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, the upper side flat and somewhat recurved at the tip, back roundish at first, then keeled and chin-like, bluish-grey, with numerous slightly raised dark dots; F. $1\frac{3}{8}$ in. ϕ, yellow, the tips of the petals reddish.

Al. Peersii L. Bol. (fig. 223) (*Deilanthe Peersii* N. E. Br., *Mes. canum* Bgr., *Nananthus canus* L. Bol.). Root turnip-like; L. 2–4, at first spreading then suddenly bent back almost at right angles; $\frac{3}{4}$–$\frac{7}{8}$ in. long, $\frac{1}{3}$ in. wide below, then widening to $\frac{5}{8}$ in. and bluntly triangular, tapering, $\frac{1}{5}$ in. thick; upper side flat, back rounded, with a round keel at the tip; smooth, bluish grey-green, with distinct dots, under a lens finely hairy; F. solitary, 1 in. ϕ, yellow.

Al. Pole Evansii N. E. Br. = *Nananthus Pole Evansii* N. E. Br.

Al. rosulata Schwant. = *Aistocaulon rosulatum* von Poelln.

Al. rubrolineata Schwant. = *Nananthus rubrolineatus* N. E. Br.

Al. Schooneesii L. Bol. (fig. 103). (Named after D. A. Schoonees,

Stellenbosch.) L. very small, 8–10 together, broadly spatulate, with roundish triangular end, blue-green; F. $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, yellowish-red, with silky sheen.

Al. vittata Schwant. = *Nananthus vittatus* N. E. Br.

Antimima N. E. Br.

Antimima dualis N. E. Br. (*Argyroderma duale*, N. E. Br., *Mes. duale* N. E. Br., *Ruschia dualis*, L. Bol.). Similar to *Argyroderma*. With many shoots; L. 2, united for third of their length, $\frac{3}{4}$ in. long, $\frac{1}{5}$ in. broad, $\frac{1}{5}$ in. thick, upper side flat, back at first half-round, then keeled; edges with horny border; whitish-grey; F. sessile with two bracts, $\frac{5}{8}$ in. ϕ, red.

Apatesia N. E. Br.

○. Cultivation as for *Cryophytum*. Occurrence: Cape Province.

Apatesia helianthoides N E. Br. (*Mes. Candollei* Haw , *Mes. calendulaceum* Haw., *Mes. helianthoides* Ait , *Mes pilosum* Haw., *Thyrasperma helianthoides* N. E. Br.). Erect, branched, with hairy stems and branches; L opposite, the lower ones spatulate-lanceolate, the upper ones lanceolate, with longer tips, flat, smooth, bare; F terminal and from the axils, 4 in. long, stalked, *c* $2\frac{1}{2}$ in. ϕ, shining yellow, in July and August

Aptenia N. E. Br.

Occurrence: Cape Colony. Small half-shrubs, which in summer are specially suitable for the rock garden or as bedding plants, and which flower freely in summer and autumn. In winter keep moderately dry in a cold house at 45–50° F.; propagation from seed, or quicker from cuttings.

A. cordifolia Schwant (*Mes. cordifolium* L. f). Much branched, branches prostrate, up to 24 in long, cylindrical, green, finely papillose, later grey; L. opposite, distant, stalked, cordate-ovate, up to 1 in. long and nearly as wide, fresh green, fleshy, finely papillose; F. terminal or lateral, short stalked, purple-red

A. cordifolia Schwant. **v. variegata** hort (*Mes. cordifolium* L. f. *v. variegatum* hort.) L. beautifully marked with creamy white. Suitable for ornamental bedding. Both varieties are useful plants for baskets.

Argeta N. E. Br.

Occurrence: Karroo. Growing period in summer. Need a light position in a greenhouse or even in a window. In winter rather dry, and not below 55° F.

A. petrensis N. E. Br. (fig. 104). Very small, almost stemless plants with fleshy roots, forming clumps; shoots without visible internodes with 1–2 pairs of leaves; L. united from the base for about third of their length and little expanded, $\frac{1}{3}$–$\frac{2}{5}$ in. long, upper side flat or only slightly convex, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, ending in a distinct tip, $\frac{1}{6}$–$\frac{1}{5}$ in. thick, lower side round at first, the free portion sharply keeled, little drawn forward at the tip; upper surface smooth, firm, whitish grey-green; keel and edges rather paler; F. terminal, apparently lateral from new pairs of leaves, short stalked, $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, reddish.

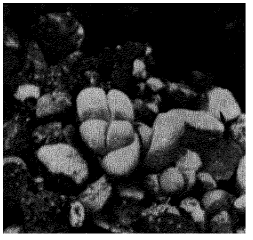


FIG. 104. Argeta petrensis N. E. Br. Seedling. $\frac{3}{4}$ nat. size.

Argyroderma N. E. Br.

Stemless, very succulent plants forming clumps or consisting of one growth. L. 2–4, rarely more on one growth, decussate, short and thick, oval, wide spread, or also long and semicylindrical, upper side usually flat or slightly convex, back very convex, often drawn forward over the upper side; united from the base to half-way up; texture very firm; surface whitish to whitish grey-green, unmarked. F. solitary, terminal, sessile or very short stalked, in July and August. Occurrence: Karroo, Little Namaqualand (S. Africa).

Growing period in summer. Needs light position in a greenhouse or window; not below 60° F., water freely in summer, hardly at all in the resting period; easily raised from seed. Young seedlings should be kept moister in winter.

Arg. angustipetalum L. Bol. = *A. Jacobsenianum* Schwant.

Arg. aureum L. Bol., Little Namaqualand. Growths solitary; L. 2, $\frac{3}{4}$–$1\frac{1}{8}$ in. wide apart, long ovate, united for third of their length, $1\frac{1}{2}$ in. long, $1\frac{1}{4}$ in. wide and thick, about $\frac{5}{8}$ in. ϕ at the tip, rounded keeled, laterally compressed; F. with stalks $3\frac{1}{4}$ in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, golden yellow.

Arg. Braunsii Schwant. (fig. 105) (*Cheiridopsis Braunsii* Schwant., *Roodia digitifolia* N. E. Br.) (named after Dr H. Brauns, Willowmoore, S. Africa). Branched when old; L. 2–4 on a growth, erect, curved laterally, 2–3 in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. wide and thick, upper side flat or convex, often quite round in cross-section, the lower side very round and drawn forward over the barely distinguishable tip, the whole leaf ± finger-like in appearance; surface smooth, bluish grey-green, when old reddish above, the edges rather paler; F. short stalked.

Arg. Delaetii v. roseum Maass. = *Arg. roseum* Schwant.

Arg. duale N. E. Br. = *Antimima dualis* N. E. Br.

Arg. Jacobsenianum Schwant. (fig. 106) (*Arg. angustipetalum* L. Bol.) (named after Garden-Inspector H. Jacobsen, Kiel), Little Namaqualand (Max. Schlechter, 1932). Thick species forming clumps, often with 6–8 growths,

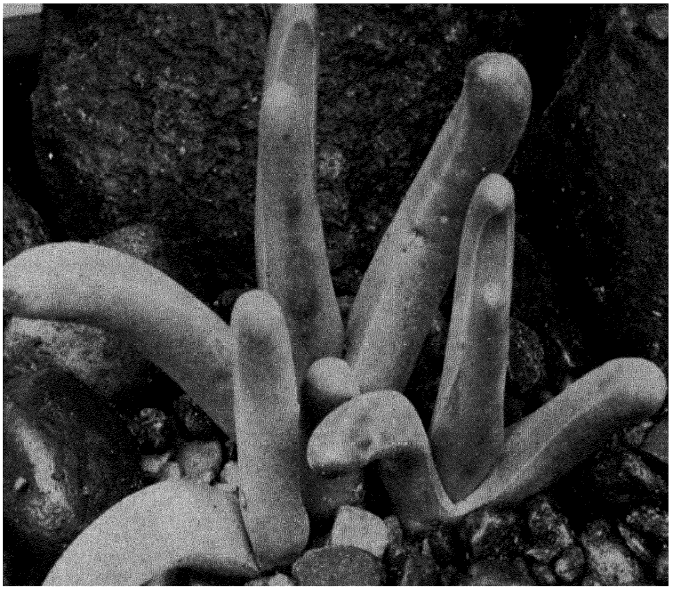


FIG. 105.—Argyroderma Braunsii Schwant. Almost nat. size.



FIG. 106.—Argyroderma Jacobsenianum Schwant. $\frac{2}{3}$ nat. size.

usually with 2, during the growing period with 4 leaves; L. semi-ovate, about 1½ in. long, 1⅛ in. wide, ¾ in. thick, upper side only about ⅝ in. long and broad, rounded triangular, flat or slightly concave; back semicylindrical and drawn far forward over the tip like a chin; surface smooth, grey-green, reddish at the base of the ⅖–½-in. wide fissure; F. sessile, *c.* 1⅛ in. ϕ, petals very narrow, yellow; fruit with broad, winged valves.

Arg. Lesliei N. E. Br. = *Arg. octophyllum* Schwant.

Arg. Luckhoffii L. Bol. (named after Dr J. Luckhoff, Cape Town), Little Namaqualand. Growths solitary, with the remains of the old leaves long persisting; L. united for nearly half their length, erect, compressed



FIG. 107.—Argyroderma octophyllum Schwant. ¾ nat. size.

together, first when flowering ¼–⅓ in. apart at the tip, ⅝ in. long and broad, hemispherical, keels hardly distinguishable; F. sessile, ¾–1⅛ in. ϕ, sooty yellow.

Arg. Margaretae N. E. Br. = *Lapidaria Margaretae* Schwant.

Arg. necopinum N. E. Br. (*Mes. necopinum* N. E. Br.). Species forming clumps when old; growths with 1 or 2 pairs of leaves; L. ¾–1 in. long, united for about ¼ in., ½–⅝ in. broad, long oval, ¼–⅓ in. thick, upper side flat, with a large pustule at the base, half-round on the back, distinctly keeled towards the tip, the under side drawn forward like a chin; whitish-grey, smooth; F. *c.* ⅝ in. ϕ, yellow.

Arg. octophyllum Schwant. (fig. 107) (*Arg. Lesliei* N. E. Br., *Mes. octophyllum* Verl. (*Mes. octophyllum* Haw. is small and many-leaved and not in cultivation)). In cultivation wrongly distributed as *Arg. testiculare* N. E. Br. (*Mes. testiculare* Ait.). L. usually 2–4 (hardly ever 8 as the specific name suggests) elliptical-ovate, 1⅛ in. long, 1 in. broad, *c.* ⅝ in. thick, upper side

flat, back semicylindrical with a slight chin, faintly keeled at the tip; surface smooth, blue-green, without dots; F. sessile, between the youngest, wide gaping leaves, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, yellow, petals spirally twisted. Wide spread in cultivation, flowers freely and readily sets seed.

Arg. ovale L. Bol. Forming clumps of up to ten growths; L. $\frac{3}{4}$–1 in. long, united together for $\frac{1}{2}$ in., gaping wide; upper side flat, oval, with a large pustule especially on the flowering growths which extends half-way or more across the free portion, back half-round, drawn forward, keeled at the tip, F. $1\frac{1}{8}$ in. ϕ, rosy purple

Arg. roseatum N. E. Br. = *Lapidaria Margaretae* Schwant.

Arg. roseum Schwant. (*Arg. Delaetii v. roseum* Maass., *Mes. octophyllum v. roseum* Haw., *Mes. testiculare* Jacq. *v. roseum* Haw.). Plant with one or two growths, these with 2–4 L., L. united from the base half-way up, $1\frac{3}{8}$ in. long, *c.* 2 in. broad, *c.* 1 in. thick, upper side flat, lower side convex, drawn forward over the upper side like a chin, not keeled, surface smooth, blue-green to porcelain white, without dots, F. sessile, 3–$3\frac{3}{4}$ in. ϕ, rosy violet; petals hanging limply over the leaves, so that the F. cover the whole plant, stamens yellow, beautiful species! A form with yellow flowers is in commerce under the name *Arg. Delaetii* Maass.

Arg. Schlechteri Schwant. (named after Max Schlechter, Port Nolloth, S. Africa) Growths usually solitary and consisting of one pair of leaves; L. $\frac{3}{4}$ in. long, $\frac{5}{8}$ in. wide, united for half-way up from the base, erect, so that the fissure is not wide open, upper side somewhat trough-shaped, $\frac{1}{4}$ in. long, $\frac{5}{8}$ in. wide; lower side semicylindrical, drawn forward like a chin over the upper side, somewhat keeled above; surface smooth, white bluish-green; F. $1\frac{1}{8}$ in. ϕ, rosy red.

Arg. Schuldtii Schwant. (named after Hans Schuldt, of the firm Albert Schenkel, Hamburg-Blankensee) Growths solitary; L. roundish-ovate, united for a third of its length, the free portions not far apart, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $1\frac{1}{8}$ in. wide, $\frac{5}{8}$ in. thick; upper side flat, back very convex and far drawn forward over the upper side, markedly sharply keeled, smooth, bluish grey-green, without dots, F. very small, inconspicuous, petals narrow, dark pink.

Arg. testiculare N. E. Br. (*Mes. testiculare* Ait.). According to Haworth, flowers white. The plant is only known by name and is not in cultivation. The plants in cultivation under this name are *Arg. octophyllum*.

Arg. Villetii L. Bol. (named after Dr. M. Villet, S. Africa). Forming clumps, often of thirty growths; pairs of leaves seen from the side united to obovate bodies, wedge-shaped below, $\frac{5}{8}$–$\frac{3}{4}$ in. long, L. united for $\frac{1}{3}$ in., the free part hardly separated, almost hemispherical, $\frac{5}{8}$ in. broad with a distinct keel; F. on $\frac{1}{3}$-in. long stalks, $\frac{5}{8}$–$1\frac{1}{8}$ in. ϕ, pink.

Aridaria N. E. Br.

Much branched shrubs. L. crowded into numerous short shoots or distant, almost cylindrical, flesh soft and sappy. F. solitary, or in

threes, white or yellowish, sweet scented, in summer. Occurrence: Cape Province. Rather intricately branched, but on account of the numerous flowers useful for planting out in summer. Winter in a cold house, propagate by seed or cuttings.

A. noctiflora Schwant. (*Mes. noctiflorum* L.). 20–30 in. high, intricately branched; branches cylindrical; L. crowded into short shoots, not much united, 1–1$\frac{3}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, spreading, almost cylindrical, blunt, grey-green; F. with 1$\frac{1}{8}$–1$\frac{1}{2}$-in. long stalks, 1$\frac{1}{8}$–1$\frac{3}{4}$ in. ϕ, white, sweetly scented, opening towards evening.

A. noctiflora Schwant. **v. fulva** (*Mes. noctiflorum* L. *v. fulvum* S.-D., *Mes. fulvum* Haw.). Altogether smaller, F. white inside, yellowish-red outside, rather smaller.

A. splendens Schwant. (fig. 108) (*Mes. splendens* L.). Freely branched, branches prostrate and so forming cushions, smooth, watery looking, papillose in the younger parts; L. cylindrical, not united, $\frac{5}{8}$–$\frac{3}{4}$ in. long, bluntish, curved inwards, recurved at the tips, smooth, pale green, with a few dark green tubercles and slightly frosted; F. solitary, terminal, rarely in threes, 1$\frac{3}{8}$–1$\frac{1}{2}$ in. ϕ, yellowish-white.



FIG. 105. ARIDARIA SPLENDENS SCHWANT. (Photo. K. Josefsky.)

Astridia Dtr. et Schwant.

(Named after Frau Astrid Schwantes, wife of Dr G. Schwantes, Kiel.)

Succulent shrubs, about 12 in. high, with woody roots. Branches at first 2-angled, with obvious internodes, brown skinned when old; L. crowded, decussate, slightly united at the base, crescent-shaped, triangular, much compressed laterally, smooth, with fine velvety hairs. F. terminal, solitary or several, short stalked, white or violet rose, in January. Occurrence: Cape Colony.

Growing time in winter at a minimum of 60° F. Needs several months rest in summer, if not complete dryness; propagation by seed or cuttings.

Astr. maxima Schwant. (*Mes. maximum* Haw.). 12 in. and more high; L. crowded, united at the base, crescent-shaped, triangular, much compressed

laterally and with curved keel, $1\frac{3}{4}$ in. long, sides 1 in. across, upper side $\frac{1}{4}$–$\frac{1}{3}$ in. broad at the base, narrowed above; surface grey to whitish-grey with numerous transparent dots; F. up to $\frac{3}{4}$ in. ϕ, pink, opening at noon.

Astr. velutina Dtr. (fig. 109) (*Mes. velutinum* Dtr.). Compact like the foregoing species; *c.* 8 in. high; L. united at the base, $1\frac{1}{8}$–$1\frac{3}{8}$ in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. wide at the base, not much narrower at the tip, bow-shaped, much compressed laterally, with velvety hairs, greyish-white, with rather transparent dots; F. $1\frac{1}{2}$ in. ϕ, white or pink.

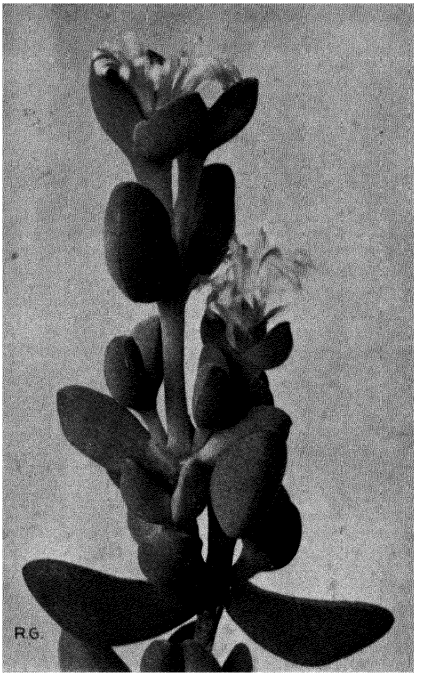


FIG. 109. Astridia velutina Dtr. (Photo, R. Graessner.) $\frac{1}{2}$ nat. size.

Bergeranthus Schwant.

(Named after the Curator, Alwin Berger, Stuttgart.)

Stemless, very succulent plants with fleshy roots; L. much crowded, decussate, united together at the base, curved inwards, upper side flat or rather trough-shaped, lower side keeled above and drawn forwards like a chin over the upper side. Edge entire; surface smooth, grey-green, without or with fine dark dots, or the dots only seen when looking through. F. with $\frac{3}{4}$–4 in. stalks, $1\frac{1}{2}$–2 in. ϕ, yellow, in June or July, opening in the afternoon. Occurrence: Cape Province.

Growing period in summer. In winter need a fairly dry position, not over 55° F. Free-growing species, which flower readily. Propagation easy from seed or cuttings.

B. albidus Schwant. = *Machairophyllum albidum* Schwant.

B. caninus Schwant. = *Carruanthus caninus* Schwant.

B. multiceps Schwant. (fig. 110) (*Mes. multiceps* Salm.). With many growths, forming clumps; L. 6–8 in a rosette, spreading recurved, 1–2 in. long, triangular, in the middle $\frac{1}{3}$–$\frac{2}{5}$ in. wide, tapering, finely granular; upper side flat, lower side bluntly keeled, rather compressed above; surface smooth, green, not dotted; F. stalk $1\frac{1}{8}$–$1\frac{1}{2}$ in. long; F. $1\frac{1}{8}$ in. ϕ, yellow, rather reddish outside.

B. rhomboideus Schwant. = *Rhombophyllum rhomboideum* Schwant.

B. scapiger N. E. Br. (*Mes. scapiger* Haw.). Habit like the foregoing. Leaves 3–5 in. long, $\frac{2}{5}$–$\frac{5}{8}$ in. wide, dark green, with a smooth, even horny line,

one of each pair shorter and tapering gradually, the other longer and with the keeled edge drawn forward, green; F. 3–5 on $1\frac{1}{2}$ in. stalks, compressed, $1\frac{1}{2}$–2 in. ϕ, golden yellow, reddish outside; easily grown.

B. vespertinus Schwant. (*Mes. vespertinum* Bgr.). Similar to the foregoing. L. erect at first, later ± prostrate, $2\frac{1}{2}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, upper side flat, lower side semicylindrical below, keeled above, triangular tapering; surface grey-green with darker dots, rather wrinkled; F. 3–5 on $\frac{3}{4}$–$1\frac{1}{8}$ in. stalks, yellow.



FIG. 110.—Bergeranthus multiceps Schwant. $\frac{1}{6}$ nat. size.

Bijlia N. E. Br.

(Named after Mrs D. van der Bijl, Great Brak, S. Africa.)

Occurrence: Eastern Karroo (S. Africa).

Bijlia cana N. E. Br. (fig. 111) (*Bolusanthemum Tugwelliae* Schwant., *Hereroa cana* L. Bol., *H. Tugwelliae* L. Bol., *Juttadinteria Tugwelliae* Schwant., *Mes. Tugwelliae* L. Bol.). Growths tufted; L. 4–6 in rosettes, decussate, *c.* $1\frac{1}{8}$ in. long, upper side $\frac{1}{2}$–$\frac{5}{8}$ in. broad at the base, widened to $\frac{3}{4}$ in. above, then short triangular tapering, or the upper side rhomboidal and oblique tipped, lower side at first semicylindrical, keeled at the end and broadly compressed, drawn forward over the tip like a chin, or obliquely keeled and the edges of the keel drawn over a lateral edge, up to $\frac{3}{4}$ in. thick at the end; surface pale grey-green, smooth; texture firm; F. short stalked, $1\frac{1}{8}$ in. ϕ, yellow, in winter.

Growing period October to April, keep under glass at 60° F., with moderate amount of water, almost dry in the resting period; propagation by seed or by division of old plants.

Bolusanthemum Tugwelliae Schwant. = *Bijlia cana* N. E. Br.
Braunsia Schwant. = *Echinus* L. Bol.

Brownanthus ciliatus Schwant. = *Trichocyclus ciliatus* N. E. Br.
Brownanthus Marlothii Schwant. = *Trichocyclus Marlothii* N. E. Br.

Calamophyllum Schwant.

Short stemmed or almost stemless, freely branched, very succulent plant, with opposite leaves which are rounded in the lower part, upper side rather flattened above, lower side with a round keel, the whole almost cylindrical and strongly curved to one side. F. short stalked, red, in April and autumn, opening at noon. Occurrence: Cape Province.

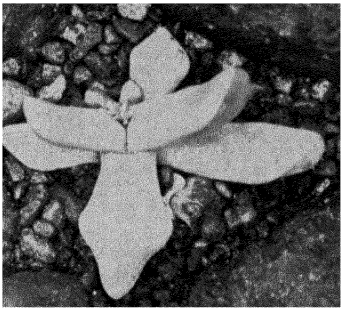


FIG. 111.—Bijlia cana N. E. Br. ½ nat. size.

Growing period February to March and on towards autumn. Likes a bright greenhouse or light window and plenty of water, in winter fairly dry at 55° F. Propagation easy from seed or cuttings. Grows freely and blooms readily, rare in cultivation.

Cal. cylindricum Schwant. (*Mes. cylindricum* Haw.). Stems hardly 2 in. long when old, close and much branched; L. cylindrical-triangular, ending in a blunt tip, with a red, spiny tip, 3–3¼ in. long, ⅓–⅖ in. thick, grey-green, not much dotted; F. solitary, stalks ¾–2 in. long, *c.* 1⅛ in. ϕ, red.

Cal. teretifolium Schwant. (*Mes. teretifolium* Haw., *Mes. cylindricum v. teretifolium* Haw.). Stems when old up to 8 in. long, branched, with prostrate, smooth-skinned branches; L. about 4 in. long, the older ones cylindrical, the younger flat on the upper side, lower side semicylindrical, with roundish keel at the end, edges much rounded, ending in a blunt tip, green, dotted; F. on 2-in. long stalks, *c.* 1⅛ in. ϕ, dark red, white at the base.

Cal. teretiusculum Schwant. (*Mes. teretiusculum* Haw.). Stemless; L. 2 in. long, ⅓–⅖ in. thick, upper side flat, lower side semicylindrical, with roundish keel towards the tip, blunt, edges rather roundish.

Carpanthea N. E. Br.

☉. Cultivation as for *Cryophytum*. Occurrence: Cape Province.

Carpanthea pomeridiana N. E. Br. (*Mes. pomeridianum* L.). Erect, branched, 12 in. high; stem, flower stalk and calyx covered with matted, white hairs; L. united at the base, spatulate or spatulate-lanceolate, narrowed into a broad, furrowed stalk, 1½–2½ in. long, ½–1 in. wide, finely ciliate at the edge; F. 1–3, terminal, on 1⅛–4-in. long stalks, 1½–3 in. ϕ, golden yellow, opening in the afternoon, in July and August.

Carpobrotus N. E. Br.

Shrublets with long, 2-sided, prostrate branches, strong growing. Leaves large, united at the base, curved sabre-shaped, triangular, close, with smooth or toothed edges; F. very large, solitary, on 2–2½-in. long stalks, red or yellow, April to November. Occurrence: Cape Province, Australia, Chile, California.

Very strong growing. Rooted cuttings planted out in spring cover in a short time considerable areas and are very noticeable on account of their very large flowers. They need rich soil. Propagation best from cuttings, but possible from seed.



FIG. 112.—Carpobrotus edulis N. E. Br. ⅛ nat. size.

Carp. acinaciformis Schwant. (*Mes. acinaciforme* L., *Mes. laevigatum* Haw., *Mes. rubrocinctum* Eckl. et Zeyh., *Mes. subalatum* Haw.), Cape Province. Branches, up to 4 ft. long, with short side branches, young branches compressed; L. 3¾ in. long, ⅜ in. wide, ⅝–¾ in. thick, upper side swollen like a bladder at the base, spreading, sabre-shaped, compressed, with very broad keel, edges horny, edge entire or slightly wavy, pale grey-green; F. 4¾ in. ϕ, bright carmine purple, opening at noon, July to November. This species has the largest flowers of any Mesembrianthemum.

Carp. aequilateralis Schwant. (*Mes. aequilaterale* Haw., *Mes. glaucescens* Haw., *Mes. Rossii* Haw., *Mes. virescens* Haw., *Mes. abbreviatum* Haw., *Mes. nigrescens* Haw.), W. and S. Australia. Similar to *Carp. edulis* Schwant., on the whole rather smaller, L. not very long or broad; F. smaller, red; wide spread species.

Carp. edulis N. E. Br. (fig. 112) (*Mes. edule* L.), Cape Province. Branches angular, up to 3 ft. long; L. uniformly angled, 3¼–4¾ in. long, up to ⅝ in. thick, spreading, and rather incurved, keel finely serrate, otherwise smooth, grass green; F. 3¼–4 in. ϕ, pale yellow, yellowish-pink, or purple, opening at noon. Free growing; widely distributed species.

Carruanthus Schwant.

Nearly allied to *Bergeranthus*, cultivation as for that genus. Occurrence: Little Namaqualand (S. Africa).

Car. albidus Schwant. = *Machairophyllum albidum* Schwant.

Car. caninus Schwant. (fig. 113) (*Bergeranthus caninus* Schwant., *Mes. caninum* Haw.). Short-stemmed, branched, very succulent plant with fleshy

roots, forming tufts; L. crowded, decussate, erect-spreading, 2–2½ in. long, *c.* ⅝ in. wide, narrower at the base, oblanceolate-clavate, triangular, edge of keel broad and drawn forward over the upper side, the edges somewhat toothed towards the tip; surface smooth, grey-green; F. usually solitary, on a 4-in. long, round stalk, 1½–2 in. ϕ, yellow, outside reddish.

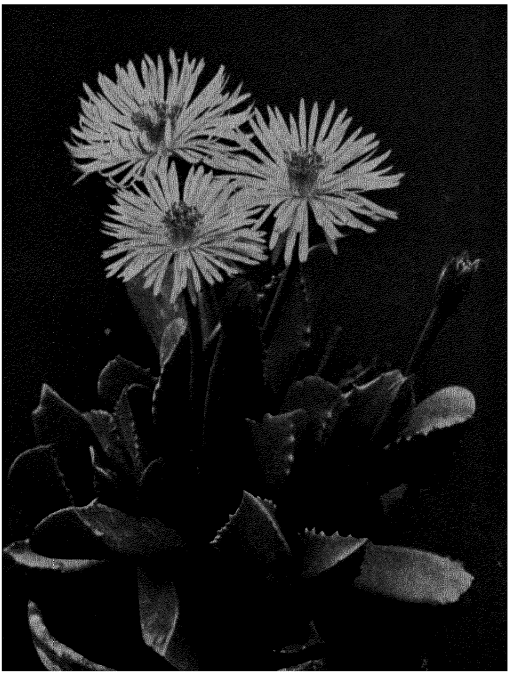


FIG. 113.—Carruanthus caninus Schwant. (From V.F.B.)

Cephalophyllum N. E. Br.

Low, succulent plants with branched, prostrate stems, swollen and knotted, or stemless with wide spread branches like runners. L. more or less crowded, elongated, triangular, or cylindrical-triangular, curved inwards or outwards. F. stalked, about 1½ in. ϕ, yellow or whitish-red, opening at noon, June to July, often later. Occurrence: Cape Province.

Growing period in summer, likes a sunny, airy position, in winter not above 55° F., and fairly dry. Grows very easily. Propagation from seed or cuttings.

Ceph. decipiens N. E. Br. (*C. laeve* Schwant., *Mes. decipiens* Haw.). Stem 12–16 in. long, with rigid branches, at first greenish or reddish, later grey skinned; L. compressed, curved upwards, 2 in. and more long, ¼–⅓ in. wide at the base, thick below, with a short sheath, united, semicylindrical, above narrowed and bluntly triangular, tapering, with short spiny tip: fresh green, reddish at the sheath, with fine, rough dots; F. solitary, terminal, on 1⅛–1½-in. long stalks, yellow.

Ceph. dissimile N. E. Br. (fig. 114) (*C. validum* Schwant., *Mes. validum* S.-D. (Haw. ?)). Stems and branches curved, up to 2 ft. long; L. close set, united at the base, semicylindrical, roundish triangular above, blunt, with a short tip, smooth, 2–3¼ in. long, ¼–⅓ in. wide at the base, smooth, shining green, rather reddish, finely dotted; F. on 2–3¼ in. stalks, yellow. Best known species.

Ceph. diversifolium Schwant. = *C. diversiphyllum* N. E. Br.

Ceph. diversiphyllum N. E. Br. (*C. diversifolium* Schwant., *C. loreum*

L. Bol., *Mes. diversiphyllum* Haw.). Stemless, with large rosettes of decussate leaves, from the axils arise side shoots like runners, which usually end in a rosette; L. of various lengths, the lowest usually the longest, $3\frac{1}{4}$–4 in. long, united at the base with a short sheath, spreading, upper side flat, back semi-cylindrical, narrowed upwards, triangular compressed, tapering; green or grey-green, with fine, rough dots; F. on short side branches, on 2–$3\frac{1}{4}$-in. long stalks, usually solitary, bright yellow, reddish below.



FIG. 114.—Cephalophyllum dissimile N. E. Br. $\frac{1}{2}$ nat. size.

Ceph. laeve Schwant. = *Ceph. decipiens* N. E. Br.

Ceph. loreum L. Bol. = *Ceph. diversiphyllum* N. E. Br.

Ceph. tricolorum N. E. Br. (*Mes. tricolorum* Haw., *Mes. stramineum* Willd.). Stem prostrate; branches twisted, reddish, later becoming grey, the internodes slightly swollen; L. close, pointing upwards, 2–$3\frac{1}{4}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. thick, united at the base with a narrow sheath, cylindrical, narrowed above, gradually tapering, pale grey or light grey-green, often reddish, with fine dots; F. solitary, short stalked, $1\frac{1}{2}$–2 in. ϕ, petals yellow, purple at the base, reddish on the back of the tips, filaments red, anthers brownish. Very beautiful species!

Ceph. validum Schwant. = *Ceph. dissimile* N. E. Br.

Chasmatophyllum Dtr. et Schwant.

Short, bushily branched plant with short, tufted branches, erect at first, later prostrate. L. decussate, without visible internodes or the internodes $1\frac{1}{8}$ in. long, grey skinned. L. united into a sheath, spreading, spatulate, semicircular in cross-section, or bluntly keeled, on the edges and on the back of the tip often with one or two blunt teeth or these wanting. Swollen like a bladder at the base; lower side with whitish tubercles, as well as on the upper side. F. solitary, terminal, short stalked, yellow, August and September. Occurrence: Cape Province.

Easily grown plants, taking little space. Growing period in a bright position under glass, moderately damp. In winter keep dry and light, not below 55° F.; propagation easy from seed or from cuttings. Suitable for growing in quantity.

Chas. musculinum Dtr. et Schwant. (fig. 115) (*Mes. Dinterae* Dtr., *Mes. musculinum* Haw., *Mes. recumbens* N. E. Br., *Stomatium musculinum*

Schwant.). Low, much branched plants with prostrate branches, forming close tufts; L. spreading, slightly curved inwards, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, equilaterally triangular to semicylindrical, with blunt keel, upper side slightly convex, with short, blunt tip, keel and edges with 1–2 small teeth or these wanting; surface grey-green, with transparent, raised grey dots; F. *c.* $\frac{5}{8}$ in. ϕ, yellow, the petals reddened at the back of the tips.

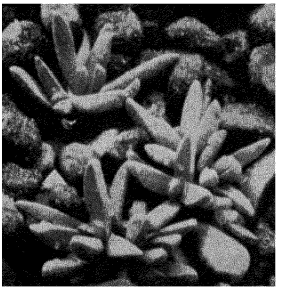


FIG. 115. Chasmatophyllum musculinum Dtr. et Schw. $\frac{1}{2}$ nat. size.

Chas. Nelii Schwant. (named after Dr G. C. Nel, Stellenbosch, S. Africa). Stem at first ascending, later prostrate; internodes $1\frac{1}{8}$ in. long, grey skinned; L. spreading, spatulate, triangular at the end, $\frac{2}{5}$–$\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, $\frac{1}{12}$–$\frac{1}{8}$ in. thick, upper side flat, or slightly convex, lower side semicylindrical, shortly keeled towards the top, tip blunt, not toothed; grey-green, lower side closely covered with whitish tubercles, as well as the upper part of the upper surface. In its native habitat the leaves are ovate, $\frac{1}{6}$ in. long, $\frac{1}{8}$ in. wide, $\frac{1}{12}$ in. thick, the internodes hardly visible; F. $\frac{1}{2}$ in. ϕ, golden yellow.

Cheiridopsis N. E. Br.

Perennial, very succulent plant of tufted growth. Growths with 1–3 pairs of opposite leaves. The leaf pairs succeeding each other are different in form, size and growth, so that one pair is shortly united, the next pair united for $\frac{1}{4}$ or almost all their length; the last pair of leaves dries to a sort of sheath during the resting period, which envelops the firm pair of leaves, lying adpressed to each other; L. green to bluish-green or whitish, often dotted or without markings; F. solitary, terminal, usually stalked, yellow, in summer or winter. Occurrence: Great and Little Namaqualand, Karroo deserts.

Almost all the Cheiridopsis grow chiefly from late summer to winter, when they need a light position and moderate amount of water. During this time the growths usually produce 1–2 pairs of new leaves. During winter water should gradually be withheld till finally the plants are kept completely dry, at 55–60° F. Propagation from seed, cuttings do not grow readily. Even young plants must be kept very dry in winter. *Cheiridopsis* are very apt to become infected with root bug, and hence should be carefully watched.

Ch. aspera L. Bol. (fig. 118). Short stemmed, little branched; growths with several, usually 2–3 pairs of leaves; L. united in the lower quarter into a round sheath, $2\frac{1}{2}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. broad and thick, terminating in a bluntish end tipped with a spine; upper side convex, lower side semicylindrical, keeled only in the upper part; surface pale green-grey, roughened by numerous horny, whitish dots.

Ch. bibracteata N. E. Br. (*Mes. bibracteatum* Haw., *Mes. rostratum* S.D. *v. bibracteatum*). Nearly or quite stemless, branched at the base; L. $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, united at the base into a cylindrical body or to a sheath $\frac{1}{2}$–1 in. long, the free part flat on the upper side, narrowed towards the tip, rounded on the back at first, keeled towards the end, the edge of the keel running parallel with the upper surface, one leaf of the pair ± acute, the other rounder; blue-green, with translucent dots, edges finely hairy towards the tip; F. on 4–5-in. long stalks, $1\frac{1}{2}$ in. ϕ, yellow; flower stem with two leaf-like, sheathing bracts, $\frac{3}{4}$–1 in. long, below the middle.

Ch. bifida N. E. Br. (fig. 116) (*Mes. bifidum* Haw., *Mes. multipunctatum* S.D.). Tufted growth; L. 4–6, with soft flesh, 2–$2\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{2}{5}$ in. broad, $\frac{1}{5}$–$\frac{1}{3}$ in. thick, united at the base into a long, thick sheath, spreading, upper side flat, lower side semicircular, keeled above, blunt-tipped, the edge of the keel finely roughened; one leaf is as a rule shorter and wider, the other longer and more acute; upper surface dull grey-green, with numerous, transparent, somewhat raised dots; F. on $3\frac{1}{4}$–4-in. long stalks, *c.* $1\frac{1}{2}$ in. ϕ, yellow.

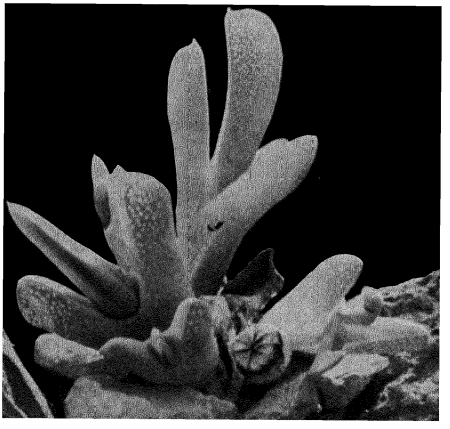


FIG. 116.—Cheiridopsis bifida N. E. Br. $\frac{3}{4}$ nat. size.

Ch. Braunsii Schwant. = *Argyroderma Braunsii* Schwant.

Ch. breve Schwant. = *Ch. mirabilis* Schwant.

Ch. candidissima N. E. Br. (fig. 117). Tufted; growths with 1–2 pairs of leaves; L. long boat-shaped, almost erect, united from the base for about two-fifths of their length, $3\frac{1}{4}$–4 in. long, about $\frac{1}{2}$ in. broad, up to $\frac{5}{8}$ in. thick; upper side, the lower third semicircular on the back, then with a round keel; the tip with a reddish spine; surface smooth, whitish-grey with dark green dots symmetrically arranged.

Ch. Caroli-Schmidtii N. E. Br. (*Mes. Caroli-Schmidtii* Dtr. et Bgr.) (named after Carl Schmidt, Erfurt). Tufted; growths with several pairs of leaves; L. united from the base for a third of their length, closely adpressed and resembling solid bodies, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, $\frac{1}{2}$–$\frac{5}{8}$ in. thick; upper side flat, under side semicylindrical, with a roundish keel above the roundish tip; the leaves are usually of different lengths, smooth, pale grey, with transparent dots, horny on the keel; F. short stalk, golden yellow.

Ch. cigarettifera N. E. Br. (*Mes. cigarettiferum* Bgr., *Mes. vescum* N. E. Br.). Similar to *Ch. Marlothii*. L. $\frac{5}{8}$–$\frac{3}{4}$ in. long, *c.* $\frac{1}{8}$ in. wide, redder outside, during the resting period the young leaves are hidden in the dry sheaths of the old leaves, thereby resembling the mouthpiece of a cigarette.

Ch. Comptonii L. Bol. (fig. 117) (named after Professor R. H. Compton, Director of the Botanic Gardens, Kirstenbosch, S. Africa). Tufted; growths with 2–3 pairs of leaves; L. adpressed when young, shortly united, *c.* $\frac{3}{4}$ in. long, $\frac{1}{4}$ in. wide at the base, narrowed above, and ending in a spiny tip; upper side flat, at first semicircular on the back, sharply keeled in the upper half; surface grey-green, smooth, ± transparent dots.

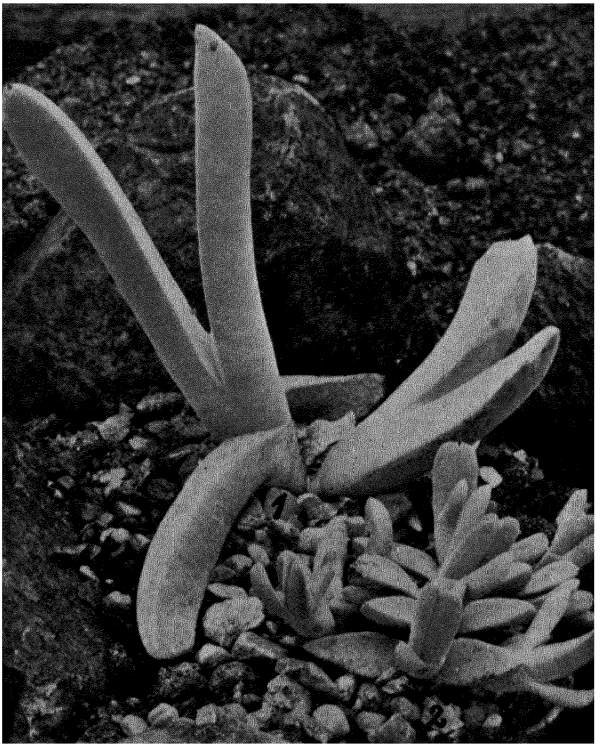


FIG. 117.—1. Cheiridopsis candidissima N. E. Br. 2. Ch. Comptonii L. Bol. ½ nat. size.

Ch. gibbosa Schick et Tisch. (fig. 118). Short stemmed, forming clumps by means of side shoots; growths consisting of 1–2 pairs of leaves; L. united for $\frac{1}{2}$–$\frac{2}{3}$ of their length, and thereby forming fairly compact bodies, with a fissure at the top, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, greatest breadth 1–$1\frac{1}{8}$ in., $\frac{5}{8}$–$\frac{3}{4}$ in. thick; upper side flat, lower side with roundish keel and ± drawn forward over the upper side like a chin, the tip ending in a small tooth; bluish grey-green, with darker, greener dots, ± coalescing into a line at the edges.

Ch. Graessneri Schick et Tisch. = *Ch. insignis* Schwant.

Ch. insignis Schwant. (*Ch. Graessneri* Schick et Tisch.). Short, thick stemmed, with 1–2 pairs of leaves; L. $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide and thick, united for a third of their length, closely adpressed; upper side flat, lower side round, indistinctly keeled; a small tip above; with fine velvety hairs, whitish bluish-green with numerous darker dots.

Ch. lecta N. E. Br. (fig. 118) (*Mes. lectum* N. E. Br.). Short stemmed, little branched; growths usually with 2 pairs of leaves; L. from the base halfway up united to form a laterally compressed, round sheath; L. spreading, one curved slightly inwards, the other outwards; from base to tip $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, united portion $\frac{5}{8}$ in. thick, free portions $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$ in. broad, $\frac{1}{6}$–$\frac{1}{5}$ in. thick; upper side flat, or slightly convex, lower sides semicylindrical, roundly keeled below, drawn forward like a chin, leaves ending in a fine tip; green

flushed with grey and covered with numerous, transparent dots, which coalesce into a line along keel and edges.

Ch. Marlothii N. E. Br. (fig. 119) (named after Dr Marloth, Cape Town). Forming round clumps; growths with 1–2 pairs of leaves; L. $1\frac{1}{4}$–$2\frac{1}{2}$ in. long,

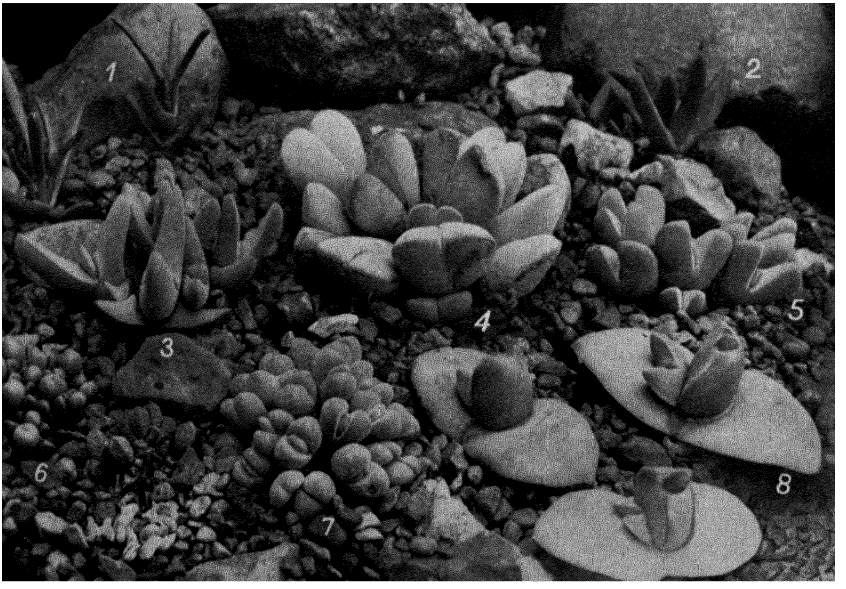


FIG. 118.—1. Cheiridopsis aspera L. Bol. 2. Ch. lecta N. E. Br. 3. Ch. Schickiana Tisch. 4. Ch. Pillansii L. Bol. 5. Ch. gibbosa Schick et Tisch. 6. Ch. Meyeri N. E. Br. 7. Ch. verrucosa L. Bol. 8. Ch. peculiaris N. E. Br. $\frac{1}{2}$ nat. size.

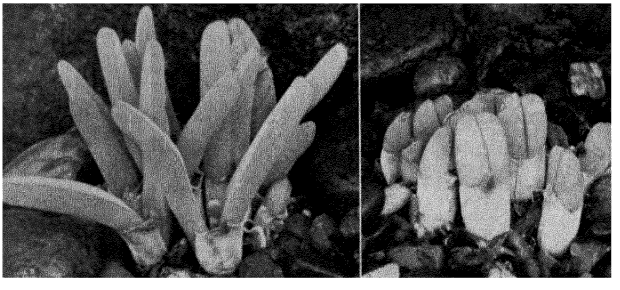


FIG. 119.—Cheiridopsis Marlothii N. E. Br. Right, during the resting period. $\frac{3}{4}$ nat. size.

one pair of leaves united for a third of their length, the other not so far united, spreading, curved outwards, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, upper side flat, tapering gradually, lower side at first semicylindrical, then sharply keeled and convex like a chin, with a fine spine at the tip; grey-green, with a waxy coating,

the upper surface towards the top ± reddish and roughened with numerous, almost transparent dots, especially on the edges, where the dots coalesce to form a line; the leaves which are united for a third of their length dry up during the resting period to a horn-shaped sheath, which envelops the young leaves F. lemon yellow, $\frac{1}{2}$ in. ϕ, often in November and December.

Ch. Meyeri N. E. Br. (fig. 118) (named after the Missionary, G. Meyer, Steinkoff, S. Africa). Very short-stemmed, branched little plant, growths usually with 2 pairs of leaves, one united to a small, obovate body, $\frac{5}{8}$ in. long, $\frac{3}{8}$ in wide, *c* $\frac{1}{4}$ in. thick, the fissure shallow, $\frac{1}{12}$ in. long, smooth, pale grey-green, with numerous darker dots; the bodies dry up in the resting period to papery skins, which envelop the young leaves, the succeeding leaves are not united much, spreading, $\frac{1}{2}$–$\frac{5}{8}$ in long, $\frac{1}{5}$–$\frac{1}{4}$ in wide, $\frac{1}{4}$–$\frac{1}{3}$ in. thick; upper side slightly convex, lower side semicircular, with a roundish keel above. Should be kept completely dry in the resting period.

Ch. mirabilis Schwant. (*Ch breve* Schwant.). Forming clumps by side shoots, low; $\frac{3}{8}$–$\frac{3}{4}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, about three-fourths of their length united, forming an almost spherical body, pale bluish-green with small, scattered, darker dots

Ch. olivacea Schwant =*Ch. Schickiana* Tisch.

Ch. peculiaris N. E. Br (fig. 118). Very short stemmed, usually with one growth, rarely branched; growths with 1–2 pairs of leaves; L. united at the base, almost prostrate, $1\frac{1}{2}$–2 in. long and broad, *c* $\frac{1}{3}$ in. thick, tapering abruptly; upper surface flat or slightly convex, lower side slightly round, a little keeled above, smooth, grey-green, with scattered dark dots. For the resting period the growths develop a pair of leaves which are completely united so that the succeeding pair of leaves, pressed close together, can only be seen through the fissure. The united pair dry up to a firm, papery skin and thus protect the young leaves. F. on $1\frac{1}{2}$-in long stalks, $1\frac{3}{8}$ in. ϕ, yellow. Beautiful species, grows easily from seed, needs complete rest.

Ch. Pillansii L. Bol. (fig. 118) (named after Dr N. S. Pillans, Pretoria). Very short-stemmed species, by branching forming strong clumps, often of 6–8 in. ϕ, growths with 1–2 pairs of leaves, united for a third of their length; L. at first closely adpressed, later a little separated, thus forming compact bodies $1\frac{3}{4}$ in long and wide and 1 in. thick; upper side of leaf flat, semicylindrical, above with a roundish keel, somewhat drawn forward over the upper surface, whitish-grey with numerous darker dots. Desirable species. Best propagated from seed. Likes a very light position.

Ch. Roodiae N. E. Br. (fig. 120) (named after Miss E. Rood, S. Africa). Short stemmed, little branched; growths on 2-in. long, thick branches, with 4–5 pairs of leaves; L. spreading, shortly united, *c.* $\frac{1}{4}$ in. long, almost $\frac{3}{4}$ in. wide at the base, linear, then gradually tapering, with a minute, hard tip; upper side slightly hollow, back sharply keeled; surface very smooth, uniformly grey-green, without dots; cuticle very firm; margins and in part the keel too with whitish edges.

Ch. rostrata N. E. Br. (fig. 121) (*Mes. rostratum* L., *Mes. quadrifidum*

Haw.). Almost or quitestemless; forming clumps when old; L. 2–4, 2–3$\frac{1}{4}$ in. long, $\frac{1}{2}$ $\frac{2}{3}$ in. broad, $\frac{1}{3}$–$\frac{2}{5}$ in. wide at the base, united below into a cylindrical

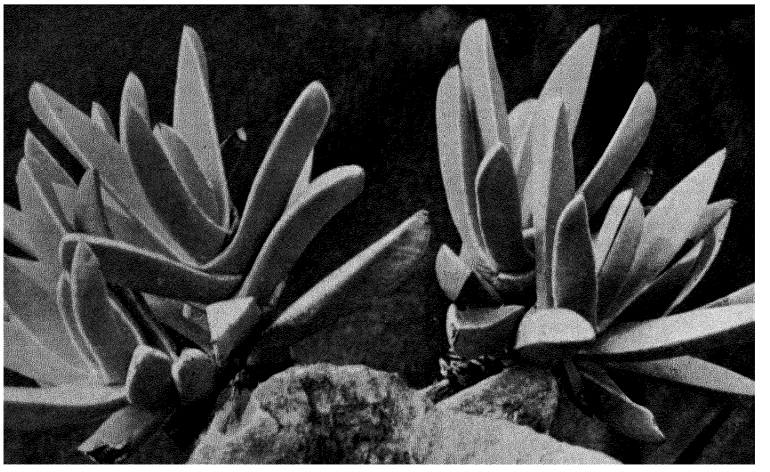


FIG. 120.—Cheiridopsis Roodiae N. E. Br. $\frac{2}{3}$ nat. size.

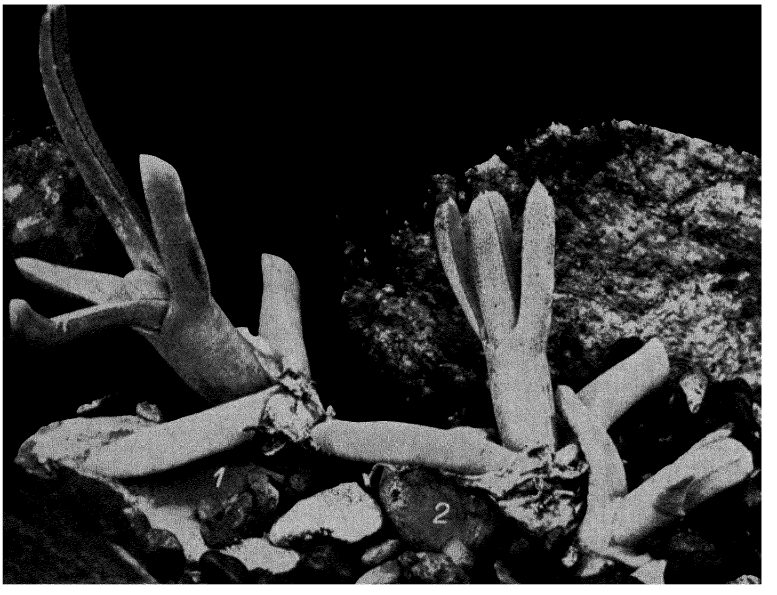


FIG. 121.—1. Cheiridopsis tuberculata N. E. Br. 2. Ch. rostrata N. E. Br. $\frac{2}{3}$ nat. size.

body or a sheath $\frac{2}{5}$–$\frac{1}{2}$ in. long and $\frac{5}{8}$–$\frac{3}{4}$ in. wide, the free part ± spreading often curved sideways, upper side flat, narrowed towards the tip, back rounded

keeled in the upper part, blunt above with a fine tip; grey-green, with transparent dots near the tip, keel and edges rough and rather horny. F. on 3¼–4-in. long stalks, large, in autumn.

Ch. Schickiana Tisch. (fig. 118) (*Ch. olivacea* Schwant.) (named after K. Schick, Freiburg i. Br.). Stemless, forming clumps; growths consisting of 1–2 pairs of leaves, 2 L. united half-way up, forming a 2-lobed body, L. 1½–2½ in. long, ¾–1 in wide, ⅝–⅔ in thick, upper side flat or slightly convex, lower side round and keeled somewhat; with a small tooth at the tip of the leaf, upper part of the L. with fine velvety hairs, lower part smooth; bluish grey-green; with faint, translucent dots above

Ch. tuberculata N. E. Br. (fig. 121) (*Mes. rostratum* S.D., *Mes. tuberculatum* Mill.). Stemless; L. 2½–5 in long, ⅓–⅖ in. wide, ⅕–¼ in. thick, united at the base to a cylindrical body or a sheath ⅝–1⅛ in. long and ⅖–⅝ in. thick, the free portions of the leaves with a bladder-like outgrowth at the base, narrowed above, round on the back, upper side round, and keeled above, tip blunt with a fine spine, bluish grey-green, often reddish, the whole leaf with transparent dots, which coalesce along the edges, the edge of the keel with fine horny tubercles; F. on 3–4-in. long stalks, 1½ in. ϕ, yellow.

Ch. verrucosa L. Bol. (fig 118). Forming tufts; growths with several pairs of leaves, L. united for ½–⅓ of their length, closely adpressed, forming conical bodies ⅝ in. long and wide and ⅖–⅝ in. thick; surface rather convex, lower side semicylindrical, round keel hardly distinct, grey-green, lower side with numerous dark dots, closer along the edges; F. on ¾-in. long stalks, ¾–1 in. ϕ, yellow. Grows easily from seed or cuttings.

Cleretum pinnatifidum N. E. Br. = *Aethephyllum pinnatifidum* N. E. Br

Conicosia N. E. Br. (fig. 122)

Succulent plants with erect stems, up to 12 in. long when old, with a close, tufted rosette of long, linear, subulate, 3-angled leaves, arranged in a close spiral, which usually persist on the stem after they are dead; or stemless with a swollen root stock, whose shoots die in the resting period. F. from the side of the rosette on branches which die after the fruit has ripened. F. long stalked, 3–3¼ in. ϕ, yellow, evil smelling, in July and August. If the flowers arise terminally from the rosette, the plant dies after the fruit is ripe. Occurrence: Cape Province.

Growing period in late summer to the beginning of winter. The Conophytums are rare but not difficult to grow, propagate by seed. Need a light position, in winter not over 55° F. They need very sandy soil.

C. brevicaulis Schwant. (*Mes. brevicaule* Haw.). Stem simple, when old 4–6 in. high with terminal rosettes; L. triangular, 4–4¾ in. long, ⅖–½ in. broad, tapering gradually, with soft flesh; upper side slightly grooved; L. green;

inflorescence lateral, 4–5$\frac{1}{8}$ in. long, with loose, alternate leaves; F. solitary, 2 in. ϕ, sulphur yellow, shining.

C. capitata Schwant. (*Mes. capitatum* Haw.). Stem simple, rarely branched, 6–12 in. high; L. like the foregoing species, but 5$\frac{1}{8}$–6$\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, grey, reddish at the base, not much grooved; inflorescence with 1–2, 4–5$\frac{1}{8}$-in. long, stalked F., 2 in. ϕ, shining golden yellow, lasting.

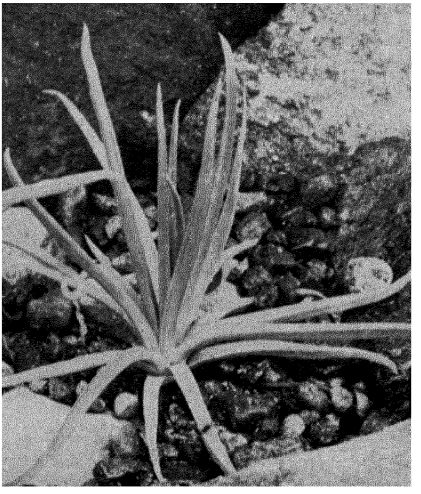


FIG. 122.—Conicosia spec. $\frac{1}{3}$ nat. size.

C. elongata Schwant. (*Mes. elongatum* Haw., *Mes. pugioniforme* DC.). Root stock persisting, turnip-shaped, shoots dying after flowering or fruiting; growths 12 in. or more long, prostrate, little branched; L. loosely arranged, alternate, spreading, curved, half-clasping the stem, 4–6 in. long, $\frac{1}{4}$ in. wide, tapering, upper side slightly grooved, lower side semicylindrical, soft, fresh green or grey-green; F. terminal or lateral, on 6-in. long stalks, 3$\frac{1}{4}$ in. ϕ, shining sulphur yellow. This species should be kept completely dry during the resting period.

C. pugioniformis Schwant. (*Mes. pugioniforme* L.). Stem simple, erect, rarely sparsely branched, 6–12 in. high, $\frac{3}{8}$–$\frac{3}{4}$ in. thick; L. erect spreading, 6–8 in. long, in the middle *c.* $\frac{1}{2}$ in. broad, acute, triangular, upper side deeply grooved, soft, grey-green, reddish at the base; F. on 4–5$\frac{1}{2}$-in. long stalks, 1–3 on lateral branches, 3 in. ϕ, shining sulphur yellow.

Conophyllum Schwant.

Allied to the genus *Mitrophyllum*. Dwarf shrubs of erect or decumbent growth. Stems thick, soft, internodes thickened like a ring, leaves various, long, only slightly joined, ± semicylindrical leaves alternate with conical bodies. The latter envelop the other pair of leaves during the resting period and so form complete protection for their transpiration. The two different pairs of leaves form as a rule a year's growth. F. short stalked, rare, whitish. Occurrence: Little Namaqualand (S. Africa).

The plants have only a short growing period, either in summer or late autumn, which may not last more than a month. The Conophytums need a very sunny place under glass, and should be kept fairly moist in the growing period, but very dry when at rest. Interesting, rare genus. Propagation from seed, cuttings are difficult to root.

C. clivorum Schwant. (fig. 123) (*Mes. clivorum* N. E. Br., *Mitrophyllum clivorum* Schwant.). 10–12 in. high; stems $\frac{1}{4}$–$\frac{5}{8}$ in. thick, branches $\frac{1}{4}$ $\frac{3}{8}$ in. thick, the nodes thickened in rings; internodes $\frac{3}{8}$–$1\frac{1}{8}$ in. long, red-brown at first, becoming pale grey with age; L. 1st form, united to form a cylindrical body $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{4}$–$\frac{5}{8}$ in. thick, resembling the internodes of the stem, end of the leaves free, wide spread or curved, 1–2 in. long, $1\frac{3}{8}$–$2\frac{1}{2}$ in. wide and as thick at the base, upper side slightly convex, lower side roundly keeled, pale green; L. 2nd form, only united round the base of the stem, curved, spreading,



FIG. 123.—1. Conophyllum cognatum Schwant. 2. C. clivorum Schwant. $\frac{1}{2}$ nat. size.

$\frac{3}{4}$–2 in. long, $\frac{1}{4}$–$\frac{2}{5}$ in. wide, $\frac{1}{4}$–$\frac{1}{3}$ in. thick at the base, narrower at the tip, upper side convex, lower side roundly keeled, pale green, with shining papillae.

C. cognatum Schwant. (fig. 123) (*Mes. cognatum* N. E. Br., *Mitrophyllum cognatum* Schwant.). Up to 6 in. high, stems $\frac{1}{3}$–$\frac{1}{2}$ in. thick, branches $\frac{1}{4}$ in. thick, nodes usually thickened, internodes $\frac{1}{5}$–1 in. long, sticky, pale grey; L. 1st form, united to a cylindrical body, $\frac{5}{8}$–1 in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, only distinguishable from the internodes by the colouring, the ends of the leaves free and spreading, $\frac{2}{3}$–$1\frac{1}{4}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. wide, $\frac{1}{8}$–$\frac{1}{5}$ in. thick, linear-triangular, upper side convex, lower side roundly keeled, pale green; L. 2nd form, united at the base to a short sheath $\frac{1}{5}$–$\frac{1}{3}$ in. long, then wide spread and recurved, $\frac{5}{8}$–$1\frac{3}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, $\frac{1}{8}$–$\frac{1}{6}$ in. thick at the base, gradually narrowing to the tip, upper side slightly convex or flat, lower side roundly keeled, pale green with shining papillae, these like teeth along the edges and drying up later.

C. dissitum Schwant. (*Mes. dissitum* N. E. Br., *Mitrophyllum dissitum* Schwant.). Up to 12 in. high; old stems $\frac{1}{8}$–$\frac{1}{5}$ in. thick, branches $\frac{1}{8}$ in. thick, nodes thickened, internodes 1–3 in. long, sticky, at first reddish-blue, later grey; L. 1st form, united to a fleshy, conical body, 1–$1\frac{3}{4}$ in. long, at the base

$\frac{1}{4}$–$\frac{2}{5}$ in. thick, above only $\frac{1}{6}$–$\frac{1}{4}$ in. thick, the free parts erect or slightly spreading, triangular, $\frac{3}{8}$–1 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, $\frac{1}{8}$–$\frac{1}{5}$ in. thick at the base, terminating in a distinct tip, upper side flat, lower side roundly keeled, pale green; L. 2nd form, united at the base, $\frac{3}{4}$–1$\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, narrowed above, upper side flat or slightly convex, lower side roundly keeled, pale green, when young shining papillose.

C. Herrei L. Bol. (named after H. Herre, Stellenbosch, S. Africa). Up to 30 in. high, much-branched shrub; internodes $\frac{3}{8}$ in. long, $\frac{1}{5}$ in thick; L. 1st form, 1 in. long, united half-way, the free part spreading, L. 2nd form, about 1$\frac{1}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, oblong, semicylindrical; F. *c.* 4–4$\frac{3}{4}$ in. ϕ, yellow.

C. Marlothianum Schwant. (*Mitrophyllum Marlothianum* Schwant.) (named after Dr R. Marloth, Cape Town) Up to 8 in. high; stems thick, soft; internodes $\frac{1}{5}$–2 in. long, red-brown; L. 1st form, united to a fleshy, conical body 1–2 in. long; L. 2nd form, united at the base for $\frac{1}{8}$–$\frac{1}{5}$ in , up to 2$\frac{1}{2}$ in. long, $\frac{1}{2}$ in. wide, upper side flat or slightly convex, lower side semi-cylindrical, pale green, with shining papillae when young.

C. moniliforme Schwant. = *Monilaria moniliformis* Schwant.

C. pisiforme Schwant. = *Monilaria pisiformis* Schwant.

C. proximum Schwant. (*Mes. proximum* N. E. Br., *Mitrophyllum proximum* Schwant.). 8–10 in. high; old stems *c.* $\frac{1}{4}$ in. thick, branches $\frac{1}{6}$–$\frac{1}{5}$ in. thick, the internodes thickened, $\frac{1}{4}$–1 in. long, sticky, dark violet-grey; L. 1st form, united for most of their length into fleshy, conical bodies, often sessile on a short, distinct internode, 1$\frac{1}{8}$–3$\frac{1}{8}$ in. long, $\frac{2}{5}$–$\frac{2}{3}$ in. thick below, $\frac{1}{4}$–$\frac{1}{3}$ in thick above, leaf tips free, erect or somewhat spreading, $\frac{1}{3}$–1 in. long, $\frac{1}{8}$–$\frac{1}{4}$ in. wide, $\frac{1}{12}$–$\frac{1}{6}$ in. thick at the base, ending in a ± distinct tip, upper side convex at first, flatter towards the end, bluntly keeled on the under side, pale green; L. 2nd form, united round the stem, wide spreading, $\frac{5}{8}$–3$\frac{1}{4}$ in. long, $\frac{1}{3}$–$\frac{5}{8}$ in. wide, $\frac{1}{4}$–$\frac{1}{3}$ in. thick at the base, narrowed towards the tip, upper side convex, flat or slightly concave, on the back roundly keeled, pale green when young, with shining papillae, with papillose teeth along the edges which fall later

Conophytum N. E. Br.

Dwarf, perennial, very succulent plants of tufted habit, usually stemless, some species forming stems when old, roots 4-6 in. long, the species which form stems with a long, vertical taproot. Growths consisting of small, fleshy bodies, which may be conical, spherical, ovate or almost cylindrical, and consist of two united leaves. The bodies are convex above, flat, compressed, with small fissure + going right across the upper surface, or incurved, or even bilobate. F. solitary from out of the fissure on a ± long stalk, $\frac{1}{3}$–1$\frac{1}{8}$ in. ϕ, white, yellow, pink or violet. August to October. Occurrence: Great and Little Namaqualand.

The new bodies of *Conophytums* are formed within the old ones.

They gradually withdraw the material from the old one till nothing remains but a dry skin, which encloses the young body and protects it during the dry period. At the beginning of the growing period the little body swells up and bursts the often very tough envelope. The growing period begins about the end of July, in a few species later. From now on the plants should be kept rather moister. The actual period of growth lasts only a few weeks according to species and size. Water must now be restricted to the least needed. In spring, about March, especially if the sun dries the plants much, more water may be given, for at this time the new bodies are being formed and the plant must store water for the next dry period. Water should be entirely withheld from May onwards, even if the bodies shrivel; in general the *Conophytums* will endure the strongest sunlight without damage, if the ventilation is good. Still, it is not wrong to give the plants light shade if the sunlight is very strong and long continued. They need a light position, under glass, at 55–60° F. in winter; the potting compost should be very sandy, and an addition of good humus such as old soil from a hot bed should not be omitted. Come easily from seed. Seedlings usually flower in the 2nd year. Cuttings grow easily and give good plants in one year. The *Conophytums* are, with the *Lithops*, the most popular Mesembrianthemums because they are extremely succulent and easy to grow. They are very suitable for raising in quantity as well as for growing in a room by amateurs.

Con. albertense N. E. Br. = *C. Purpusii* N. E. Br.

Con. albescens N. E. Br. (fig. 124). Stemless, tufted; body laterally compressed to round, indented above about $\frac{1}{8}$–$\frac{1}{5}$ in. deep, 1–1$\frac{1}{4}$ in. high, $\frac{5}{8}$–$\frac{2}{3}$ in.



FIG. 124.—Conophytum albescens N. E. Br.; C. corculum Schwant. $\frac{3}{4}$ nat. size.

wide, rather less thick; L. tips round, soon distinctly visible, $\frac{1}{6}$ in. long; pale grey-green, with very fine white hairs, indistinctly marked with large, transparent dots, tips of the lobes distinctly red; F. yellow.

Con. altile N. E. Br. (fig. 128) (*Mes. altile* N. E. Br.). Tufted; body top-shaped, $\frac{3}{4}$ in. high, 1 in. broad, $\frac{3}{4}$ in. thick, roundly truncated above, upper

surface ± convex, slightly sunk round the fissure, fissure $\frac{1}{5}$ in. long, lying in a distinct groove; surface glabrous, shining, grey-green, with scattered, large, dark dots especially on the upper surface; the dots round the fissure at the edge of the surface almost forming a line; F. $\frac{3}{4}$ in. ϕ, purple, sometimes white. Beautiful species!

Con. Angelicae Dtr. et Schwant. (*Mes. Angelicae* Dtr. et Schwant.) (named after Frau Angelica Rusch, Lichtenstein, near Windhuk). Tufted; body small, $\frac{1}{4}$–$\frac{1}{3}$ in. high, truncate at the end, covered with slightly raised, linear protuberances, which run from the $\frac{1}{12}$-in. long fissure to the edge, green,

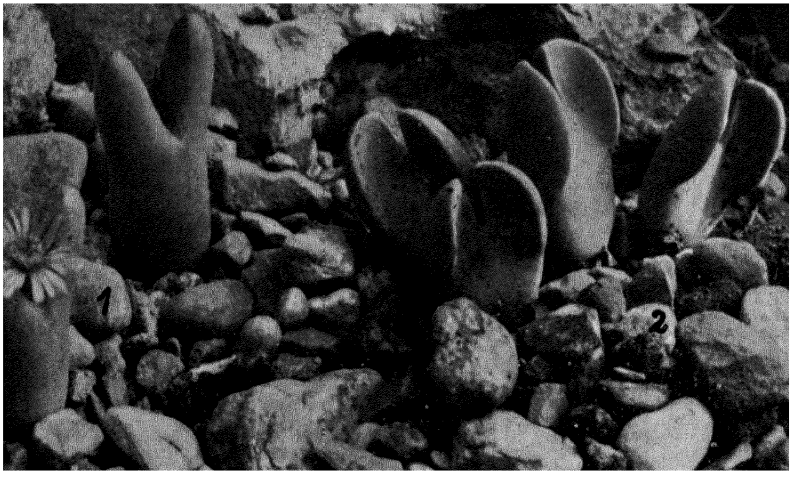


FIG. 125. 1. Conophytum Meyerae Schwant. 2. C. bilobum N. E. Br. $\frac{2}{3}$ nat. size.

without dots. During the resting period the bodies are wrapped in white, papery skins.

Con. approximatum Lavis, S.W. Africa. Shrubby species; branches prostrate, bodies often 50, on $\frac{3}{8}$–$\frac{3}{4}$-in. long branches, elliptical, $\frac{3}{4}$ in. long, faintly cordate, laterally compressed, pale bluish-green, markings not very prominent; dry skin persisting a long time, with large dark, brownish-red flecks; F. on $\frac{1}{4}$-in. long stalks, $\frac{5}{8}$ in. ϕ, canary yellow.

Con. Batesii N. E. Br. Forming small tufts; bodies small, mostly three together on one shoot, of which the central one is the largest, obconical, $\frac{1}{3}$–$\frac{2}{5}$ in. high, upper surface almost round, $\frac{1}{6}$ in. ϕ, very convex; fissure $\frac{1}{25}$ in. long; surface smooth; grey-green, lower part of plant body reddish, upper surface with a few dark dots, the dots ± coalescing into lines.

Con. bilobum N. E. Br. (fig. 125) (*Derenbergia biloba* Schwant., *Mes. bilobum* Marl.). Stemless, becoming branched and tufted when old; body somewhat flattened, cordate, only to the tip $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, rather less thick, fissure $\frac{1}{4}$–$\frac{1}{3}$ in. deep, leaf tips blunt, pale grey-green; F. very short stalked, $1\frac{1}{8}$ in. ϕ, yellow. Valuable, large species.

Con. Bolusiae Schwant. (named after Mrs L. Bolus, Cape Town). Forming tufts; body up to $\frac{3}{8}$ in. long, $\frac{1}{4}$ in. broad, obconical, sides smooth, upper surface of the body circular, flat, only slightly convex, fissure up to $\frac{1}{12}$ in. long, very hairy and surrounded by a dark line; blue-green with a few scattered dots.

Con. Braunsii Schwant. (*C. Pearsonii* N. E. Br. *v. minor* N. E. Br.) (named after Dr H. Brauns, Willowmoore, S. Africa). Forming short stems, covered with dry, pale brown leaf sheaths, body $\frac{3}{8}$ in. high and wide, upper surface circular, slightly convex, rather warty, fissure $\frac{1}{25}$–$\frac{1}{12}$ in. long, with very fine hairs, outlined with a dark line, pale bluish grey-green, young bodies with many fine, irregularly distributed dots; F. violet, $\frac{1}{2}$ in. ϕ.

Con. Brownii Tisch. (named after Dr N. E. Brown, Kew). Forming small clumps; body small, $\frac{3}{8}$–$\frac{5}{8}$ in. high, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, $\frac{1}{8}$–$\frac{1}{5}$ in. thick, upper surface almost circular, with a number of raised lines, rows of dots and markings, fissure $\frac{1}{25}$ in. long; green, markings brown, the whole surface fine granular.

Con. calculus N. E. Br. (fig. 126) (*Mes. calculus* Bgr.). Forming tufts up to 6 in. ϕ; body flat compressed-spherical, $\frac{5}{8}$–$\frac{7}{8}$ in. high, rather less broad, fissure $\frac{1}{8}$–$\frac{1}{5}$ in. long; pale grey-green, without dots or markings, the body is usually half-enclosed in the skin of the older body; F. $\frac{1}{2}$ in. ϕ, dull yellow.

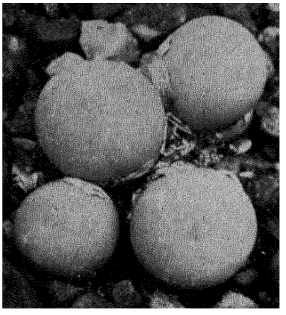


FIG. 126.—Conophytum calculus N. E. Br. $\frac{2}{3}$ nat. size.

Con. catervum N. E. Br. (*Mes. catervum* N. E. Br.). Forming spherical clumps; bodies obconic, somewhat compressed laterally, almost $\frac{3}{4}$ in. high, $\frac{2}{5}$–$\frac{1}{2}$ in. wide, $\frac{1}{3}$–$\frac{2}{5}$ in. thick, upper surface, fissure $\frac{1}{6}$–$\frac{1}{5}$ in. long, about $\frac{1}{25}$ in. deep; surface glabrous, pale grey-green, the lower part of the body much reddened, upper surface dotted, the dots mostly arranged in distinct branching lines, with scattered dots between.

Con. cauliferum N. E. Br. (fig. 127). Small shrub with short, $\frac{3}{4}$–$1\frac{1}{8}$-in. long, ascending branches; bodies $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, about 1 in. broad, the lower, almost round portion $\frac{3}{4}$ in. thick, deeply cleft; lobes $\frac{1}{3}$–$\frac{2}{5}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, inner surfaces, tips, and edges as well as the keel rounded; fissure $\frac{1}{4}$ in. long; surface smooth, dark green, with scattered, pale, translucent dots, tips of lobes with distinct red markings; F. orange yellow.

Con. concinnum Schwant. Forming a convex clump; bodies wide, obconical, $\frac{1}{3}$–$\frac{5}{8}$ in. high, $\frac{3}{8}$–$\frac{7}{8}$ in. wide, upper surface usually circular, flat, slightly convex, or slightly grooved about the fissure, fissure $\frac{1}{12}$–$\frac{1}{5}$ in. long; blue-green, upper surface generally with numerous darker dots, coalescing to a line round the fissure.

Con. corculum Schwant. (fig. 124). Forming close clumps, body cylindrical to heart-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. high, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, lobes $\frac{1}{12}$–$\frac{1}{6}$ in. long, flat on the inner side, rounded above; with hardly visible, close, stiff hairs; yellowish-green, with a few scattered dots; edges of the lobes somewhat reddish; F. yellow, *c.* $\frac{1}{3}$ in. ϕ.

Con. cordatum Schick et Tisch. Forming clumps; body heart-shaped, $\frac{3}{4}$–1 in. high, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, lobes $\frac{1}{25}$–$\frac{1}{12}$ in. high, rounded, $\frac{1}{12}$–$\frac{1}{8}$ in long; bluish-green, reddish above, without dots, only with a darker mark on each side of the fissure; F. $\frac{1}{2}$ in. ϕ, yellow.

Con. corniferum Schick et Tisch. Forming clumps; short stemmed when old; body cylindrical in the lower part, fairly thin, club-shaped above the middle, above the thickening compressed wedge-shaped and ending in 2 lobes, body $\frac{5}{8}$–$\frac{3}{4}$ in. long, at the thickest part $\frac{1}{4}$–$\frac{1}{3}$ in. broad, $\frac{1}{5}$–$\frac{1}{4}$ in thick; lobes $\frac{1}{8}$–$\frac{1}{6}$ in. high, rounded above, inner side flat; fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long, dull green, unmarked, except for 2–3 darker spots below the fissure.

Con. cornutum Schwant. (*Ophthalmophyllum cornutum* Schwant.). Growths usually solitary, bodies with very soft flesh, the lobes tapering to a cone and with a slightly transparent window; yellowish-red; F. dark red

Con. cylindratum Schwant. Forming clumps; bodies 1 in. long, $\frac{3}{8}$ in wide, circular in cross-section, hemispherical at the top, fissure $\frac{5}{8}$ in. long; surface smooth, yellowish-green.

Con. diversum N. E. Br. Similar to *Con. approximatum*. Internodes shorter, body smaller, not much compressed; F. rather smaller, yellow.

Con. Edithae N. E. Br. (named after Miss Edith E. Brown, Kew). Stemless; growths solitary, not forming clumps, $\frac{1}{2}$–$\frac{2}{3}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in thick, somewhat rounded above, divided into 2 short, slightly rounded lobes by a fissure $\frac{1}{3}$ in. long and not very deep. The inner side of the lobes pressed together rather; glabrous, bare, dull green, with ± large, dark green dots on the lobes, which run together to form a window; no markings on the rest of the plant body; F. unknown (possibly this species belongs, according to Dr Tischer, to the genus *Ophthalmophyllum*).

Con. Edwardii Schwant. (named after Edward Taylor, Southborough, England). Dwarf, branching freely, forming small clumps, bodies $\frac{1}{4}$ in. long, $\frac{1}{6}$ in. wide, circular in cross-section, tapering to convex; fissure often only $\frac{1}{50}$ in. long, hairy, bright green, without markings, except a few dark dots round the fissure.

Con. elegans N. E. Br =*Con. pellucidum* Schwant.

Con. Ernianum Loesch. et Tisch., Great Namaqualand (named after F. Erni, Aus, S.W. Africa). Forming cushions; bodies $\frac{5}{8}$–1 in. high, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, somewhat compressed above and cleft, upper surface sharply keeled; fissure $\frac{1}{12}$–$\frac{1}{5}$ in. deep, $\frac{1}{12}$–$\frac{1}{5}$ in long, inner side of the lobes glabrous, colour whitish grey-green, keel reddish, edges and keel with large, close, dark green dots, with a darker zone round the fissure, the whole covered with irregularly distributed, large, ± raised dots; F. $\frac{5}{8}$–1 in. ϕ, pinkish lilac

Con. Etaylorii Schwant (named after Edward Taylor, Southborough, England) (*Con. piluliforme* N. E. Br.). Forming clumps; bodies $\frac{2}{5}$–$\frac{1}{2}$ in. high and wide, obconical, upper surface oval to round, $\frac{1}{12}$–$\frac{1}{8}$ in. long, surrounded by dark lines, green, with fine, short hairs, with raised dots and lines running from the fissure; F. salmon coloured.

Con. ficiforme N. E. Br. (*Mes. ficiforme* Haw.). Forming clumps;

bodies top-shaped, truncate above, *c.* $\frac{5}{8}$–$\frac{3}{4}$ in. high and wide, upper surface almost round, hardly convex, a little depressed round the fissure, fissure $\frac{1}{6}$ in. long, pale grey with darker green dots a little or not at all coalescing into rows; F. 1 in. ϕ, bright pink, slightly scented.

Con. Friedrichiae Schwant. = *Ophthalmophyllum Friedrichiae* Dtr. et Schw.

Con. frutescens Schwant. (fig. 127). Small bush up to 4 in. high, with spreading branches, internodes $\frac{2}{5}$–$\frac{1}{2}$ in. long, bodies $1\frac{1}{8}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in.



FIG. 127.—Conophytum frutescens Schwant.; *C. cauliferum* N. E. Br. $\frac{1}{2}$ nat. size.

wide, almost $\frac{3}{8}$ in. thick in the lower part, with a deep cleft, each lobe *c.* $\frac{1}{3}$ in. long, inner side flat, with sharp edges, sharply keeled, dark green, with pale dots when seen through; F. orange, 1 in. ϕ.

Con. globosum N. E. Br. (fig. 128). Forming roundish clumps; bodies $\frac{3}{4}$–1 in. high and wide, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, upper surface somewhat kidney-shaped, rounded, slightly depressed near the fissure, fissure $\frac{1}{5}$ in. long, surface smooth, dull shining green, slightly flushed with grey, without markings; F. soft pink, $\frac{1}{2}$ in. ϕ.

Con. Graessneri Tisch. (named after R. Graessner, Perleberg). Similar to *Con. saxetanum*. Body $\frac{1}{4}$–$\frac{1}{3}$ in. high, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, rather less thick, upper surface oval in outline, hemispherical, fissure $\frac{1}{50}$–$\frac{1}{25}$ in. long, in a wide, hairy notch, smooth, grey-green, the notch surrounded by a few fairly large dots, which run down to the fissure; F. unknown.

Con. gratum N. E. Br. (fig. 128) (*Mes. gratum* N. E. Br.). Forming clumps with few growths, bodies top-shaped, 1 in. high and broad, rather less thick, upper surface almost circular, hardly convex; fissure $\frac{1}{5}$–$\frac{1}{4}$ in. long, $\frac{1}{25}$ in. deep; surface smooth, blue-green, closely dotted with fine grey dots, the whole appearing bluish grey-green. Upper surface also with scattered dark dots; F. $\frac{1}{2}$ in. ϕ, shining magenta; beautiful species.

Con. Halenbergense N. E. Br. (fig. 131) (*Mes. Halenbergense* Dtr. et Schwant.) (named after Halenberg, S.W. Africa). Forming clumps; bodies

$\frac{1}{3}$–1 in. long; heart-shaped at the top, $\frac{1}{4}$–$\frac{2}{3}$ in. wide, edges of the lobes rather convex; pale bluish grey-green, with numerous dark dots, transparent against the light; F. small, straw coloured, in September.

Con. Herrei Schwant. (named after H. Herre, Stellenbosch, S. Africa). Forming small clumps; bodies obconical, $\frac{1}{5}$ in. high, $\frac{1}{8}$ in. ϕ; upper surface roundish, flat or slightly convex; fissure $\frac{1}{8}$ in. long, with whitish hairs; surrounded by dark, indented surfaces; shining green, with darker dots running

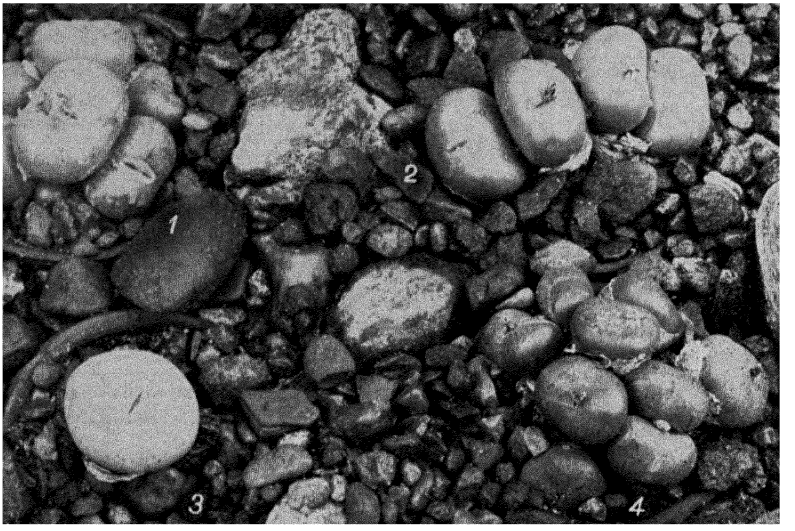


FIG. 128. – 1. Conophytum altile N. E. Br. 2. C. globosum N. E. Br. 3. C. gratum N. E. Br. 4. C. Julii Schwant. $\frac{1}{3}$ nat. size.

into lines and scattered dots, the lines as a rule running vertically and round the dark patch by the fissure.

Con. Johannis Winkleri N. E. Br. (*Mes. Johannis Winkleri* Dtr. et Schwant.) (named after Dr Hans Winkler, Hamburg). Forming clumps; bodies $\frac{1}{3}$–$\frac{5}{8}$ in. high and wide, rather less thick, truncate; upper surface slightly convex, fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long; pale blue-green, without markings.

Con. Julii Schwant. (fig. 128) (named after Dr Julius Derenberg, Hamburg). Forming spherical clumps; bodies top-shaped, $\frac{5}{8}$–$\frac{2}{3}$ in. thick, truncate above; upper surface flat or slightly convex, slightly depressed near the fissure; fissure $\frac{1}{12}$ $\frac{1}{8}$ in. long, surface smooth, dark green, upper surface with scattered red-brown dots, running into lines here and there; F. yellow, *c.* $\frac{1}{3}$ in. ϕ.

Con. leviculum N. E. Br. (*Mes. leviculum* N. E. Br., *Mes. glebula* Schwant.). Tufted; bodies $\frac{3}{8}$–$\frac{5}{8}$ in. high, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, obconical, upper surface convex, fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long; bluish-green with dark green dots, often appearing reddish and forming branched lines, the fissure surrounded by a line; F. $\frac{2}{3}$ in. ϕ, sooty yellow, scented.

Con. longum N. E. Br. Growths solitary or several; bodies compressed cylindrical or obconical, 1–1$\frac{1}{8}$ in. long, $\frac{3}{4}$ in. wide above, $\frac{5}{8}$ in. thick, truncate, fissure running right across, $\frac{3}{8}$–$\frac{5}{8}$ in. deep, gaping, the lobes distinctly roundly keeled on the back, the keel drawn forward up to the fissure; smooth, bare, sappy and fleshy; grass green, the lower part often brownish and strewn with large, oblong, transparent dots, the leaves translucent against the light; F. unknown. (Possibly this species belongs to the genus *Ophthalmophyllum*.)

Con. Luisae Schwant. (named after Frl. Luise Meyer, Steinkopf, S. Africa). Freely branched, forming loose clumps; bodies heart-shaped, *c.* $\frac{5}{8}$ in. long, $\frac{3}{8}$ in. wide, $\frac{1}{3}$ in. thick; lobes $\frac{1}{50}$–$\frac{1}{12}$ in. long, rounded, inner sides with very short hairs, fissure $\frac{1}{12}$–$\frac{1}{6}$ in. long, edges of the lobes with ± dark margins, and a dark mark each side of the fissure, and the inner surfaces of the lobes or



FIG. 129. Conophytum Meyeri N. E. Br.; C. Meyerae Schwant. ½ nat. size.

even the whole body with a few, distinct, scattered dots; F. on $\frac{1}{4}$-in. long stalks, yellow, $\frac{2}{3}$ in. ϕ.

Con. Markoetterae Schwant. (named after Frl. Markoetter, Stellenbosch). Forming small clumps consisting of 10–12 bodies; bodies 2 in. long, 1 in. broad, $\frac{1}{5}$ in. thick, with a notch $\frac{1}{5}$–$\frac{3}{4}$ in. deep; lobes somewhat compressed, flat inside, outside rounded, not keeled, blue-green, reddened at the top and the edges, below the fissure scattered dark dots, surface glabrous; F. yellow.

Con. Maughanii N. E. Br. = *Ophthalmophyllum Maughanii* Schwant.

Con. Meyerae Schwant. (figs. 125 and 129) (named after Frau G. Meyer, Steinkopf, S. Africa). Forming few bodies, up to 2 in. long, $\frac{1}{8}$ in. wide, deeply notched, lobes $\frac{5}{8}$–1 in. long, inner side flat, round at the back, tapering; dark grey-green, the angles of the inner sides of the lobes marked with a line of coalescing dots, a similar line on the middle of the backs of the lobes, and the surface covered with small, dark, inconspicuous dots; F. yellow.

Con. Meyeri N. E. Br. (fig. 129) (named after the Missionary, G. Meyer, Steinkopf, S. Africa). Low, branched shrub with prostrate branches 2$\frac{1}{2}$–4 in. long; bodies $\frac{3}{4}$–1 in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. wide, $\frac{3}{8}$–$\frac{2}{3}$ in. thick, with a notch $\frac{1}{12}$–$\frac{1}{8}$ in.

leep; fissure $\frac{1}{6}$–$\frac{1}{5}$ in. long, lobes much rounded; grey-green; surface covered vith numerous, fine, whitish-grey dots; F. $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, yellow.

Con. minutum N. E. Br. (*Mes. minutum* Haw., *Mes. thecatum* N. E. 3r.). Forming roundish clumps, bodies obconical, $\frac{3}{8}$–$\frac{2}{3}$ in. high, $\frac{1}{4}$–$\frac{2}{5}$ in. vide, upper side round or elliptical, fissure $\frac{1}{8}$ in. long; grey-green, without narkings; F. $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, pale violet red; good species for amateurs, flowers egularly.

Con. mundum N. E. Br. (fig. 130). Forming clumps; bodies top-haped, $\frac{2}{5}$–$\frac{1}{2}$ in. high and wide, truncate, upper surface almost circular, slightly

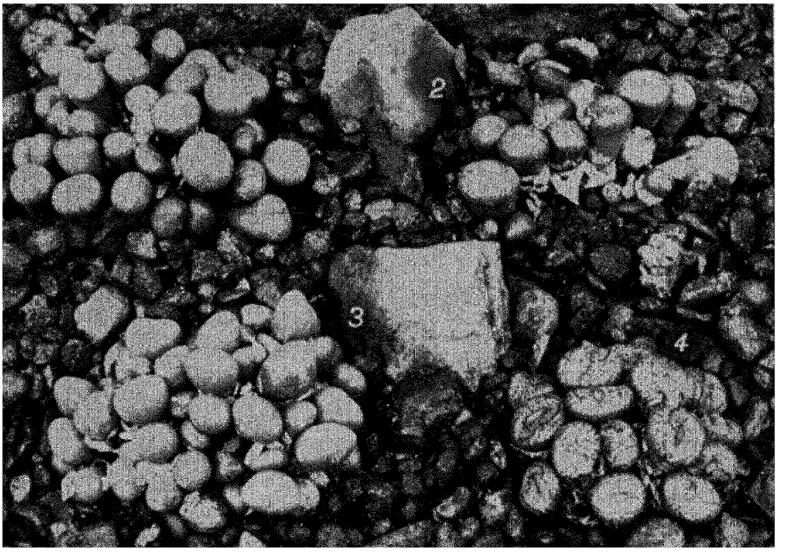


FIG. 130.—1. Conophytum obmetale N. E. Br. 2. C. notatum N. E. Br. 3. C. ovigerum Schwant. 4. C. mundum N. E. Br. $\frac{3}{4}$ nat. size.

epressed near the fissure, fissure $\frac{1}{8}$–$\frac{1}{6}$ in. long; grey-green; on the upper urface are numerous, raised, transparent dots running along the edge, in rows r coalescing into lines.

Con. muscosipapillatum Lavis, Namaqualand. Bodies on branches –$\frac{3}{4}$ in. long, 5–10 together, $1\frac{1}{2}$ in. long, $1\frac{1}{8}$ in. broad, distinctly bilobed, reen, dotted; keel with a reddish stripe, with fine velvety hairs; F. on $1\frac{1}{8}$-in. ong stalks, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, shining, golden yellow.

Con. Nelianum Schwant. (named after Dr G. C. Nel, Stellenbosch, S. Africa). Forming clumps; bodies $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. wide, $\frac{1}{5}$–$\frac{1}{2}$ in. thick, eart-shaped at the end, lobes ± compressed, inner surfaces of the lobes flat, –$\frac{1}{2}$ in. long, sharply keeled on the upper part of the back, lower part cylin-rical; grey-green, with numerous small, dark green dots, the whole surface nely warted; F. yellow.

Con. Nevillei N. E. Br. (fig. 131) (*Mes. Nevillei* N. E. Br.) (named after

Neville S. Tillans, Cape Town, S. Africa). Forming low clumps; bodies $\frac{2}{5}$–$\frac{1}{2}$ in. high, $\frac{3}{4}$–1 in. wide, truncate, upper surface almost circular, sunken like a trough, fissure $\frac{1}{12}$–$\frac{1}{10}$ in. long; smooth, grey to pale green; upper surface reddish and with transparent dots; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, whitish-yellow.

Con. notatum N. E. Br. (fig. 130). Forming low clumps; bodies obconical, $\frac{3}{4}$–$\frac{7}{8}$ in. long, $\frac{1}{2}$ in. broad, rather less thick, truncate above, upper surface almost circular, slightly convex; fissure $\frac{1}{12}$ in. long, distinctly sunk; smooth, grey-green, with reddish-brown scattered dots, the dots united by fine lines, lower part of plant body reddish.

Con. obconellum N. E. Br. = *Con. obcordellum* N. E. Br.

Con. obcordellum N. E. Br. (*Con obconellum* N. E Br., *Mes. obcordellum* Haw., *Mes obconellum* Haw.). Forming cushions; bodies obconical or somewhat heart-shaped, $\frac{5}{8}$–1 in high, truncate, upper side elliptical, $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, rather narrower near the fissure, grey-green, flushed with red at the base, upper side with dark, purple-coloured dots which run together into raised lines; F. in September and October, yellow, the tips reddish Flowers and grows freely

Con. obmetale N. E Br. (fig. 130) (*Mes obmetale* N. E. Br.). Forming roundish clumps; bodies obconical, $\frac{3}{4}$–$\frac{7}{8}$ in. wide, $\frac{1}{3}$–$\frac{2}{5}$ in. thick; slightly truncate and rounded; fissure $\frac{1}{8}$–$\frac{1}{6}$ in. long, not very deep; grey-green, upper surface somewhat greyer, with distinct, transparent lines round the fissure and from thence to the edge run branching lines, F. $\frac{2}{5}$–$\frac{1}{2}$ in. ϕ, milk white.

Con. oviforme N E Br = *Oophytum oviforme* N E Br.

Con. ovigerum Schwant. (fig. 130). Forming close clumps; bodies tapering ovate, up to $\frac{3}{8}$ in. high, $\frac{1}{4}$ in. thick, upper surface much rounded, slightly notched near the fissure, fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long, ringed by a darker line and dark dots; smooth, green.

Con. Pageae N. E. Br (*Mes. Pageae* N. E. Br.) (named after Mrs Page, Cape Town, S. Africa). Forming clumps; bodies 2–4 in. high, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, flat or slightly convex at the top, fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long; pale blue-green above, the sides round the fissure bright red; F. yellow.

Con. pallidum N. E Br (fig. 132) (*Mes pallidum* N E Br.) Forming clumps; bodies obconical, almost circular, $\frac{3}{4}$–1 in. high, almost the same broad, $\frac{5}{8}$–$\frac{2}{3}$ in. thick, much rounded above, $\frac{1}{8}$–$\frac{1}{6}$ in. deep near the fissure, $\frac{1}{12}$–$\frac{1}{5}$ in long; smooth, grey-green, upper surfaces with dark green, almost transparent dots in distinct rows or coalescing into lines, of which one runs at right angles to the fissure; F. purple to carmine, whiter below, in September. Beautiful species.

Con. Pearsonii N E Br **v minor** N E Br = *Con Braunsii* Schwant

Con. pellucidum Schwant. (*C. elegans* N. E. Br., *Lithops Marlothii* N. E. Br., *Mes. Marlothii* Schwant., *Ophthalmophyllum Marlothii* Schwant.). Forming small clumps; bodies $\frac{1}{2}$–$\frac{5}{8}$ in. high, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, $\frac{1}{4}$–$\frac{1}{3}$ in. thick; upper surface divided into 2 roundish lobes, greenish-brown, with cream to ochre coloured markings, wrinkled, often bright and transparent like a little window, F. $\frac{1}{3}$–$\frac{2}{5}$ in. ϕ, white.

Con. perpusillum N. E. Br. (*Mes. perpusillum* Haw.). Forming clumps; bodies obconical, $\frac{3}{8}$–$\frac{1}{2}$ in. high, slightly convex above, fissure small, finely hairy; greenish, with dark dots running together into branching lines; F. white.

Con. pilosulum N. E. Br. = *Gibbaeum pilosulum* N. E. Br

Con. piluliforme N. E. Br. = *Con. Etayloi* Schwant.

Con. pisinnum N. E. Br. (fig. 131) (*Mes. pisinnum* N. E Br.). Forming clumps; body top-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. high, roundish truncate above, upper surface almost circular, $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, depressed like a funnel, fissure very deep, $\frac{1}{12}$ in. long, surface glabrous; grey-green, upper surface with scattered dark dots; F. yellow (?).

Con. praesectum N. E. Br. Forming small clumps, often growing as single bodies, imported plants $\frac{3}{4}$–$1\frac{1}{6}$ in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. wide, $\frac{1}{6}$–$\frac{1}{2}$ in. thick, compressed-cylindrical, seen from the side shortly two-lobed and rather blunt at the top; lobes $\frac{1}{8}$–$\frac{1}{4}$ in. long, depressed, the tips of the lobes convex-truncate, the upper part distinctly window-like and rather transparent seen against the light; fleshy, juicy; upper surface smooth, with a velvety feel due to minute dots; green, the upper part of the sides brownish, the windows paler; F. 1 in. ϕ, colour unknown (Kenhart Division, near Pofadder). (In habit very similar to an Ophthalmophyllum, but according to the diagnosis of the flower by Dr N. E. Brown in the *Gardener's Chronicle* it is certainly a *Conophytum*.)

Con. Purpusii N. E. Br. (fig. 132) (*Con. albertense* N. E. Br., *Mes albertense* N. E. Br, *Mes familiare* Schwant., *Mes. minusculum* Schwant, *Mes obcordellum* Marl., *Mes. Purpusii* Schwant., *Mes. uvaeforme* Purp) (named after J. A. Purpus, Darmstadt) Forming low clumps; bodies low conical, $\frac{1}{4}$–$\frac{5}{8}$ in. high, slightly convex above, round or elliptical, $\frac{1}{4}$–$\frac{5}{8}$ in. wide, fissure $\frac{1}{5}$ in. long; bluish grey-green, covered on the upper side with very short clavate papillae and small dark dots, scattered, in rows but hardly coalescing into lines; F. $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, pale yellow

Con. pygmaeum Schick et Tisch Forming little clumps of dwarf, spherical or conical bodies, of which only the upper halves project beyond the old skins; bodies $\frac{1}{8}$–$\frac{1}{5}$ in long, $\frac{1}{12}$–$\frac{1}{4}$ in ϕ above, fissure not depressed, $\frac{1}{50}$ in long; bluish or whitish-green, without markings. One of the smallest species!

Con. quaesitum N. E. Br. (fig. 131). Forming a compact, spherical clump; bodies very close together, bluntly obconical, $\frac{2}{5}$–$\frac{1}{2}$ in. high, $\frac{2}{5}$–$\frac{5}{8}$ in. wide, about $\frac{1}{2}$ in. thick; bluntly rounded above, fissure $\frac{1}{12}$ in. long, lying in a notch $\frac{1}{25}$–$\frac{1}{12}$ in. deep and $\frac{1}{6}$–$\frac{1}{5}$ in. wide; smooth, blue-green, pale grey-green on account of the numerous whitish dots, strewn with isolated, transparent dots, often in a row along the keel.

Con. ramosum Lavis, Namaqualand. Bodies on branches $\frac{3}{8}$–$\frac{3}{4}$ in long, up to 50 together, somewhat pear-shaped, adpressed longitudinally, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. wide, distinctly 2-lobed, grey-green, dotted, with fine hairs, keel usually with a red stripe; F. on $1\frac{1}{8}$-in. long stalks, $\frac{5}{8}$ in. ϕ, yellow.

Con. Ricardianum Loesch. et Tisch. (named after R. Graessner, Perleberg). Forming cushions, loosely branched when old; bodies conical, $\frac{3}{4}$–1 in.

high, upper side circular, $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, flat or slightly depressed, or even slightly convex, the edges sometimes overhanging; very acute below; fissure *c.* $\frac{1}{50}$ in. long, hairy, grey-green, upper side with numerous dark green dots especially round the fissure; F. $\frac{1}{4}$–$\frac{1}{3}$ in. ϕ, straw coloured.

Con. rufescens N. E. Br. Growths usually solitary, $\frac{1}{2}$–1 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, cylindrical-elliptical, cylindrical or slightly obconical, at the top notched or shortly 2-lobed, fissure $\frac{1}{12}$–$\frac{1}{6}$ in. deep, rounded at the lobes and going almost right across; juicy and fleshy, bare, smooth, dark



FIG. 131.—1. Conophytum quaesitum N. E. Br. 2. C. Halenbergense N. E. Br. 3. C. pisinnum N. E. Br. 4. C. Nevillei N. E. Br. $\frac{3}{4}$ nat. size.

purple, not glossy, the tips of the lobes windowed, the other part of the body covered with translucent dots; F. unknown. (Locality near Pofadder, Little Namaqualand.) (This species was recently rediscovered and distributed under the incorrect names of *Ophth. rufescens* Schwant. or *Ophth. Schuldtii* Schwant.)

Con. saxetanum N. E. Br. (fig. 132) (*Mes. saxetanum* N. E. Br., *Mes. Böhmerianum* Dtr.). Forming clumps; bodies $\frac{1}{3}$–$\frac{2}{5}$ in. high, $\frac{1}{4}$ in. broad, rather less thick, numerous and close together, usually buried half-way up in the old skins; bodies rounded above, circular or oval in cross-section, fissure very small, finely hairy, usually depressed, green, with only a few dots or no markings. Rarely flowers; F. $\frac{1}{4}$ in. ϕ, whitish.

Con. Schickianum Tisch. (*Mes. Schickianum* Bgr.) (named after K. Schick, Freiburg). Forming small, crowded tufts; bodies conical, $\frac{1}{4}$–$\frac{1}{2}$ in. high, circular above, flat, $\frac{1}{6}$–$\frac{1}{4}$ in. ϕ; fissure rather depressed, $\frac{1}{12}$–$\frac{1}{6}$ in. long;

smooth, whitish-green, without markings, the sides usually flushed with red, and sometimes round the fissure also; F. yellow (?).

Con. Schlechteri Schwant. (*Mes. Schlechteri* Schwant.) (named after Max Schlechter, Port Nolloth, S. Africa). Forming low clumps; body obconical, upper surface truncate, notched laterally, heart-shaped or somewhat depressed; fissure with white hairs inside, $\frac{1}{12}$–$\frac{1}{8}$ in. long; grey or grey-green, the upper side with raised, dark green dots, running together into lines; F. $\frac{2}{3}$ in. ϕ, sooty yellow.

Con. Stephanii Schwant. (named after Paul Stephan, in charge of Succulents, B.G., Hamburg). Forming low, slightly convex clumps; bodies

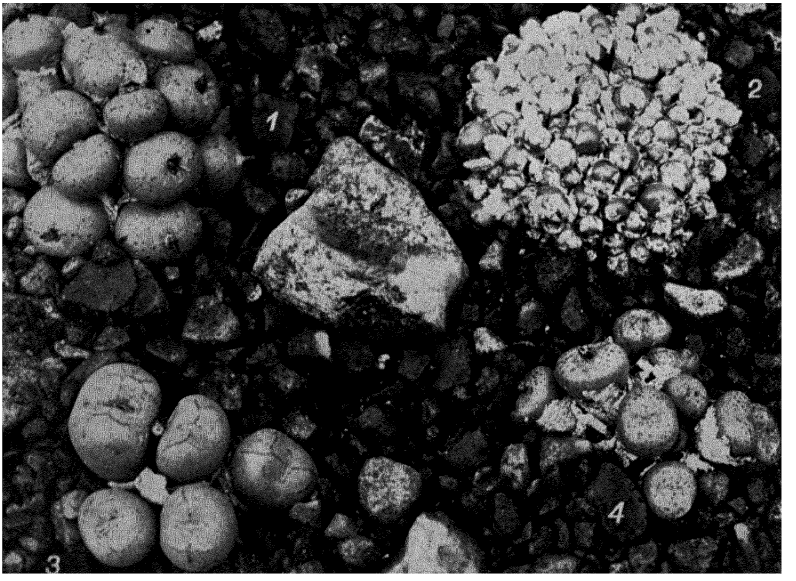


FIG. 132.—1. Conophytum uvaeforme N. E. Br. 2. C. saxetanum N. E. Br. 3. C. pallidum N. E. Br. 4. C. Purpusii N. E. Br. $\frac{3}{4}$ nat. size.

numerous, obconical, $\frac{1}{4}$ in. long, $\frac{1}{4}$ in. broad, upper side rather concave; fissure up to $\frac{1}{25}$ in. long; green, upper side paler, closely covered with white hairs $\frac{1}{12}$ in. long; F. $\frac{1}{6}$–$\frac{1}{5}$ in. ϕ, whitish.

Con. subfenestratum Schwant. Forming clumps; bodies obconical, up to 1 in. high, $\frac{2}{3}$ in. broad, heart-shaped at the top, fissure almost right across, $\frac{1}{4}$ in. broad; lobes of different lengths, $\frac{1}{4}$ in. and $\frac{1}{3}$ in., slightly rounded; very fleshy and juicy; bright, shining green, inner surfaces of the lobes with short hairs, upper surface with numerous, close, dark markings, which appear transparent against the light; F. violet.

Con. tabulare Loesch. et Tisch. Forming clumps; bodies $\frac{2}{3}$–$\frac{3}{4}$ in. high, truncate above, flat or only slightly convex, circular, $\frac{3}{4}$–$\frac{7}{8}$ in. ϕ, fissure $\frac{1}{5}$–$\frac{1}{4}$ in. long; surface glabrous, pale grey-green; F. yellow; beautiful species!

Con. Taylorianum Dtr. et Schwant. (*Mes. Taylorianum* Dtr. et Schwant.) (named after E. Taylor, Southborough, England). Forming flat clumps 8–10 in. in diameter; bodies $\frac{1}{3}$–$\frac{5}{8}$ in. high, $\frac{1}{4}$–$\frac{5}{8}$ in. thick (at right angles to the fissure), $\frac{1}{4}$–$\frac{2}{5}$ in. wide; the broad sides drawn forward like a blunt chin, sloping to the fissure, fissure $\frac{1}{12}$–$\frac{1}{8}$ in. long; dark grey-green, sides often reddish-green, dull glossy, with dark reddish brownish-green dots; fissure surrounded by coalescing dots.

Con. Tischeri Schick (named after Dr Tischer, Siegburg, Rhineland). Forming clumps, forming little stems when old; bodies broadly cordate, somewhat depressed above, $\frac{2}{5}$–$\frac{1}{2}$ in. high, $\frac{2}{5}$–$\frac{1}{2}$ in. broad, $\frac{1}{4}$–$\frac{2}{5}$ in. thick, fissure $\frac{1}{12}$–$\frac{1}{6}$ in. long, surrounded by an irregular dark zone, grey-green with dark dots; F. $\frac{5}{8}$ in. ϕ, pale lilac.

Con. Tischleri Schwant. (named after Dr G. Tischler, Kiel). Forming clumps; bodies close together, obconical, $\frac{2}{3}$–$\frac{3}{4}$ in. long, flat truncate above, upper surface $\frac{1}{3}$ in. ϕ, fissure only about $\frac{1}{12}$ in. wide, labiate, surface coarsely granular, green, upper surface much bulged; the bodies are almost entirely buried in the white, papery skins of the old plants; F. *c.* $\frac{5}{8}$ in. ϕ, yellow.



FIG. 133.—Conophytum truncatellum N. E. Br. (Photo, K. Josefsky.)

Con. truncatellum N. E. Br. (fig. 133) (*Mes. truncatellum* Haw.). Forming clumps; bodies compressed and truncate, $\frac{1}{2}$ in. high, almost circular above, $\frac{2}{5}$–$\frac{1}{2}$ in. ϕ, fissure $\frac{1}{12}$ in.; pale grey-green, with many small dots, rarely markings coalescing; F. $\frac{5}{8}$ in ϕ, yellowish.

Con. udabibense Loesch. et Tisch. Forming compact cushions; bodies obconical, almost circular above, slightly convex, $\frac{1}{5}$–$\frac{2}{5}$ in. ϕ above, fissure $\frac{1}{25}$–$\frac{1}{12}$ in. long, slightly depressed, lips of the fissure somewhat swollen; chalk whitish-green, without markings, smooth; F. $\frac{1}{3}$–$\frac{1}{2}$ in. ϕ, yellowish-white.

Con. uvaeforme N. E. Br. (fig. 132) (*Mes. uvaeforme* Haw.). Forming clumps; bodies almost spherical, slightly compressed laterally, $\frac{2}{5}$–$\frac{1}{2}$ in. high and wide, $\frac{1}{3}$–$\frac{2}{5}$ in. thick; fissure $\frac{1}{12}$ in. long; pale grey-green, with scattered dark dots; F. $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, whitish-yellow.

Con. Vanrhynsdorpense Schwant. Forming hemispherical, convex clumps; bodies obconical, upper surfaces almost hemispherical up to $\frac{5}{8}$ in. long, $\frac{2}{3}$ in. broad, fissure $\frac{1}{12}$–$\frac{1}{6}$ in. long, with short white hairs; dark green, dull, the upper surface with a few scattered dark dots, ± coalescing to an irregular line. (Named after its habitat, near Vanrhynsdorp, S. Africa.)

Con. Wagneriorum Schwant. (named after the family of Farmer Wagner, S.W. Africa). Forming clumps; bodies obconical; upper surface circular, very convex, $\frac{1}{3}$ in. high, $\frac{3}{8}$ in. wide, fissure $\frac{1}{6}$ in. long, not depressed, lips gaping, whitish-bluish grey-green, pinkish lilac with numerous, scattered, dark green or violet red dots, upper surface warted.

Con. Wettsteinii N. E. Br. (fig. 134) (*Mes. Wettsteinii* Bgr.) (named after Dr R. Wettstein, Vienna). Forming clumps; bodies flat top-shaped, $\frac{5}{8}$ in. high, $\frac{7}{8}$–$1\frac{1}{8}$ in. wide, mostly buried in the dried up, split skins, truncate above, upper surface fairly smooth, only slightly convex, usually irregularly circular, fissure $\frac{1}{8}$–$\frac{1}{6}$ in. long, rarely quite in the centre; dull green or grey-green, with very fine white dots, often with larger dots between; F. violet purple.



FIG. 134. Conophytum Wettsteinii N. E. Br. (Photo, H. Grammann.) (From V.P.B.)

Corpuscularia Schwant.

Small, very succulent plants with prostrate branches, forming cushions; stems with short and long shoots, short shoots numerous with short, thick pairs of leaves and invisible internodes, long shoots with longer leaves, elongated internodes, obvious; L. of the long shoots thick, triangular, often ± prismatic or boat-shaped, shortly united at the base, of firm texture, glabrous, grey-green. Flowers terminal, short stalked, red or yellow, June, July or even later; with many flowers. Occurrence: S. Africa.

Easily grown, suitable for growing in rooms. Should be planted out in summer, propagation by cuttings, but seedlings also grow well. The latter are especially succulent as small plants, and are valued as cheap succulents. Recommended for growing in quantity.

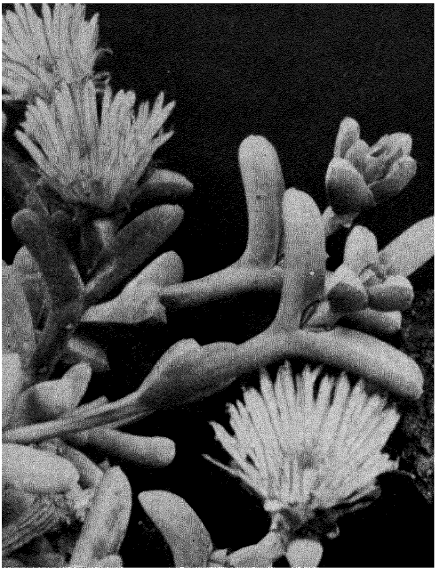


FIG. 135.—Corpuscularia Lehmannii Schwant. $\frac{3}{4}$ nat. size.

Corp. Lehmannii Schwant. (fig. 135) (*Mes. Lehmannii* Eckl. et Zeyh.). Branches $\frac{3}{8}$–1 in. long, 2-angled, reddish, becoming grey with age; L. of the long shoots united at the base, obliquely spreading, 3-angled with convex sides, blunt, projecting tip, $\frac{1}{2}$–1 in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. broad; L. of the short shoots close together and small; grey-

green or very grey, sometimes rather reddish, glabrous; F. on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, $1\frac{1}{2}$ in. ϕ, pale yellow, opening in the afternoon

Corp. molle Schwant. = *Ruschia mollis* Schwant.

Corp. Taylori Schwant. (named after E Taylor, Southborough, England). Similar to *Corp. Lehmannii*, but larger; L. grey-green, almost whitish-grey.

Cryophytum N. E. Br.

○. Plants suitable for use as summer flowerers in the rock garden or for bedding out, but also very useful in summer as small pot plants. Sow at the beginning of April in pots, in a cool hot bed or later out of doors in a sandy place. The plants should not be too close, and kept only moderately damp. Occurrence: Cape Province, Canary Islands, California.

Cr. crystallinum N. E Br. (*Mes. crystallinum* L , *Mes. glaciale* Haw) Branches wide spread, cylindrical, with bright papillae; L. united at the base, ovate or spatulate, narrowed into a short, wide stalk, wavy, fleshy, covered with shining papillae; F. 3–5, terminal, almost sessile, $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, white in July and August This species is much grown for its sparkling leaves.

Cylindrophyllum Schwant.

Occurrence: Cape Province. Growing period in summer. Needs a light position in a greenhouse, moderately damp; in winter fairly warm and dry. Propagation from seed.

Cyl. calamiforme Schwant. (fig 136) (*Mes. calamiforme* L.). Almost stemless or short stemmed, very succulent plant up to 2 in. high; branched when old, and thus forming small clumps; internodes invisible; L. 6–8, decussate, approximate, united at the base, erect curved, 2–3 in. long, $\frac{1}{3}$ in. broad, almost cylindrical, upper side rather flat, narrowed somewhat above and curved, with a blunt end and a short tip, grey-green, finely dotted; F. on $\frac{3}{4}$-in. long stalks, 2–3 in ϕ, pale pink, yellowish-white at the base, in summer, opening in the afternoon.

Cyl. Tugwelliae L. Bol. (named after Mrs Tugwell, Cape Town). Similar to the foregoing; leaves shorter and thicker; F. $1\frac{1}{2}$–2 in. ϕ; pale yellow.

Dactylopsis N. E. Br.

Occurrence: Karroo (S. Africa). Very interesting species. Needs a very bright position in a greenhouse and only a moderate amount of water. Resting period in late winter and early summer. The addition of 2 per cent. of kitchen salt to the earth is useful but not essential.

Dactylopsis digitata N. E. Br. (fig. 137) (*Mes. digitatum* Ait., *Mes. digitiforme* Thbg.). Stemless, highly succulent plants forming close tufts;



FIG. 136.—Cylindrophyllum calamiforme Schwant. $\frac{2}{3}$ nat. size.



FIG. 137.—Dactylopsis digitata N. E. Br. Almost nat. size.

L. alternate, 3–4, $3\frac{1}{4}$–$4\frac{3}{4}$ in. long, $\frac{3}{4}$–1 in. broad, cylindrical, blunt, finger-like, whitish-grey, bare; F. terminal, solitary, sessile, $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, white, November–December.

Deilanthe Peersii N. E. Br. = *Aloinopsis Peersii* L. Bol.

Delosperma Schwant.

Dwarf, bushy shrub, much branched, with wide spread or prostrate, somewhat ascending branches, compressed laterally, green to reddish, later round with a grey margin; or round, papillose, scaly; internodes obvious; L. triangular, ± curved like a hook at the tip, with no or very fine papillae; F. in 3-partite false umbels, or solitary, small, whitish-yellow or red, in summer and often in winter too. Occurrence: S.W. Africa, Cape Province.

Long in cultivation, easily grown, flowering freely most of the year. May be put out of doors, in not too damp a position, in winter rather drier at 50° F.; propagate from seeds or cuttings, which root quickly and soon make flowering plants; like rich, porous soil.

Del. Brunnthaleri Schwant. (fig. 138) (*Mes. Brunnthaleri* Bgr. (named after Dr Brunnthaler, Vienna). Branches 8–16 in. high; L. not much united



FIG. 138.—Delosperma Brunnthaleri Schwant. (Photo, K. Josefsky.)

at the base, spreading, or slightly curved, $1\frac{3}{8}$–$1\frac{1}{2}$ in. long, upper side flat, back keeled above, at the base and along the edges ciliate; surface finely papillose,

sap green; inflorescence 3-partite, or doubly 3-partite; F. short stalked, $\frac{3}{4}$ in. ϕ, violet pink.

Del. echinatum Schwant. (fig. 139) (*Mes. echinatum* Ait., *Trichodiadema echinatum* L. Bol.). A close bush, up to 12 in. high; branches forked, $\frac{1}{12}$–$\frac{1}{6}$ in. thick, grey or pale brown, with white, often pointed papillae, especially on the young parts; L. thick, little united at the base, ovate-hemispherical, $\frac{2}{5}$ $\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick and wide, upper side rather flat, pale sap green,

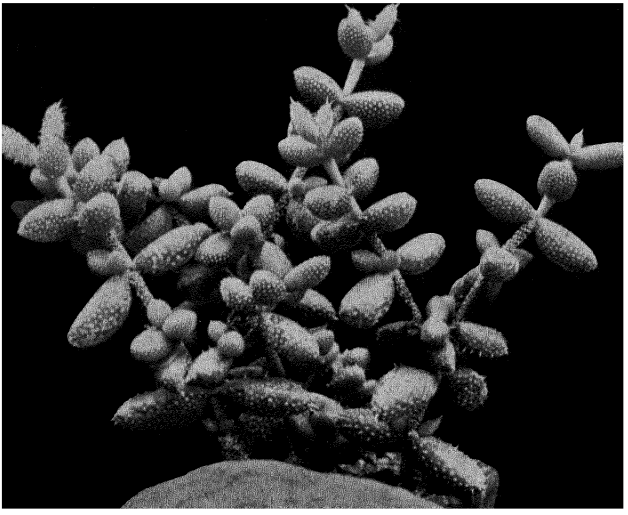


FIG. 139.—Delosperma echinatum Schwant. $\frac{3}{5}$ nat. size.

with large round or bristly tipped papillae; F. solitary, short stalked, $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, whitish or yellowish, almost throughout the year.

Del. Ecklonis Schwant. (*Mes. Ecklonis* Salm.). Branches prostrate, long, with fine white hairs when young; L. approximate, erect or horizontal and recurved, 1–$1\frac{3}{8}$ in. long, united at the base; flat compressed, triangular, tip tapering, ending in a short point, upper side wider, grooved towards the base, pale green, in a sunny position reddish with fine papillae and soft hairs, of soft texture; F. short stalked, $\frac{5}{8}$ in. ϕ, white. Very free growing.

Del. robustum L. Bol. (*Mes. robustum* Haw.). Branches close; stems when old 2–6 in. long, strong, prostrate; L. awl-shaped, blunt, inner side swollen at the base, back rounded, triangular at the tip, grey-green, $\frac{5}{8}$ in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, $\frac{1}{12}$ in. thick; F. $\frac{3}{8}$ in. ϕ, lilac.

Del. subincanum Schwant. (*Mes. subincanum* Haw.). Bushy, prostrate when old; L. longer than the internodes, united at the base, compressed, bluntly triangular, tapering shortly, ending in a small spine, spreading, slightly recurved at the tip only, 1–$1\frac{1}{8}$ in. long, with soft flesh; grey; velvety with fine soft hairs, especially along the edges; F. $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, white.

Del. Taylori Schwant. (named after E. Taylor, Southborough, England).

Dwarf, leaves hardly united at the base, lanceolate, triangular, $\frac{3}{8}$–1 in. long, $\frac{1}{8}$–$\frac{1}{4}$ in. wide, green, without dots; F. solitary, terminal, on $\frac{3}{8}$-in. long stalks, 1–1$\frac{1}{8}$ in. ϕ, pale violet.

Del. uitenhagenensis L. Bol. Closely branched shrub; L. oblong-linear, triangular-acute at the end, $\frac{2}{3}$ in. long, $\frac{1}{8}$–$\frac{1}{4}$ in. wide, $\frac{1}{8}$ in. thick, upper side flat, back sharply keeled, with a fine spiny tip, green; F. $\frac{3}{8}$ in. ϕ, white.

Derenbergia biloba Schwant. = *Conophytum bilobum* N. E. Br.

Didymaotus N. E. Br.

Very interesting, peculiar, succulent plant, which closely resembles *Pleiospilos*. Rather difficult to grow, the plants need to be very dry, and want the brightest position in the greenhouse. Resting period in early summer. Propagation only by seed!

Didymaotus lapidiformis N. E. Br. (fig. 140) (*Mes. lapidiforme* Marl.), S. Africa. Stemless, very succulent plants; L. usually two together, uneven in thickness, very fleshy, the triangular surface $\frac{5}{8}$ in. long and *c.* 1$\frac{1}{8}$ in. broad, flat or slightly concave, the back altogether 2 in. long, acute chin-like, drawn forward over the tip, distinctly keeled; surface rough, whitish-grey to green; F. stalked, lateral to the leaves, white with a pink centre.

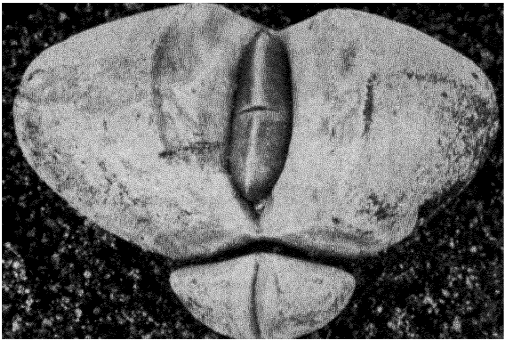


FIG. 140.—Didymaotus lapidiformis N. E. Br. (Photo, R. Graessner.)

Dinteranthus Schwant.

(Named after Prof. K. Dinter, Bautzen.)

Stemless plants, branched when old or forming clumps. Stem with 1–3 pairs of leaves; L. very short and thick, united at the base, upper side flat, nearly as long as broad, lower side much rounded, ± half ovate, ± semicylindrical at the base, keeled towards the tip; lower side of the leaf drawn right over the tip like a chin, surface tough, glabrous, whitish, without dots, or with numerous, inconspicuous, green dots. Flowers solitary, short stalked, large, yellow, in spring to autumn. Occurrence: Great Namaqualand (S.W. Africa), Bushmanland.

Growing period in summer, likes a very light position and warmth. Even in summer the Dinteranthus do not like moist air as they become soft and very easily go off. Water should be given very sparingly, in winter the plants should be kept quite dry. Easily raised from seed.

Dint. inexpectatus Dtr. (fig. 141). Similar to *D. microspermus*. Growth very compact; L. smaller and very round, keel ± sharp; surface



FIG. 141. Dinteranthus inexpectatus Dtr. $\frac{1}{3}$ nat. size.

smooth, uniformly grey; F. 1 in. ϕ, golden yellow, September.

Dint. microspermus Schwant. (fig. 142) (*Mes. microspermum* Dtr et Derenbg., *Rimaria microsperma* N. E. Br.). Usually one-, rarely many-headed, branches when old $\frac{3}{4}$–2 in. long, covered with the dried remains of leaves; L. 1–2 pairs to a growth, united for about half their length, free part of leaf over 1–$1\frac{1}{8}$ in. long, $1\frac{1}{8}$ in. broad, $\frac{3}{4}$ in. thick, upper side flat or slightly convex, lower side hemispherical, round, the lower side projecting like a chin, with a weakly defined keel; surface finely granular, reddish to grey-violet, chalk white when young to grey-olive green, with ± transparent, greenish dots; F. on wide spread, $\frac{5}{8}$–$\frac{3}{4}$-in. long stalks, $1\frac{1}{2}$–$1\frac{3}{4}$ in. ϕ, upper side golden yellow, with reddish tips, lower side pale yellow; flowers with us in August, in its native country from March–April.

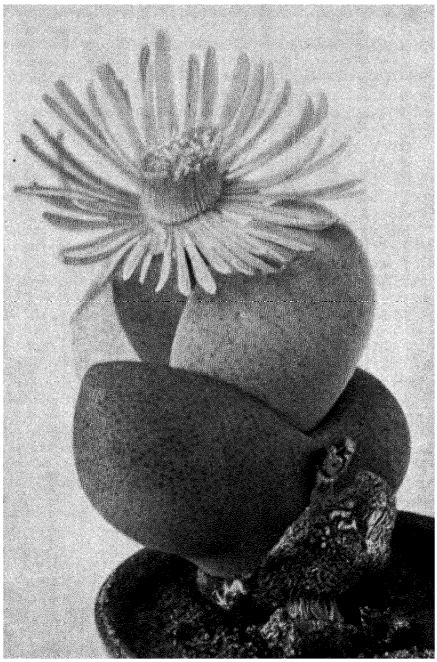


FIG. 142. Dinteranthus microspermus Schwant. (Photo, Dr Derenberg.) (From M.d.d.K.G.) Nat. size.



FIG. 143.—Dinteranthus Pole Evansii Schwant. Almost nat. size.

Dint. Margaretae Schwant. = *Lapidaria Margaretae* Schwant.

Dint. Pole Evansii Schwant. (fig. 143) (*Mes. Pole Evansii* N. E. Br., *Rimaria Pole Evansii* N. E. Br.) (named after Dr J. B. Pole Evans, Pretoria). Plants usually with one growth; pairs of leaves united half-way up, gaping very little, $1\frac{3}{4}$ in. long overall, almost $1\frac{1}{2}$ in. broad, $\frac{3}{4}$–1 in. thick; upper side flat, back much rounded, with faintly marked keel; surface ± wrinkled, glabrous, finely granular under a

lens, dove grey, often tinged with yellow or red, without dots; F. $1\frac{1}{2}$ in. ϕ, glossy yellow, April–May. Dislikes excess moisture!

Dint. puberulus N. E. Br. (fig. 144). Forming clumps; growths with 1–2 pairs of leaves; L. united for $\frac{1}{3}$–$\frac{1}{2}$ of their length, erect, hardly spreading, 1–$1\frac{1}{8}$ in. long, $\frac{5}{8}$ in. broad, $\frac{1}{2}$ in. thick, upper side flat or slightly convex, back round and slightly keeled above, not drawn forward over the tip; surface microscopically granular and hairy, with a velvety feel, brownish grey-green, with numerous dark green dots; F. $1\frac{1}{8}$ in. ϕ, golden yellow, October.

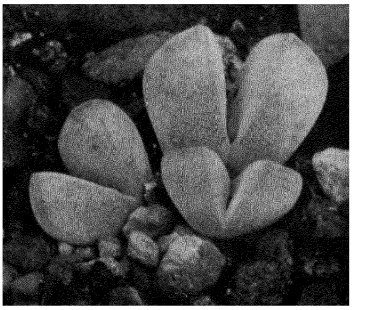


FIG. 144.—Dinteranthus puberulus N. E. Br. $\frac{3}{4}$ nat. size.

Dint. punctatus L. Bol. is identical with *D. puberulus* N. E. Br.

Dint. Ruschii junioris (Dtr. ?) is identical with *D. puberulus* N. E. Br.

Diplosoma Schwant.

Small, almost stemless, perennial, succulent plants with numerous fine roots; the outermost shortened branches closely enveloped in the skins of the dried up leaves, growths with two opposite L., both spreading horizontally, united at the base and shortly below the base, the free part united on one side, with the tips curved; upper side fairly flat or grooved, back roundish, fleshy, bare, glabrous, green, with transparent dots or lines, drying up after the growing period. F. terminal, sessile, solitary, rosy purple. Occurrence: Western Great Karroo (S. Africa).

Very difficult, interesting species, to be kept absolutely dry after the growing period in late summer. Grow in sandy soil, not below 60–70° F. The plants should not be watered overhead!

Dipl. Leipoldtii L. Bol. Similar to the following species; L. a quarter of one edge joined together, $\frac{5}{8}$–$\frac{2}{3}$ in. long, about $\frac{1}{4}$ in. broad, and the same thick, slightly twisted, somewhat semicircular, upper side convex or flat, with blunt angles, tip rounded; with a few transparent, dark, longitudinal lines.

Dipl. retroversum Schwant. (*Mes. retroversum* Kensit). Plants about 1 in. high; L. $\frac{3}{4}$–1 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, $\frac{1}{6}$ in. thick, one edge united to the other nearly half-way up, rather round, sides slightly convex or flat, with round edges, hardly narrowing to the blunt tip, with a few transparent dots; F. $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, rosy purple.

Disphyma N. E. Br.

Creeping plants, forming clumps, the branches often rooting from the nodes; L. little united at the base, linear, semicylindrical or 3-angled, slightly papillose, or smooth or with translucent dots.

F. solitary or 2–3 together, stalked, whitish, pink or violet, in spring or summer, opening at noon, free flowering. Occurrence: Cape Province.

Very suitable for planting out on the rock garden during the summer or as a plant for baskets. Should be wintered in a cold house at 45° F.; propagation by seed or cuttings.

Disph. crassifolia L. Bol. (*Mes. crassifolium* L.). L. 1–1⅜ in. long, ⅕ in. broad, bluntly triangular, tapering, glabrous, dark green, with faint, transparent dots; F. 1½ in. ϕ, rose red; beautiful species.

Disph. crassulina N. E. Br. (*Mes. crassulinum* DC., *Mes. crassuloides* Haw.). L. ⅝–1 in. long, narrow lanceolate tapering, upper side slightly grooved, back rounded, fresh green, very finely papillose; F. *c.* 1⅛ in. ϕ, white.

Dorotheanthus Schwant.

(Named after Frau Dorothea Schwantes, Kiel.)

⊙. Suitable as a summer flowerer for the rock garden or for bedding out and the most beautiful of all the ⊙ species of the family.



FIG. 145.—Dorotheanthus gramineus Schwant. ⅔ nat. size.

Cultivation as for *Cryophytum*. Occurrence: Cape Province. Recommended as a pot plant for florists. For this purpose, about 6–8 plants should be pricked out in a 4-in. pot in spring and will then flower in June. Grow in cold frames.

Dor. criniflorus Schwant. (*Mes. criniflorum* Houtt.). Similar to the following species; L. obovate, narrowed to a cylinder towards the base, 1–3 in.

long, $\frac{1}{4}$–$\frac{2}{5}$ in. wide, fleshy, rough papillose; F. $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, white or white with red tips to the leaves.

Dor. gramineus Schwant. (fig. 145) (*Mes. clavatum* Haw., *Mes. claviforme* DC., *Mes. gramineum* Haw., *Mes. pyropaeum* Haw., *Mes. tricolor* Willd.). Short stalked, branched from the base, plant up to 4 in. high with reddish papillose branches; L. united at the base, linear elongated, $1\frac{1}{8}$–2 in. long, $1\frac{1}{8}$–2 in. broad, upper side flat, lower side rounded and with many papillae, fresh green; F. terminal, on $1\frac{1}{8}$–$2\frac{1}{2}$-in. long stalks, $\frac{3}{4}$–1 in. ϕ, bright carmine with darker centre, in June–September.

Dor. gramineus Schwant. **v. albus** (*Mes. pyropaeum v. album* Haw., *Mes. apetale* Thbg., *Mes. lineare* Thbg.), with white flowers.

Dor. gramineus Schwant. **v. roseus** (*Mes. pyropaeum v. roseum* Haw.). Like the preceding, but with pink flowers.

Dracophilus Schwant.

Plant forming cushions; L. very fleshy, numerous, generally crowded, decussate, united at the base, internodes almost unrecog-

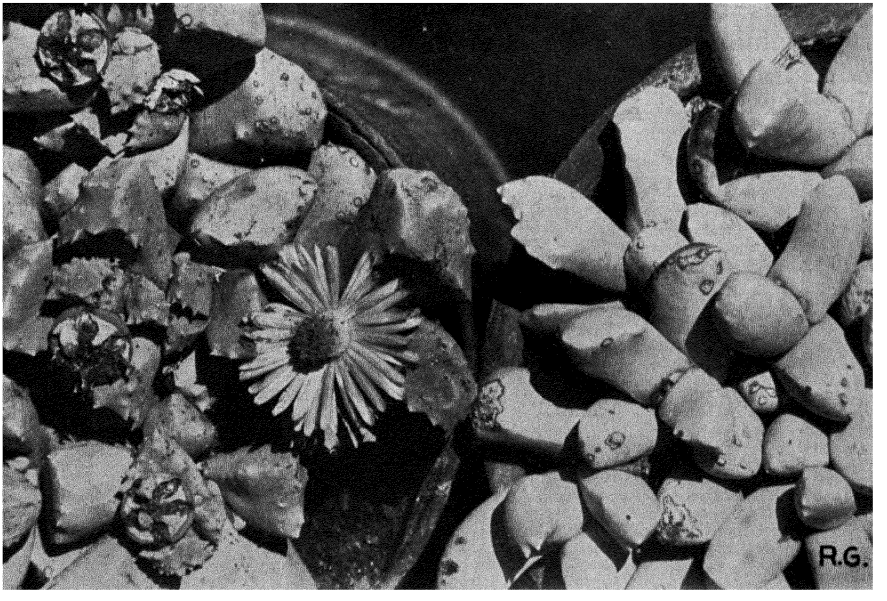


FIG. 146.—Dracophilus Delaetianus Dtr. et Schwant. (Photo, R. Graessner.) *c.* nat. size.

nisable on account of the wide leaf bases, triangular, usually irregular in shape, with a few teeth along the edges, bluish-green, finely roughened, without dots. F. terminal or apparently so, on *c.* 1-in. long stalks which are almost buried in two much united bracts, $\frac{3}{4}$–$1\frac{1}{8}$ in ϕ,

white or pink, in summer. Allied to the genus Juttadinteria, and requiring the same cultivation. Occurrence: S.W. Africa.

Dr. Delaetianus Dtr. et Schwant. (fig. 146) (*Juttadinteria Delaetianus* Dtr. et Schwant., *Mes. Delaetianum* Dtr.) (named after F. de Laet, Contich, Belgium) Forming cushions 4 in. ϕ, L. 4–6, almost arranged in a rosette, on many shoots, of various size and thickness, triangular, about ¾–1⅛ in. long, ⅜–⅝ in. wide and thick, one side often distinctly wider and the leaves therefore oblique, the sides usually convex, the upper side broadly triangular, edges with 5–6 broad notches, the chin-like keel with 2–3 teeth, surface hardly rough, whitish-blue, F. ¾–⅞ in. ϕ, rosy violet.

Dr. Montis Draconis Dtr. et Schwant. (*Juttadinteria Montis Draconis* Dtr. et Schwant., *Mes. Montis Draconis* Dtr.) (named after its native place, the Drakenbergen, S. Africa) Growths with 2–3 pairs of leaves, L. *c.* 4¾ in. long, united, bluntly triangular, slightly curved outwards, 1⅛–2 in. long, ⅜–⅝ in. thick, rather oblique, with one or two low tubercles at the end, surface bluish-green, finely roughened, F. solitary, 1⅛–1 in. ϕ, white or pale pink.

Drosanthemum Schwant.

Succulent shrubs with erect or prostrate branches, papillose, later becoming rough. L. decussate, compressed, triangular to cylindrical, closely covered with sparkling papillae (reminiscent of Sundew = *Drosera*). F. terminal, solitary, or up to three together, from lateral short shoots, red or white, in summer. Occurrence: Cape Province. Very easy to grow, and the most free-flowering of all the Mesembrianthemum. Put out of doors in summer, in winter bright and fairly warm, may be wintered in the cold house. Easily increased by cuttings; seedlings usually flower the first year.

Dros. asperulum Schwant. (*Mes. asperulum* Salm.). Branches slender, grey-brown, L. ½–¾ in. long, hardly 1/12 in. broad, triangular to semicylindrical, fresh green, F. 1 in. ϕ, pale pink.

Dros. autumnale L. Bol. Erect habit, intricately branched; branches very thin, blackish-brown; L. almost cylindrical, ⅜ in. long, 1/12 in. thick, papillose, F. ⅜ in. ϕ, lilac. Very free flowering.

Dros. brevifolium Schwant. (*Mes. brevifolium* Ait., *Mes. erigeriflorum* Jacq., *Mes. lateriflorum* DC.). With slender branches, L. semicylindrical to 3-angled, blunt, ⅙–⅖ in. long, 1/12–⅙ in. thick, fresh green; F. *c.* ¾ in. ϕ, rose red.

Dros. calycinum Schwant. (*Mes. calycinum* Haw.) Intricately branched, branches thin, L. cylindrical, bluntish, ½–¾ in. long, 1/12 in. thick, fresh green, F. ¾ in. ϕ, white.

Dros. flavum Schwant. (*Mes. flavum* Haw.). ⅜–⅝ in. high, branches very thin, curved, L. ¼–⅓ in. long, almost 1/12 in. thick, almost cylindrical; F. ⅔ in. ϕ, golden yellow.

Dros. floribundum Schwant. (*Mes. floribundum* Haw., *Mes. hispidum v. pallidum* Haw., *Mes. torquatum* Haw.). Forming cushions; branches thread-like, prostrate; L. cylindrical, somewhat thickened above, curved erect, blunt, somewhat united at the base, $\frac{1}{2}$–$\frac{5}{8}$ in. long, 1 in. thick, pale green; F. in large quantities from lateral short shoots, on $\frac{3}{8}$–$\frac{3}{4}$-in. long stalks, $\frac{2}{3}$ in. ϕ, pale pink. Very free flowering!

Dros. hispidum Schwant. (fig. 147) (*Mes. hispidum* L.). Up to 2 ft. high, much branched, with slender branches; L. cylindrical, blunt, $\frac{5}{8}$–1 in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, pale green, reddish in the sun; F. 1–3, on $\frac{3}{8}$–2-in. long stalks, up to $1\frac{1}{8}$ in. ϕ, deep purple red, with a silky sheen. Free flowering, quite the most beautiful!



FIG. 147.—Drosanthemum hispidum Schwant. $\frac{1}{3}$ nat. size.

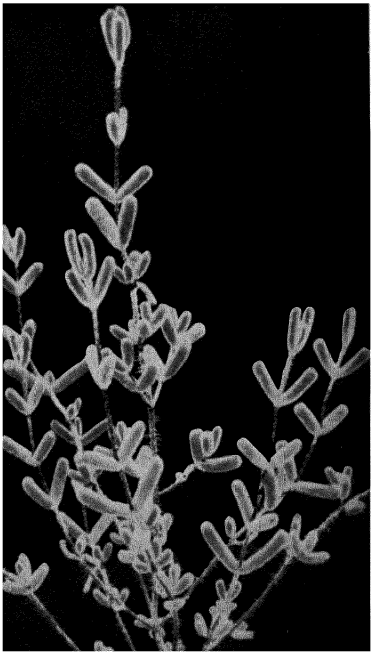


FIG. 148.—Drosanthemum Schoenlandianum L. Bol. $\frac{2}{3}$ nat. size.

Dros. micans Schwant. (*Mes. micans* L.). Branched, up to 30 in. high; L. almost cylindrical, above more or less flattened, $\frac{1}{2}$–1 in. long, $\frac{1}{12}$–$\frac{1}{6}$ in. thick, fresh green; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, purple, rather yellowish. Beautiful species!

Dros. parvifolium Schwant. (*Mes. parvifolium* Haw.). 6–8 in. high, with thread-like branches; L. $\frac{1}{6}$ in. long, $\frac{1}{12}$ in. thick, fresh green; F. $\frac{5}{8}$ in. ϕ, purple red. Beautiful species!

Dros. Schoenlandianum L. Bol. (fig. 148) (named after Dr H. Schönland, Cape Town). Intricately branched, with thin, red-brown, papillose branches; L. spreading, $\frac{3}{8}$ in. long, $\frac{1}{12}$ in. thick, semicylindrical, blunt; fresh green; F. 1 in. ϕ, cream to whitish-yellow.

Dros. speciosum Schwant. (*Mes. speciosum* Haw.). Up to 2 ft. high, L. blunt, $\frac{1}{2}$–$\frac{5}{8}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. thick, fresh

green; F. 1 in. ϕ, bright orange red, greenish in the middle; a valuable species with beautiful flowers!

Dros. subcompressum Schwant. (*Mes. subcompressum* Haw.). Up to 2 ft. high, with slender branches; L. $\frac{3}{8}$–1 in. long, $\frac{1}{12}$–$\frac{1}{6}$ in. thick, finely papillose, the papillae larger on the edges; F. $\frac{3}{4}$ in. ϕ, purple-red.

Dros. striatum Schwant. (*Mes. striatum* Haw.). Erect, up to 2 ft. high, L. almost cylindrical, bluntish, $\frac{3}{4}$–1 in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, green, with large, transparent papillae, ending in a fine bristle; F. 1–$1\frac{1}{8}$ in. ϕ, pale pink, free flowering.

Eberlanzia Schwant.

(Named after F. Eberlanz, Lüderitz Bay, S.W. Africa.)

Shrubs with woody roots and stiff, erect branches. L. somewhat united at the base, 3-angled to cylindrical, elongated or short and thick, at the end with a fine point, grey-green or bluish-green, with fine dark dots. F. in branched inflorescences, small to medium sized, red, in May to July. The flowering branches are sometimes converted into thorns. Occurrence: Cape Colony.

Plants with beautiful flowers, should be planted out in summer. Need a bright position in winter, at 43–46° F., propagation easy from seed or cuttings.

Eb. micrantha Schwant. (*Mes spinosum* L. *v. micranthum*). Resembles the following species; F. $\frac{1}{5}$ in. ϕ, dark pink, very free flowering in May

Eb. spinosa Schwant. (*Mes. spinosum* L.). With forked branching, up to 2 ft. high; with rectangularly branched thorns at the tips of the branches; L. erect or curved outwards, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, grey-green, dotted with dark green; F. on $\frac{1}{4}$–$\frac{1}{3}$-in. long stalks, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, dark pink.

Ebracteola Dtr. et Schwant.

Dwarf, very succulent plants of tufted habit with much thickened roots; internodes invisible; L. elongated, 3-angled to prismatical or almost cylindrical; F. terminal, short stalked, solitary, red or white, in summer. Occurrence: Great Namaqualand (S.W. Africa).

Growing period from April to autumn. Needs a light position in an airy greenhouse or window. In summer keep fairly moist, in winter drier and not over 55° F.; propagation easy by seed or by division.

Ebr. Derenbergiana Dtr. et Schwant. (*Mes. Derenbergianum* Dtr.) (named after Dr J. Derenberg, Hamburg). Cushions 8 in. ϕ, from thick, 8-in. long taproots; shoots with 2–3 pairs of leaves; L. united to a $\frac{1}{12}$–$\frac{1}{8}$-in. long sheath, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, bluntly triangular, tip blunt, hatchet-shaped above, expanded about $\frac{3}{8}$ in.; pale bluish-green, with faint, close dots; F. on $\frac{3}{8}$-in. long stalks, $\frac{3}{4}$–1 in. ϕ, glossy pale pink.

Ebr. Montis Moltkei Dtr. et Schwant. (fig. 149) (*Mes. Montis Moltkei* Dtr.) (named after its native habitat, the Moltke Mountains, S.W. Africa). Branches $\frac{1}{4}$–$\frac{1}{3}$ in. thick, $\frac{3}{8}$–$\frac{3}{4}$ in. long; shoots with rosettes of 6–8 decussate



FIG. 149. Ebracteola Montis Moltkei Dtr. et Schwant. (Photo, R. Graessner.) *c.* nat. size.

leaves; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. long, united for about a fifth of their length, at the base of the free part $\frac{1}{8}$–$\frac{1}{5}$ in. thick, $\frac{1}{4}$–$\frac{1}{3}$ in. thick above, sharply 3-angled, at the end boat-shaped, curved upwards, upper side lanceolate, the keel curved; grey-green, thickly dotted; F. almost sessile, $\frac{5}{8}$ in. ϕ, pale violet-pink.

Echinus L. Bol.

(Braunsia Schwant.)

Dwarf, creeping shrubs with fine fibrous roots, often rooting at the nodes, growths with 1–2 pairs of leaves. Leaves short, crescent-shaped, triangular, keeled, united half-way up or more, not hairy or velvety, often with raised, scattered dots. F. 1 from the rooting short shoots, terminal, almost sessile. (Seeds with small appendages, so that they look like hedgehogs: Echinus = hedgehog).

Echinus geminatus L. Bol. (*Mes. geminatum* Haw., *Mes. Matthewsii* L. Bol.). Branches ascending, up to 6 in. long, forked; L. erect, 3-angled, united for more than half their length, not much separated above, 1 in. long, the united portion $\frac{5}{8}$ in. wide, almost the same thick, the free part $\frac{1}{4}$ in. wide, glabrous, with a white, horny margin; F. $1\frac{1}{2}$ in. ϕ, white.

Erepsia N. E. Br.

Shrubs with erect, 2-angled, compressed stems. Somewhat united at the base, compressed 3-angled, with broad sides, with entire or horny keel. F. 1–3, red or white, in summer. Occurrence: Cape Province.

With beautiful flowers, may be planted out in summer or kept in a window, the flowers open even in dull weather. Winter at 45–50° F., propagation easy by seed or cuttings.

Er. inclaudens N. E. Br. (*Mes. inclaudens* Haw., *Mes. inclaudens* Eckl. et Zeyh., *Mes. mutabilis* Eckl. et Zeyh.) L. acute, sabre-shaped, $\frac{5}{8}$–1 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide below the tip, edge entire, glabrous, glossy green, somewhat reddish, with large transparent dots, F. on $1\frac{1}{2}$–2-in. long stalks, $1\frac{1}{2}$ in. ϕ, shining, purple-violet. Very beautiful plant for rooms.

Er. heteropetala Schwant. (*Mes heteropetalum* Haw.). L. spreading, sickle-shaped, laterally compressed, $\frac{3}{4}$ in. long, the sides $\frac{1}{4}$–$\frac{1}{3}$ in. wide, upper side *c.* $\frac{1}{4}$ in. wide, flat, somewhat grooved, green and with fine transparent dots, and bluish waxy coating, the edge horny, irregularly toothed, the edge of the keel with coarser teeth; F. $\frac{5}{8}$ in. ϕ, reddish or white

Faucaria Schwant.

Very succulent plants, at first stemless, later with short stems, branching in a tufted manner, with fleshy roots. L. 4–6 on a growth, decussate, very crowded, united at the base, spreading, fleshy, ± semicylindrical in cross-section near the base, towards the tip keeled and triangular in cross-section, shortly rhomboidal or elongated spatulate to lanceolate, on the edges and also on the upper surface usually with strong or long-awned teeth, lower side often prolonged over the upper like a chin, of firm texture; lower half glossy or dull, usually covered with more or fewer irregular markings; leaf edges and keel, as well as the teeth, horny. F. large, sessile, yellow, in August to November, or even later, opening in the afternoon. Occurrence: Karroo Desert (S. Africa).

Growing period autumn and winter, easily grown. Need a bright and airy position in greenhouse or window. During winter water freely, in summer rather less water is required. Temperature in winter not above 55° F. Propagation quick and easy from seed, but also possible from cuttings. Usually flowering in the second year! Recommended for growing in quantity.

F. albidens N. E. Br. Rosette with 5–6 pairs of leaves; L. 1 in. long, $\frac{3}{8}$ in. broad, wider in the middle, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, elongated triangular tapering, slightly convex above, back semicylindrical, keeled and boat-shaped towards the apex, surface glabrous, almost glossy, fresh green, with small, ± distinct,

scattered dots, the edges with 3–5 recurved, whitish-awned teeth, which arise from white horny projections, the keel with a white, horny band; F. $1\frac{1}{2}$ in. ϕ, golden yellow.

F. Bosscheana Schwant. (fig. 150) (*Mes. Bosscheanum* Bgr.) (named after L. van den Bossche, Tirlement, Belgium). L. 6–8, narrow lanceolate, or acute rhomboidal, *c.* $1\frac{1}{8}$ in. long, $\frac{3}{8}$ in. wide, glossy green, the edges whitish

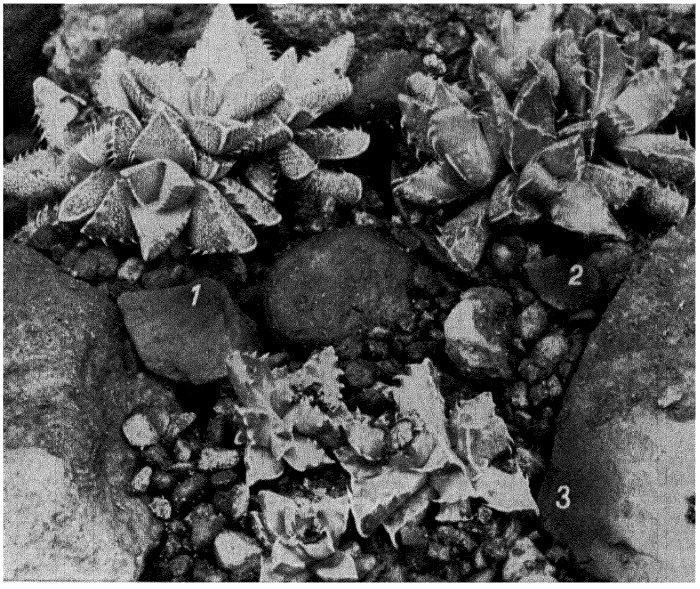


FIG. 150. 1. Faucaria tigrina Schwant. 2. F. felina Schwant. 3. F. Bosscheana Schwant. *c.* $\frac{1}{2}$ nat. size.

and horny, irregularly toothed, teeth 2–3 on each side, pointing backwards, $\frac{1}{12}$-$\frac{1}{8}$ in. long; F. $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, shining golden yellow.

F. Brittenae L. Bol. L. crowded, *c.* $1\frac{3}{8}$ in. long, rhomboidal ovate at the base $\frac{5}{8}$ in., in the middle $\frac{3}{4}$ in. wide, upper side slightly concave, back at first semicircular, sharply and obliquely keeled in the upper part and the tip drawn forward like a chin; surface grey-green with ± distinct grey dots; the edges and part of the keel surrounded by a whitish or reddish horny band $\frac{1}{25}$ in. wide, with 3–4 recurved teeth as fine as hairs in the middle.

F. Duncanii L. Bol. L. crowded, boat-shaped, *c.* 1 in. long, $\frac{1}{3}$ in. wide at the base, sharply keeled at the base; surface smooth, green, with irregular red dots at the end, dots on the edges and keel in lines or ± coalescing; edges ± regularly beset with 6–7 recurved teeth ending in a fine spike.

F. felina Schwant. (fig. 150) (*Mes. felinum* Haw.). L. 6–8, elongated rhomboidal, almost 3-sided, tapering gradually, $1\frac{1}{2}$–2 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad, fresh green, reddish when old, indistinctly dotted with white, the edges with 3–5 recurved, fleshy teeth with fine tips, the keel white and horny; F. solitary or in twos, *c.* 2 in. ϕ, golden yellow.

F. Haagei Tisch. (named after Walter Haage, of the firm of F. A Haage, jun., Erfurt). Is identical with *F. Bosscheana* Schwant. Edges with white horny margin, almost entirely without teeth.

F. lupina Schwant. (*Mes. lupinum* Haw.). L. spreading and curved, up to 1½ in. long, ⅝ in. wide, lanceolate, triangular tapering, tip 3-angled, chin-like, with a fine horny edge; fresh green, with numerous fine dots, smooth or only slightly roughened, leaf margins with 7–9 recurved teeth tapering to fine hairs; F. solitary 1⅛–1⅜ in. ϕ, yellow.

F. militaris Tisch. Forming clumps, stemless or short stemmed when old; growths with 1–3 pairs of leaves; L. boat-shaped, *c* 1⅛ in long, ⅓–½ in thick; upper side flat or slightly convex, ⅝–⅔ in. broad, at first uniformly broad, later tapering, the edges of the lower part horny, with ⅙–¼-in long, recurved, pink teeth with hair-like tips in the upper part, sharply keeled on the back, the keel drawn forward over the apex like a chin; keel edge pink and horny with 2–4 short teeth at the side; grey-green, lower side with fine white dots; F. 2½–3 in. ϕ, shining golden yellow, whitish in the centre, pale reddish-brown at the edge.

F. tigrina Schwant. (fig. 150) (*Mes tigrinum* Haw.). L much crowded, 1⅛–2 in. long, ⅝–1 in. broad, rhomboidal ovate, short-tipped, upper side flat, lower side much rounded, keeled above, the apex drawn forward like a chin, grey-green, with numerous white dots in rows; leaf edges with 9–10 stout, recurved teeth which end in fine hairs; F. 1–2, 2 in. ϕ, golden yellow. In a very light position the leaves become reddish, care should be taken that they are not burnt! Certain plants are always reddish.

F. tuberculosa Schwant. (*Mes. tuberculosum* Rolfe). L. very thick, about ¾ in. long, ⅝ in. wide, rhomboidal triangular, dark green, edges usually with three stout and several under-developed teeth, the upper side covered with tooth-like warts; F. 1½ in. ϕ, yellow.

Fenestraria N. E. Br.

Occurrence: Namaqualand (S.W. Africa).

In its native habitat the leaves are buried in the desert sand up to the transparent tops or "windows," and the sunlight can only penetrate to the chlorophyll by filtering through the translucent leaf ends. The plants are accustomed to intense illumination in nature, and consequently must be given as light a position as possible, otherwise the plants would soon rot off. Chief growing period in summer. It begins about the end of February. In summer only a moderate amount of water should be given, in winter hardly any at all. Since the Fenestraria resent repotting, it is a good plan to put the pots, through which as a rule the roots very quickly push their way, into a second pot of rather sandier soil. Propagation by seed, though growths can be rooted. Compost should consist of ¾ sand! Not below 57° F. in winter, light position!

Fen. aurantiaca N. E. Br. (fig. 151). Very succulent plant. Growth tufted, forming cushions 4 in. ϕ, with very thin roots; L. erect, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, clavately thickened above, upper side slightly flattened, back rounded, convex at the end, circular, $\frac{1}{4}$–$\frac{1}{3}$ in. ϕ, or roundly triangular; surface smooth, whitish,

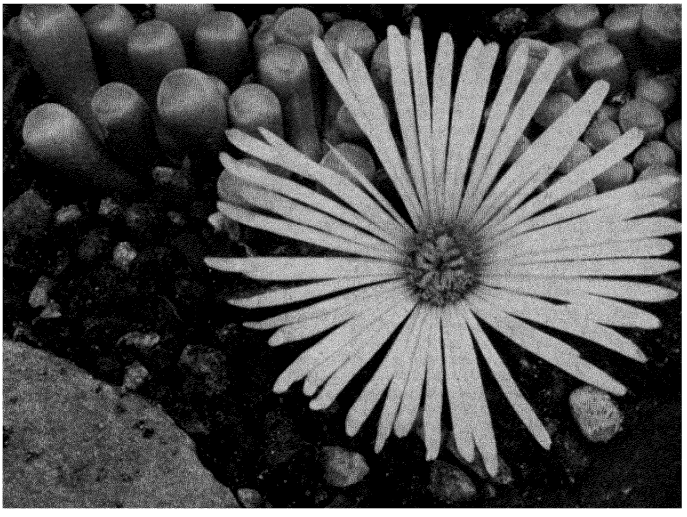


FIG. 151.—Fenestraria aurantiaca N. E. Br. Almost nat. size.

± reddish at the base, with scattered transparent dots towards the end, the convex end almost transparent and without chlorophyll; F. on $1\frac{1}{2}$–2-in. long stalks, $1\frac{1}{8}$–3 in. ϕ, orange yellow, August or even later.

Fen. rhopalophylla N. E. Br. (*Mes. rhopalophyllum* Schl. et Diels). Very like the preceding; L. shorter and more club-shaped; F. $\frac{2}{3}$–$1\frac{1}{8}$ in. ϕ, white.

Frithia N. E. Br.

(Named after Frank Frith, S. Africa.)

Occurrence: West Transvaal, S.W. Africa. Growing period in winter. Flowering period March to April. Needs a warm, light position in very sandy soil, quite dry in summer, in winter moderately moist; propagation easy from seed. Desirable, rather difficult species.

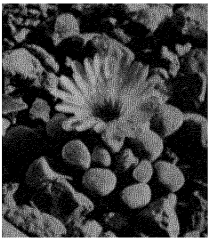


FIG. 152. Frithia pulchra N. E. Br. (Photo, F. Kahl.) $\frac{3}{4}$ nat. size.

Fr. pulchra N. E. Br. (fig. 152). Small, stemless plant; L. 3–9, arranged in a rosette, erect, *c.* $\frac{3}{4}$ in. long, somewhat clavate or almost cylindrical, truncate and roughened above, translucent like a window, $1\frac{1}{8}$–$2\frac{1}{2}$ in. thick, grey-

green; F. solitary, sessile or almost so, $\frac{1}{3}$–$\frac{3}{4}$ in. ϕ, carmine, white in the centre. (The plant looks very like a *Fenestraria*.)

Gibbaeum Haw.

Perennial, tufted, stemless plants or with prostrate branches. Growths consisting of ovate, obovate or almost spherical bodies, which are slightly notched or distinctly divided into even or uneven "lobes," with the cleft above or below the apex; or bodies obliquely ovate or cylindrical with a fissure on one side. The bodies consist of two opposite, ± united leaves, in some cases separated from each other above; F. stalked, white or rosy lilac, in late autumn or early spring. Occurrence: Karroo (S. Africa).



FIG. 153.—Gibbaeum album N. E. Br. ⅔ nat. size.

Very interesting plants. The chief growing period varies with the species, and the plants then need a very light position in a greenhouse or window at a minimum temperature of 60° F. Water should be given in moderation, in the resting period keep the plants quite dry. Propagation is easy from seed, and cuttings grow readily.

G. album N. E. Br. (fig. 153). Forming clumps; L. of different lengths; united to an obliquely ovate body, $\frac{3}{4}$–1 in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. wide, rather less thick; fissure at first hardly recognisable, later gaping a little; surface glabrous, closely covered with minute, fine, white hairs; F. on $\frac{1}{2}$-in. long stalks, 1 in. ϕ, white. Very beautiful species. Cultivation as for *G. dispar*.

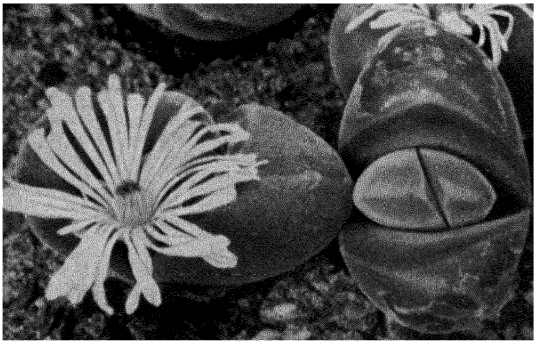


FIG. 154.—Gibbaeum dispar N. E. Br. (Photo. R. Graessner.)

G. album N. E. Br. **v. roseum** N. E. Br. A pink-flowered variety of the foregoing.

G. Comptonii L. Bol. (named after Dr Compton, Kirstenbosch, S.

Africa). Leaf pairs usually in twos; L. elongated-hemispherical, pale green; F. $1\frac{1}{2}$ in. ϕ, red. August. Towards the end of the growing period.

G. dispar N. E. Br. (fig. 154). Forming clumps; bodies consisting of two leaves, unequal, the size of an egg, often bluntly keeled, fairly thick; fissure very deep; at first the leaves lie close together; grey-green flushed with brown, rather glossy, with fine, velvety hairs; F. $\frac{1}{3}$–$\frac{2}{5}$ in. ϕ, lilac red, in August. Growing period in summer; needs full sun and little moisture, the bodies may be allowed to shrivel a little in the resting period. Seedlings flower in the second year. Difficult!



FIG. 155.—Gibbaeum Nelii Schwant. (Photo, K. Josefsky.)

G. geminum N. E. Br. (fig. 157) (*Mes. geminum* N. E. Br.). Low plant, stems and branches short and prostrate, forming cushions; growths with 2–3 decussate pairs of leaves; L. united at the base, spreading, unequal in length, the larger $\frac{5}{8}$ in. long, $\frac{1}{4}$ in. thick, roundish, little compressed, with a distinct ridge running over the apex; the smaller leaf only $\frac{1}{4}$–$\frac{1}{5}$ as long as the larger, pale grey-green, with fine white hairs under a lens; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, magenta. Grows from January to summer.

G. gibbosum N. E. Br. (*Mes. gibbosum* Haw.). Stems when old $\frac{3}{4}$–$1\frac{1}{8}$ in. long, prostrate, with numerous short branches; L. spreading, united at the base, unequally long, ovate, semicylindrical, very rarely somewhat keeled below the tip, yellowish-green; F. $\frac{1}{2}$ in. ϕ, reddish.

G. Haagei Schwant. spec. nova (named after Walter Haage, Erfurt). Low, tufted plants, hardly more than $\frac{3}{4}$ in. high; growths numerous with 1 or 2 pairs of leaves, opposite leaves of different lengths, $\frac{1}{4}$ in. united together, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{3}$ in. broad, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, upper side flat or slightly concave, back at first semicircular, then somewhat obliquely keeled, the longer leaves with the back drawn far over the tip; smooth, bluish grey-green; F. on $\frac{5}{8}$-in. long stalks, *c.* $\frac{3}{4}$ in. ϕ, lilac red.

G. luteoviride N. E. Br. (*G. perviride v. luteoviride* N. E. Br., *Mes. luteoviride* Haw.). Stems thin, prostrate, $\frac{3}{4}$–2 in. long; L. oval, semicylindrical, 3-angled above, yellowish-green; F. solitary, sessile, pink, in February, grows from winter to early summer.

G. Muiri Schwant. (*Mentocalyx Muiri* N. E. Br.). Similar to *G. velutinum*; L. rather longer and less obliquely keeled.

G. Nelii Schwant. (fig. 155) (*Mes. obtusum* L. Bol., hort. (Haw. ?)) (named after Dr G. C. Nel, Stellenbosch, S. Africa). Forming close clumps; L. *c.* $1\frac{1}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad and thick, upper side flat or slightly convex, back semicylindrical, somewhat angled above, surface grey-green or even reddish, smooth or rather wrinkled; F. short stalked, 2–$2\frac{1}{2}$ in. ϕ, pink.



FIG. 156.—Gibbaeum perviride N. E. Br. (Photo, K. Josefsky.)

G. perviride N. E. Br. (fig. 156) (*Mes. perviride* Haw.). Forming clumps; stems 2–3 in. long, prostrate; L. 3-angled, semicylindrical or almost semiovate, dark green; F. very short stalked, reddish, January–March. Grows from winter to early summer.



FIG. 157.—1. Gibbaeum geminum N. E. Br. 2. G. Shandii N. E. Br. 3. G. pilosulum N. E. Br. $\frac{2}{3}$ nat. size.

G. perviride v. luteoviride N. E. Br. = *G. luteoviride* N. E. Br.

G. pilosulum N. E. Br. (fig. 157) (*Conophytum pilosulum* N. E. Br.,

Mes. pilosulum N. E. Br.). Tufted; L. united into obovate bodies, 1 in. high, $\frac{7}{8}$ in. broad, near the fissure $\frac{5}{8}$–$\frac{2}{3}$ in. thick, fissure not exactly in the centre, notch $\frac{1}{8}$–$\frac{1}{6}$ in. deep, $\frac{2}{5}$ in. long; the bodies split below as the new bodies emerge; F. $\frac{1}{4}$ in. ϕ, lilac red. December–January; grows in winter to the beginning of summer.

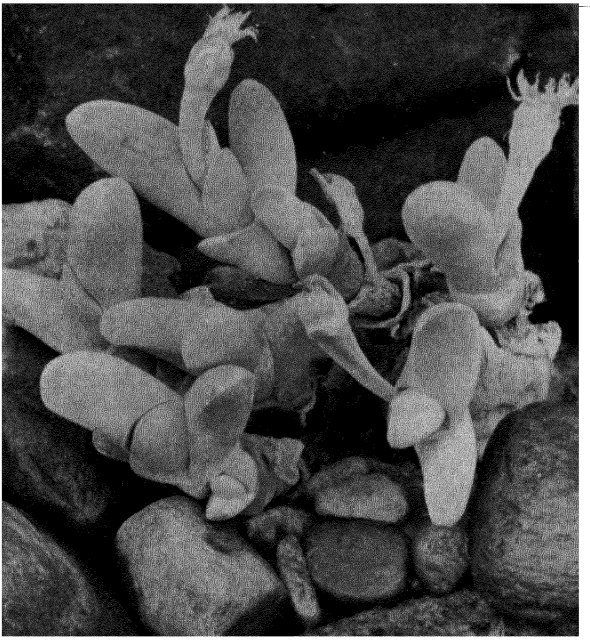


FIG. 158.—Gibbaeum pubescens N. E. Br. Almost nat. size.

G. pubescens N. E. Br. (fig. 158) (*Mes. pubescens* Haw.). Stems short, woody, branched, enveloped in the dead leaves; growths with 2–3 pairs of decussate leaves; L. united at the base, spreading, of unequal length, the larger $1\frac{1}{8}$ in. long, roundish, somewhat laterally compressed above and obliquely keeled, tip rather hooked, up to $\frac{5}{8}$ in. thick, the smaller only a third as long as the larger, blunt, flat or only weakly keeled; surface covered with short, soft, fine, felty, adpressed hairs, whitish-grey; F. up to $\frac{3}{4}$ in. long, stalks $\frac{5}{8}$ in. ϕ, violet-red, in February–March. Beautiful, rare species. Chief period of growth December to spring.

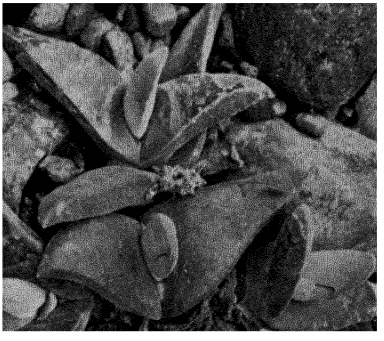


FIG. 159.—Gibbaeum velutinum Schwant. $\frac{3}{5}$ nat. size.

G. Shandii N. E. Br. (fig. 157). Stems when old $\frac{3}{4}$–$1\frac{1}{8}$ in. long, prostrate; pairs of leaves 2–3; L. united at the base, spreading, ovate, semicylindrical, of unequal length, the large *c.* $1\frac{1}{8}$ in., the other only a third as long; F. very short stalked, $\frac{1}{2}$ in. ϕ, reddish, in February, grows from winter to May or June.

G. velutinum Schwant. (fig. 159) (*Mes. velutinum* L. Bol., *Mentocalyx velutina* N. E. Br.). Tufted, the prostrate branches enveloped in the old dry leaves; growths with 1–2 decussate pairs of leaves; L. united at the base, wide spread, ± lying on the ground, of unequal length, the longer 2–$2\frac{1}{2}$ in. long, at the base 1–$1\frac{1}{8}$ in. broad, tip tapering, upper side fairly concave, lower side obliquely keeled, the tip ± curved in like a hook; the

shorter leaf about 1½ in. long, triangular-acute, upper side slightly convex, lower side very obliquely keeled, the edge of the keel prolonged over a lateral edge; surface pale grey bluish-green, with fine, whitish hairs under a lens; F. on 1⅛–2-in. long stalks, 1½–2 in ϕ, white, March–April. Grows from December to summer.

Glottiphyllum Haw.

Low, perennial, very succulent plants with forked stems, leaves ± in two rows or decussate, crowded, four or more to a growth, upper side rather bulged at the base. Usually three or many times as long as broad, in a few species only a little longer than broad; obliquely tongue-shaped, semicircular or almost cylindrical, leaves of a pair almost equal or of unequal length, leaf tips blunt, ⊥ curved outwards or pointed; thick, with soft flesh, fresh, glossy green, or whitish-green or rather brownish, in some species even with transparent dots. F. solitary, lateral, sessile or short stalked, very large, shining yellow, September to January, or even earlier. Occurrence: Cape Province.

Easily grown and free flowering. They should be increased from cuttings since they hybridise easily, and seed often is not true. Chief period of growth June to the end of January. At the end of May the plants should be put out of doors in a very sunny place in little soil, and not watered even when it is very dry. The plants must be protected from heavy rain. They should be wintered in shallow pans or wooden boxes in a mixture of ¼ sand and ¾ sieved ash, kept above 32° F., light and dry.

Gl. apiculatum N. E. Br. L. 4–6 to a growth, decussate, curved backwards, with a hard red tip, lanceolate, 1½–2½ in. long, at the base ⅓–½ in. wide, and ¼–⅖ in. thick; smooth, grass green, somewhat reddish at the base, F. on ½-in. long stalks, 2–2½ in ϕ, shining golden yellow.

Gl. arrectum L. Bol. Growths with 2–3 decussate pairs of leaves, L. spreading, oblong, semicylindrical, at the end with a hardened spiny tip, 1½–2 in. long, ⅓ in. wide and thick, upper side flat or slightly convex, back round, distinctly keeled towards the end; green; F. sessile, 1½ in. ϕ, golden yellow.

Gl. cruciatum N. E. Br. (*Mes. cruciatum* Haw.). L. oblique, decussate, sickle-shaped, curved upwards or downwards, linguiforme, 3¼–4 in. long, ⅝–¾ in. wide, semicylindrical, unilaterally thickened, obliquely keeled towards the tip; pale green; F. solitary, on a 2-in. long stalk, 2½ in. ϕ, yellow.

Gl. depressum N. E. Br. (fig. 160). L. 3–4 pairs to a growth, very crowded, arranged in two rows, lying close to the ground, the end curved upwards, oblong, obliquely keeled, 4 in. long, 1 in. wide, ⅖–½ in. thick, green; F. on ¾-in. long stalks, 1 in. ϕ, yellow.

Gl. difforme N. E. Br. (*Mes. difforme* Haw.). Stems up to 6 in. long, little branched, prostrate; L. oblique, decussate, rather obliquely curved to one side, narrow linguiform, of different lengths, ½–⅝ in. broad, semicylindrical,

the shorter 2 in. long, with blunt tip, the longer $3\frac{1}{4}$ in. long, with compressed and keeled tip prolonged forward, with a tooth-like, fleshy protuberance $\frac{3}{4}$–$1\frac{1}{8}$ in. below the tip; glossy, pale green, smooth, with fine, transparent dots; F. on $\frac{3}{4}$–1-in. stalks, $1\frac{3}{8}$–$1\frac{1}{2}$ in. ϕ, yellow.

Gl. Fergusoniae L. Bol. (named after Mrs Emily Ferguson, Riverdale, S. Africa). L. 6–8 to a growth, decussate, united at the base, rather erect, the end slightly recurved, rather oblique, semicylindrical, narrowed towards the



FIG. 160.—Glottiphyllum depressum N. E. Br. $\frac{2}{3}$ nat. size.

tip, one leaf tapering, the other ± distinctly compressed, keeled, elongated and blunt ended; $\frac{2}{5}$–$\frac{1}{2}$ in. long, $\frac{7}{8}$ in. broad, $\frac{2}{3}$–$\frac{5}{8}$ in. thick, with soft flesh, dark green; F. sessile, 2–$2\frac{1}{2}$ in. ϕ, yellow.

Gl. fragrans Schwant. (*Mes. fragrans* S.D., *Mes. linguiforme* L. *v. fragrans* Bgr.). L. obliquely tongue-shaped, very crowded, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, 1 in. broad, in the middle about $\frac{1}{2}$ in. thick, one side rather convex, blunt at the tip, the other side keeled; F. sessile, $3\frac{1}{4}$–4 in. ϕ, shining, golden yellow, sweet scented.

Gl. grandiflorum N. E. Br. (*Mes. grandiflorum* Haw., *Mes. linguiforme* L. *v. grandiflorum* Bgr.). L. broadly linguiform, pointing downwards, 4–6 in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. wide, up to $\frac{5}{8}$ in. thick, obliquely round, pointing upwards at the apex, the lower edge sharp, the upper blunt or from apex to middle curved inwards, the upper side slightly concave, pale green; F. sessile, $3\frac{3}{4}$–4 in. ϕ, yellow.

Gl. latum N. E. Br. (*Mes. linguiforme* L. *v. latum* S.D., *Mes. linguiforme v. obliquum* Bgr., *Mes. obliquum* Willd., *Mes. latum* Haw., *Mes. medium*

Haw.). L. unequal linguiform, L. up to $3\frac{3}{4}$ in. long, 1 in. wide, sickle-shaped, curved downwards, the tip thicker, obliquely truncate and curved upwards, dark green; F. short stalked, $2-2\frac{1}{2}$ in. ϕ, golden yellow.

Gl. latum N. E. Br. **v. cultratum** (*Mes. linguiforme* L. *v. cultratum* Bgr., *Mes. cultratum* S.D.). L. linguiform, a little or hardly curved, *c.* $3\frac{1}{4}$ in. long, 1 in. broad, edges sharp, tip blunt; F. on stalks about $\frac{3}{4}$ in. long.

Gl. linguiforme N. E. Br. (fig. 161) (*Mes. linguiforme* L., *Mes. scalpratum* Haw., *Mes. lucidum* Mill.). L. arranged in two rows, the upper side

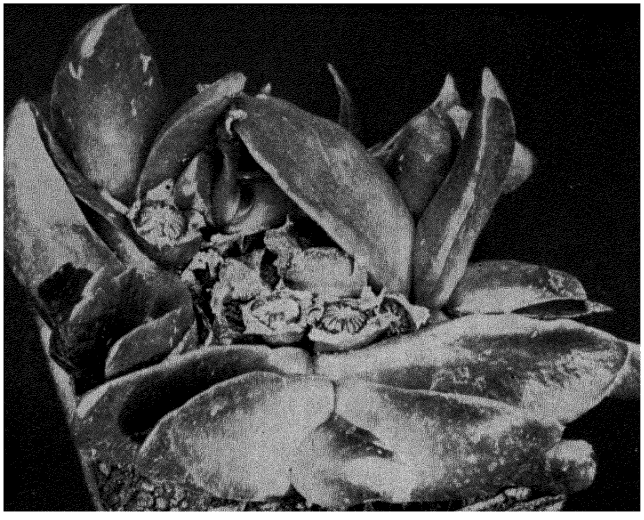


FIG. 161.—Glottiphyllum linguiforme N. E. Br. $\frac{1}{2}$ nat. size.

obliquely pointing forwards, tongue-shaped, $2-2\frac{1}{2}$ in. long, $1\frac{1}{8}-1\frac{1}{2}$ in. broad, slightly curved outwards above, the lower edges usually much thickened, bluntly rounded at the end, with soft flesh, glossy fresh green; F. short stalked, 2–3 in. ϕ, golden yellow. Well-known species of which the true form is seldom found. Most of the plants under this name are hybrids.

Gl. longum N. E. Br. (*Gl. pustulatum* N. E. Br., *Mes. linguiforme* L. *v. longum* Bgr., *Mes. longum* Haw., *Mes. linguiforme* S.D., *Mes. linguiforme* L. *v. pustulatum* Bgr.). L. more erect, linguiform, rather narrower above, 3–4 in. long, $\frac{3}{4}$ in. broad, upper side flat, with blunt tip, dark green; F. on stalks $3-3\frac{1}{4}$ in. long, $2\frac{1}{2}-3\frac{1}{4}$ in. ϕ, golden yellow.

Gl. Marlothii Schwant. (fig. 162) (named after Dr R. Marloth, Cape Town). L. arranged in two rows, one leaf of the pair $2\frac{1}{2}-3$ in. long, the other rather shorter, $\frac{1}{2}-\frac{5}{8}$ in. broad; the longer one rather concave on the upper side, strongly keeled, the tip curved in like a hook; the shorter one concave on upper and lower sides, the end slightly recurved, fresh green, with scattered, transparent dots; F. almost sessile, 3 in. ϕ, golden yellow. Very free flowering.

Gl. Neilii N. E. Br. (fig. 163) (named after Neil van der Bijl, Great Brak

River, S. Africa). Growths with 3–4 pairs of leaves; L. arranged in two rows, one edge ± lying on the ground, of different lengths, the longer $4\frac{3}{8}$–$4\frac{3}{4}$ in. long, $1\frac{3}{8}$–2 in. wide, at the base almost $\frac{3}{4}$ in. thick, tongue-shaped, obliquely



FIG. 162.—Glottiphyllum Marlothii Schwant. $\frac{3}{5}$ nat. size.



FIG. 163.—Left, Glottiphyllum Neilii Schwant; right, Gl. Neilii N. E. Br. $\frac{1}{2}$ nat. size.

truncate, the tip often curved in like a hook; dull glossy, opalescent grey-green, often redder in the sun; F. on stalks almost $\frac{3}{4}$ in. long, $3\frac{3}{4}$–4 in. ϕ, yellow.

Gl. Nelii Schwant. (fig. 163) (named after Dr G. C. Nel, Stellenbosch, S. Africa). Growing in compact clumps; L. arranged in two rows, fairly

erect, 2 in. long, one leaf of the pair shorter, *c.* $\frac{3}{4}$ in. broad, $\frac{1}{2}$ in. thick; the longer with the upper side flat, obliquely keeled, the tip rounded, rather curved in like a hook; the shorter leaf curved rather outwards with round tip; pale green; F. sessile, $1\frac{1}{2}$ in. ϕ, golden yellow.

Gl. parvifolium L. Bol. L. ± distinctly decussate, ascending, elongated, rather obliquely semicylindrical, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. wide and thick, at the apex with a small, hardened, spiny tip, upper side flat or slightly concave, back round, keeled towards the tip; green; F. sessile, $3\frac{1}{4}$ in ϕ, shining golden yellow.

Gl. Peersii L. Bol. Compact plants, growths with 2–3 pairs of opposite leaves of different lengths; L. oblong, keeled at the end, 1 and $1\frac{3}{8}$ in. long, $\frac{5}{8}$ in. wide, $\frac{3}{8}$–$\frac{2}{3}$ in. thick, upper side flat or trough-like, back much rounded; dull glossy, grey-green with a reddish tinge.

Gl. praepingue N. E. Br. (*Mes. praepingue* Haw.). L. oblique decussate, spreading and curved inwards, obliquely linguiform, $1\frac{1}{2}$–3 in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. wide, semicylindrical, tip ± compressed, curved outwards, ± prolonged forward, smooth, pale green, the younger leaves finely ciliate along the edge; F. solitary, short stalked, 2 in. ϕ, yellow.

Gl. pustulatum N. E. Br. = *Gl longum* N. E. Br.

Gl. Salmii N. E. Br. (*Mes. Salmii* Haw.) (named after Prince Salm-Dyck, Reifferscheid). L. decussate, erect, variously curved, 3–4 in long, $\frac{5}{8}$–$\frac{3}{4}$ in. broad, obliquely semicylindrical, narrowed above, one of the pair tapering, the other compressed, keeled, elongated, and bluntly tipped, fresh green; F. solitary, sessile, $2\frac{1}{2}$ in. ϕ, yellow.

Gl. semicylindricum N. E. Br. (*Mes. semicylindricum* Haw.). When old, with small stems and stiff, spreading branches; growths with 2–3 decussate pairs of leaves; L ± prostrate, narrow and incurved and united to a short sheath at the base, semicylindrical, compressed and keeled at the end, with apex prolonged forward, $1\frac{1}{2}$–2 in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide and thick, upper side flat or concave, with small tooth-like projections at the edges and in the middle; fresh glossy green, with a few raised, transparent dots; F. on stalks 1 in. long, $1\frac{1}{2}$ in. ϕ, golden yellow.

Hereroa Dtr. et Schwant.

(Named after the S.W. African race, the Hereros. This genus is often included in the genus *Rhombophyllum*.)

Stemless plants forming clumps. L. decussate, with soft flesh, ± united at the base, semicylindrical below, above laterally compressed and expanded, with large dots. F. several on one flower stem, stalked, medium sized, yellow or pink, May and June. Occurrence: S.W. Africa.

Easily grown plant, growing period in summer under glass or in a bright window, in winter fairly warm and bright. Propagation from seed. F. in second year. Suitable for growing in quantity.

H. cana L. Bol. = *Bijlia cana* N. E. Br.

H. carinans Dtr. et Schwant. (*Mes. carinans* Haw.). Pairs of leaves usually of unequal length, curved spreading, 1–1$\frac{1}{8}$ in. long, $\frac{3}{4}$ in. thick, keeled and expanded above, about $\frac{1}{4}$–$\frac{1}{3}$ in. wide below the tip which is curved inwards, angles blunt, edge entire; dull green, when old grey-green, with numerous, green, raised dots. F. 1–3, on 1$\frac{1}{8}$–1$\frac{1}{2}$-in. long stalks, 1$\frac{1}{8}$–1$\frac{1}{2}$ in. ϕ, yellow.

H. Derenbergiana Schwant. = *Ebracteola Derenbergiana* Dtr. et Schwant.

H. granulata Dtr. et Schwant. (*Mes. granulatum* N. E. Br.). L. spreading, often prostrate, slightly recurved, $\frac{1}{6}$–$\frac{1}{4}$ in. long, $\frac{1}{4}$ in. broad, $\frac{1}{12}$ in. thick, at first semicylindrical, keeled above, and somewhat expanded, with small tip at the end; dark green, roughened with numerous, ± transparent dots.

H. Herrei Schwant. (named after H. Herre, Stellenbosch, S. Africa). Similar to *H. granulata*.

H. hesperantha Dtr. et Schwant. (fig. 164) (*Mes. Bergerianum* Dtr., *Mes. hesperanthum* Dtr. et Bgr.). L. at first almost horizontal, later curved

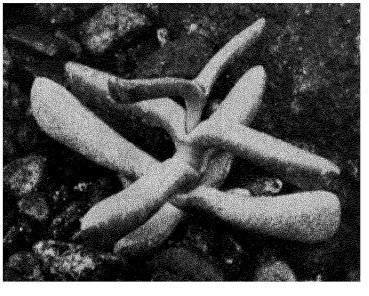


FIG. 164.—One-year-old seedling of Hereroa hesperantha Dtr. et Schwant. $\frac{3}{4}$ nat. size.

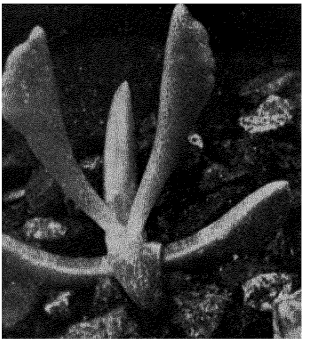


FIG. 165.—One-year-old seedling of Hereroa Nelii Schwant. $\frac{3}{4}$ nat. size.

upwards, 1$\frac{3}{8}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. thick, compressed and widened above, *c.* $\frac{1}{3}$ in. broad, edges and keel rounded; grey-green, with dark, hardly raised dots.

H. Nelii Schwant. (fig. 165) (named after Dr G. C. Nel, Stellenbosch, S. Africa). Growths with 1–3 pairs of leaves; L. sickle-shaped; 1–1$\frac{1}{8}$ in. long, $\frac{1}{5}$ in. wide, up to $\frac{2}{5}$ in. thick, upper side flat, back indistinctly keeled at the end, and ± rounded below, green, with numerous transparent warts; F. 1–3, yellow.

H. Rehneltiana Dtr. et Schwant. (*Mes. Rehneltianum* Bgr.) (named after F. Rehnelt, Giessen). Stems with short branches; L. erect, somewhat curved inwards or outwards, 2$\frac{1}{2}$–4 in. long, up to $\frac{3}{8}$ in. broad, *c.* $\frac{1}{4}$ in. thick, upper side flat or slightly concave, the upper third compressed and keeled, at the keel about $\frac{3}{8}$ in. wide, edges rounded, blunt above, with small horny tip, with very soft flesh, pale green, with numerous, somewhat raised, transparent dots; F. 3–7 on a 4–8-in. stem, stalks 1$\frac{1}{8}$–3$\frac{1}{4}$ in. long, $\frac{7}{8}$ in. ϕ, yellow.

H. Puttkammeriana Dtr. et Schwant. (*Mes. Puttkammeriana* Bgr. et Dtr.). L. curved inwards and, above, outwards, $2\frac{1}{2}$–3 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide, blunt, 3-angled, above semicylindrical, slightly glossy, grey-green, reddish above, with dark, raised dots, especially on the keel; F. 1–3, orange.

H. Tugwelliae L. Bol. = *Bijlia cana* N. E. Br. Owing to differences of opinion between the authors L. Bolus, N. E. Brown and Dr Schwantes the name *Hereroa Tugwelliae* was included in the synonomy for *Bijlia cana* N. E. Br. *Hereroa Tugwelliae* L. Bol. represents, however, another species which is not identical with *Bijlia cana* (see *South African Gardening and Country Life*, vol. xx, 1930, p. 122).

Herreanthus Schwant.

(Named after H. Herre, Stellenbosch, S. Africa.)

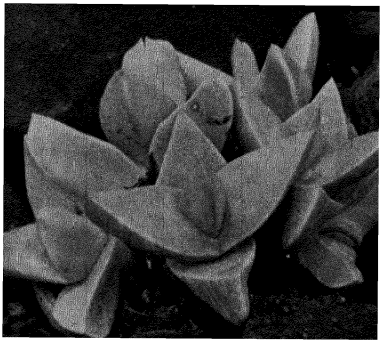


FIG. 166.—Herreanthus Meyeri Schwant. $\frac{2}{3}$ nat. size.

Branched, very succulent plants. Occurrence: Little Namaqualand, S. Africa. Chief growing period in autumn in a greenhouse or window; the plants need plenty of warmth and light, and should have a moderate amount of water during growth only; in winter they need a light position not below 60° F. Propagation from seed, also easy from cuttings. A good species, deserves to be better known.

Herreanthus Meyeri Schwant. (fig. 166) (named after G. Meyer, Steinkopf, S. Africa). Tufted, with thready roots; L. decussate, thick, triangular, $1\frac{1}{2}$ in. long, $1\frac{1}{8}$ in. broad, $\frac{5}{8}$ in. thick, united together for $\frac{3}{8}$ in., upper side tapering, triangular, flat, ending in a little spine; lower side flatly keeled half-way, semi-cylindrical at the base; of firm texture, pale bluish-green, smooth, with inconspicuous dots; F. almost sessile, 1 in. ϕ, white, in August. Opening day and night, scented. Remaining open almost 10 days.

Hydrodea N. E. Br.

Small, annual, branched, papillose herbs, L. opposite or alternate, usually cylindrical, thick, very fleshy papillose, green; F. terminal

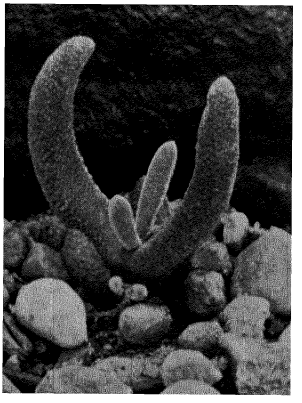


FIG. 167.—Hydrodea Hampdenii N. E. Br. Almost nat. size.

or axillary, short stalked, small, whitish, in late summer. Occurrence: St Helena, Great Namaqualand.

Interesting small plants. Cultivation as for *Cryophytum*.

Hydrodea cryptantha N. E. Br. (*Mes. cryptanthum* Hook. f.), St Helena. 10–12 in. high, stem almost $\frac{3}{8}$ in. thick, forked or branched in threes; 1–2 in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, roundish, blunt.

Hydrodea Hampdenii N. E. Br. (fig. 167), Great Namaqualand. Stem ± creeping; the lower L. opposite, united at the base, oblong, blunt, very thick and fleshy; L. on the flowering branches alternate, ± cylindrical or clavate, very thick and fleshy.

Hymenocyclus Dtr. et Schwant.

Shrubby plants with erect branches. L. shortly united at the base, 3-angled, prismatic, elongated, semicylindrical, with soft flesh, with slight blue waxy covering, without dots; F. axillary or terminal, short stalked, golden yellow, $1\frac{1}{8}$–2 in. ϕ, in autumn and winter. Occurrence: Cape Province.

Easy plant, flowering in late autumn and winter. Plant out of doors in summer. In winter keep in the cold house. Propagation easy from seed, seedlings often flower the first year; or from cuttings.

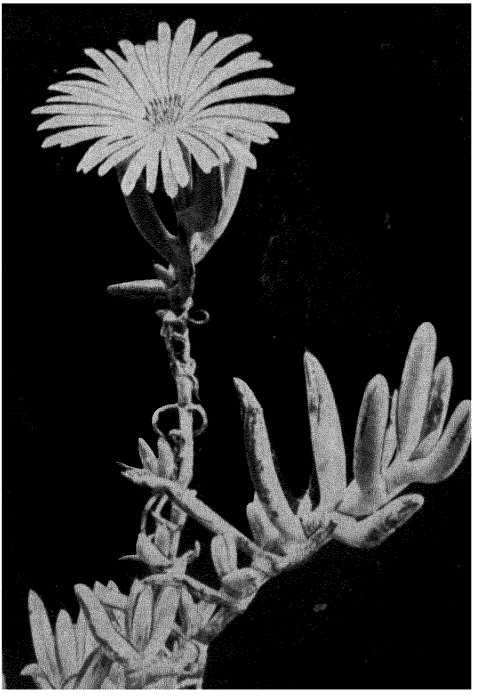


FIG. 168. Hymenocyclus luteus Schwant. $\frac{2}{3}$ nat. size.

Hym. croceus Schwant. (*Mes. croceum* Jacq., *Mes. purpureo-croceum* Haw.). Branches stout, grey-brown, somewhat knotted; L. crowded on the short shoots, erect, the older ones spreading, 1–$1\frac{3}{4}$ in. long, $\frac{1}{4}$ in. broad, blunt at the tip, faintly 3-angled, compressed, pale green, mealy; F. solitary, terminal, on stalks 1–$1\frac{3}{4}$ in. long, $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, golden yellow inside, reddish outside.

Hym. Herrei Schwant. (named after H. Herre, Stellenbosch, S. Africa). Branches usually prostrate, often rooting in the soil; L. on the erect growths decussate, those on the prostrate branches ± lying in one plane, 2 in. long,

$\frac{1}{5}$ in. broad, triangular in cross-section, roundly keeled; green; F. from the axils, on stalks $1\frac{1}{8}$ in. long, 2 in. ϕ, golden yellow, reverse orange.

Hym. luteus Schwant. (fig. 168) (*Mes. luteum* Haw., *Mes. purpureo-croceum* Haw. *v. flavocroceum*). Erect plant; branches brown, with many short shoots, L. spreading, $1-1\frac{3}{4}$ in. long, $\frac{1}{6}$ in. wide, narrowed above, compressed, 3-angled, tapering shortly; yellowish-green, frosted with white; F. terminal, on $1-1\frac{3}{8}$-in. long stalks, 1 in. ϕ, orange and yellow.

Imitaria N. E. Br.

Imitaria Muiri N. E. Br. (fig. 169) (named after Dr J. Muir). Stemless, forming clumps, very succulent plants; pairs of leaves united to roundish bodies, 2–8 together, $\frac{1}{2}-1$ in. high, $\frac{2}{5}-\frac{5}{8}$ in. broad, $\frac{1}{3}-\frac{5}{8}$ in. thick, the fissure going right across, the tip divided into 2 lobes; texture soft and fleshy; surface smooth, velvety, with very fine hairs, dark grey-green or brownish, in cultivation pale green, the tips rather transparent; F. solitary from the fissure, $\frac{3}{4}$ in. ϕ, pink, October. Occurrence: Little Karroo (S. Africa).



FIG. 169.—Imitaria Muiri N. E. Br. *c.* $\frac{2}{3}$ nat. size.

Cultivation as for *Gibbaeum dispar*, in a bright and warm position.

Juttadinteria Schwant.

(Named after Frau Jutta Dinter, wife of Prof. K. Dinter, Bautzen.)

Very succulent plants with ± woody roots, half-shrubs, tufted or growing in clumps. L. decussate, very thick to half egg-shaped or broadly boat-shaped, very short or broadly linear or ± triangular or even rhomboidal spatulate, united at the base and often swollen, ± semicylindrical, towards the end triangular in cross-section, with fairly sharp edges and keel or rounded edges; upper leaf edges, often the keel also, and the upper part of the under side of the leaf covered with fairly blunt and broad protuberances or teeth. Lower side often prolonged forward like a chin; surface fairly firm, whitish-grey, pale yellow-green, bluish or whitish-green. F. short stalked or almost sessile, medium sized to large, white, lilac or violet, in August. Occurrence: S.W. Africa.

J. albata L. Bol. (fig. 170). Branches short, erect, with many leaves; L. somewhat spreading, $\frac{3}{4}-1$ in. long, upper side flat or slightly convex, $\frac{3}{8}$ in. broad at the base, widening above and triangular tapering, lower side at first

round, then sharply keeled, broadly compressed; surface smooth, whitish grey-green, with scattered, transparent dots, keel and edges reddish, the dots there running into lines.

J. cinerea Schwant. = *Namibia cinerea* Dtr. et Schwant.

J. decumbens Schick et Tisch., Namaqualand. Forming tufts; prostrate *c.* 2 in. high; growths fairly close, with 1–2 pairs of leaves; L. united for $\frac{1}{3}$–$\frac{1}{2}$ of their length, $\frac{5}{8}$–$1\frac{1}{8}$ in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. broad, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, upper side flat or slightly convex with a blunt tip, back very convex, broadly keeled towards the tip; surface smooth, whitish-green; F. on $\frac{3}{8}$–$\frac{3}{4}$-in. long stalks, 1–$1\frac{1}{8}$ in. ϕ, white. Older plants grow mainly with both sides in one direction, so that the clumps are therefore longer than broad.

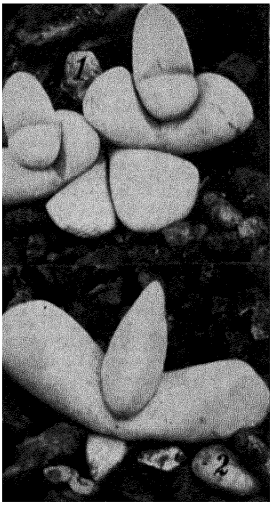


FIG. 170.—1. Juttadinteria deserticola Schwant. 2. J. albata L. Bol. $\frac{2}{3}$ nat. size.

J. Delaetianus Dtr. et Schwant. = *Dracophilus Delaetianus* Dtr. et Schw.

J. deserticola Schwant. (fig. 170) (*Mes. deserticolum* Marl.). Branches short, erect, with many leaves; L. $\frac{3}{8}$–$\frac{5}{8}$ in. long, upper side flat or slightly convex, *c.* $\frac{3}{8}$ in. broad, roundish tapering, lower side semicylindrical, keel hardly visible, the lower side much drawn forward over the apex, $\frac{3}{8}$–$\frac{1}{2}$ in. thick; surface smooth, whitish grey-green, the edges with scattered, transparent dots; F. white, $\frac{2}{3}$ in. ϕ.

J. kovisimontana Dtr. et Schwant. (*Mes. kovisimontanum* Dtr.), Great Namaqualand. Forming cushions up to 8 in. ϕ; branches scarcely woody, $2\frac{1}{2}$–4 in. long, internodes hardly recognisable; L. $\frac{5}{8}$–$\frac{7}{8}$ in. long, $\frac{3}{8}$–$\frac{2}{3}$ in. thick, whitish-green, surface with close granules, young L. slightly but distinctly dotted; upper side rather convex, $\frac{3}{8}$ in. wide at the base, $\frac{3}{4}$ in. wide at the base of the triangular end portion, with low tubercles on the edge of the triangular apex; keel very blunt; F. short stalked, *c.* $\frac{7}{8}$ in. ϕ, white. The plant is like *J. Simpsonii* L., stumpier and rougher.

J. Montis Draconis Dtr. et Schwant. = *Dracophilus Montis Draconis* Dtr. et Schwant.

J. Pomonae Schwant. = *Namibia Pomonae* Dtr. et Schwant.

J. Simpsonii Schwant. (fig. 171) (*Mes. Simpsonii* Dtr.) (named after Mr Simpson, Halenberg, S.W. Africa). Low, woody, half-shrubs with erect branches, forming cushions with many leaves, internodes hardly recognisable; L. erect, 1–$1\frac{1}{8}$ in. long, upper side $\frac{3}{8}$–$\frac{1}{2}$ in. wide at the base, from the tip for $\frac{3}{4}$ in. widened into a triangular tip, $\frac{1}{3}$–$\frac{5}{8}$ in. thick, lower side at first half round, keeled above and laterally compressed and widened, ± drawn forward over the tip; keel and side angles covered with short, acute, backward-pointing tubercles, and also the upper part of the upper side and flanks with reddish teeth; surface slightly rough, pale blue-green with inconspicuous, darker dots; F. terminal, short stalked, *c.* $1\frac{3}{8}$ in. ϕ, shining white.

J. suavissima Schwant. (*Mes. suavissimum* Dtr.). Branches prostrate or ascending, up to 12 in. high; L. bluntly 3-angled, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, the tip somewhat recurved, the flanks covered in the upper part with a few blunt teeth; smooth, pale grey-green, with a few inconspicuous dots; F. on $\frac{5}{8}$-in. long stalks, $1\frac{1}{2}$–2 in. ϕ, pure white, strongly scented, opening in the afternoon.

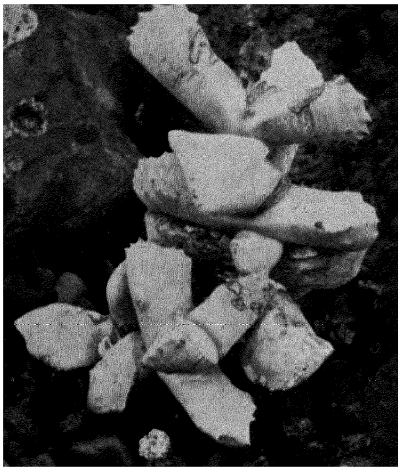


FIG. 171. – Juttadinteria Simpsonii Schwant. $\frac{3}{4}$ nat. size.

J. Tugwelliae Schwant. = *Bijlia cana* N. E. Br.

Lampranthus N. E. Br. = *Mesembrianthemum* Schwant.

Lapidaria Schwant.

Allied to *Dinteranthus*, cultivation the same. Occurrence: Great Namaqualand (S. Africa).

Lapidaria Margaretae Schwant. (fig. 172) (*Argyroderma Margaretae* N. E. Br., *A. roseatum* N. E. Br., *Dinteranthus Margaretae* Schwant., *Mes. Margaretae* Schwant., *Mes. roseatum* N. E. Br.) (named after Frl. Margarete Friedrich, Warmbad, S.W. Africa). Stemless, when old branched in tufts; L. 6–8, united at the base, spreading, much thickened, $\frac{3}{8}$–$\frac{5}{8}$ in. long, $\frac{3}{8}$ in. broad and thick, upper side flat, lower side hemispherical, bluntly triangular towards the tip, sharply keeled on the back, surface smooth, whitish or pinkish-white, without dots, edges reddish; F. on 2–$2\frac{1}{2}$-in. long compressed stalks, $1\frac{1}{8}$–2 in. ϕ, upper side golden yellow, lower side whitish-yellow, reddish when fading. Propagation easy from seed. Suitable for growing in quantity.

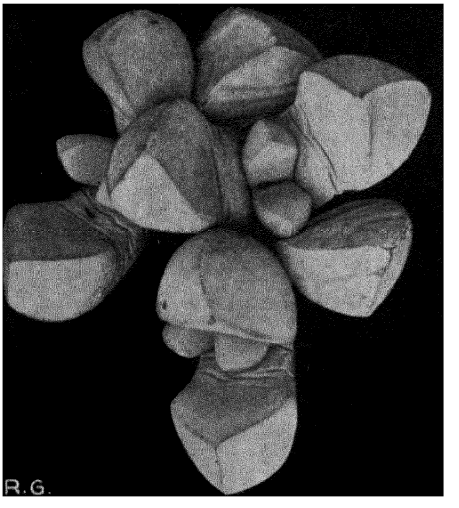


FIG. 172. – Lapidaria Margaretae Schwant. (Photo, R. Graessner.) *c.* nat. size.

Lithops N. E. Br.

Stemless, perennial, very succulent plants consisting of one, two or more growths in clumps. Each plant, that is, growth, consists of a conical or almost cylindrical, fleshy body, formed of two completely or almost completely united leaves. A distinct fissure across the

upper surface divides the growth ± into two short, flat or convex "lobes." F. usually solitary from the centre of the fissure, rarely 2–3 from the same body; sessile, white or yellowish to yellow, from July to November, opening in the afternoon. Occurrence: Great and Little Namaqualand, Karroo.

In the native language known by the descriptive name of "Living Stones." These plants in fact resemble pebbles. They are so like

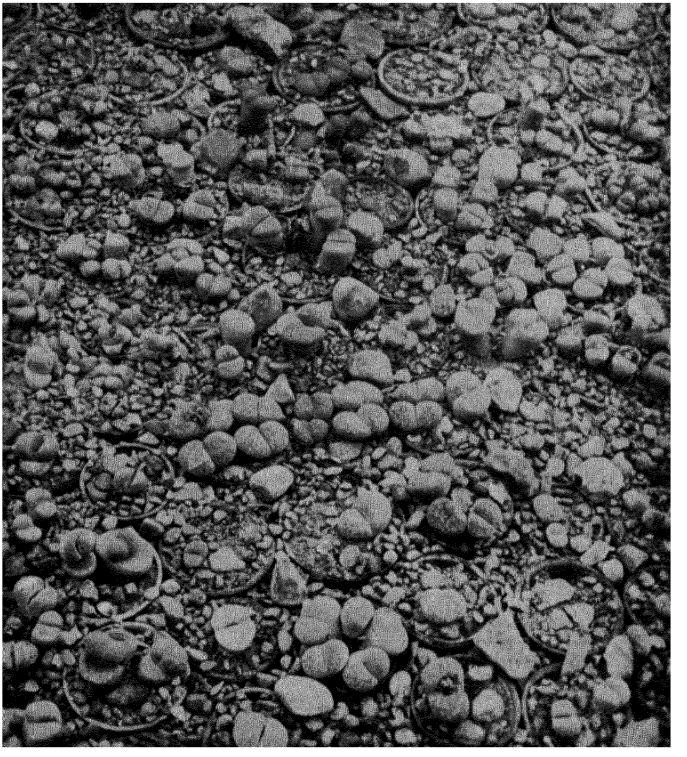


FIG. 173.—Fifteen different species of Lithops. Pots sunk in gravel. From Dr Schwantes' collection in the Botanic Garden, Kiel (Germany).

them in form and colour that it is not always easy to find them in their natural habitat. The *Lithops* grow in very dry desert regions, partly buried in the sand, to obtain protection from the grilling sun. Growing period in summer. The plants should then be put in the full sun with plenty of ventilation in a greenhouse, hot frame or even a bright window. Burning is unlikely even under the strongest sunlight. The *Lithops* can endure without harm temperatures of 122° F. measured on the surface of the soil. It is best not to stand the pots separately but to sink them in gravel (see fig. 173), to avoid burning the roots. In

summer the pots may be kept fairly moist, but in winter water should be withheld entirely. The growing period usually begins in March or April. The plants then make new bodies, the old bodies shrinking to a dry skin which is split by the new growth. During the summer months the new bodies become fatter and fatter till in autumn the flower appears. In winter keep in the lightest position possible, at about 60° F. The soil must be especially sandy and porous, the bodies should not be buried in the soil up to the upper surface, but should project for about $\frac{3}{4}$ of their length. Propagation best from seed. Seedlings often attain their full size in two years and are then capable of flowering. Forcing in a hot bed has the advantage of speeding up growth, but the plants easily rot off in winter. Increase by cuttings is possible, but only to be recommended when, for any reason, propagation from seed is not possible. In nursery practice growing on imported plants is the most profitable.

L. alpina Dtr. (fig. 174). Bodies obconical, small, $\frac{3}{8}$–$\frac{1}{2}$ in. high, compressed and truncate, upper surface slightly convex, $\frac{3}{8}$–$\frac{1}{2}$ in. ϕ, pale brown, freely dotted and with fine brown markings, otherwise like *L. pseudotruncatella*; F. yellow.

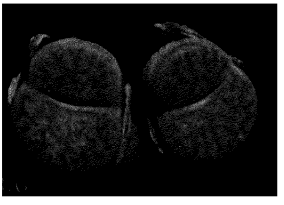


FIG. 174. Lithops alpina Dtr. (Photo, R. Graessner.) Nat. size.

L. Aucampiae L. Bol. (named after Mrs Aucamp, Pretoria). Forming clumps, large species; form of body like *L. pseudotruncatella*, ± oval, *c.* $\frac{3}{4}$ in. high; upper surface *c.* $1\frac{1}{8}$ in. ϕ, in the direction of the $\frac{1}{6}$-in. deep fissure, $\frac{7}{8}$ in. ϕ, slightly convex; sienna brown or coffee coloured, markings consisting of ± coalescing dots and lines; fissure and conical part blue-grey; F. 1 in. ϕ, yellow, September.

L. aurantiaca L. Bol. Forming clumps of 4 or more bodies; bodies $1\frac{1}{8}$–2 in. ϕ, top-shaped; upper surface flat, scarred and wrinkled, fissure not very deep; brown; F. $\frac{3}{4}$ in. ϕ, orange yellow.

L. bella N. E. Br. (fig. 175) (*Mes. bellum* Dtr.). Growing in clumps of 1–6 bodies, bodies 1–$1\frac{1}{8}$ in. high, upper surface convex, $\frac{7}{8}$ in. long, $\frac{5}{8}$ in. broad, in colour resembling the granite chips of their natural habitat, brownish-yellow to ochre coloured with slightly branched, darker, slightly grooved markings; fissure $\frac{1}{3}$ in. long, surface finely granular; F. 1 in. ϕ, pure white, September–November. Very beautiful species!

L. Bromfieldii L. Bol. (named after Mr H. Bromfield, S. Africa). Forming clumps; bodies 5–6 together; bodies top-shaped, $\frac{5}{8}$ in. high, above sharply truncate, upper surface almost flat, fissure $\frac{1}{8}$–$\frac{1}{6}$ in. deep, running right across, the upper surface divided into two unequal halves, $\frac{5}{8}$ in. ϕ, less wide in the direction of the fissure, sides reddish to sienna brown, smooth, end surfaces with eight marked humps on each half, ochre brown, the broad grooves between the humps reddish-brown; F. $1\frac{3}{8}$–$1\frac{1}{2}$ in. ϕ, yellow.

L. Comptonii L. Bol. (named after Dr R. H. Compton, Director of the

Botanic Garden, Kirstenbosch, S. Africa). Forming clumps; bodies up to $1\frac{1}{2}$ in. ϕ, the two leaves gaping owing to the deep fissure, L. somewhat flattened



FIG. 175.—1. Lithops kunjasensis Dtr. 2. L. bella N. E. Br. 3. L. Lericheana Dtr. et Schwant. 4. L. Julii Dtr. et Schwant. *c.* $\frac{1}{2}$ nat. size.

laterally, with a faint window above; olive green; F. 1 in. ϕ, yellow. Rare species from the Ceres Karroo.

L. damarana N. E. Br. = *L. karasmontana* N. E. Br.

L. Dinteri Schwant. (fig. 176) (named after Professor K. Dinter, Bautzen). Bodies obconical, $\frac{3}{4}$–$1\frac{1}{8}$ in. high, upper surface truncate, very convex, almost circular, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{2}{3}$–1 in. wide, fissure $\frac{1}{5}$–$\frac{1}{4}$ in. deep, running right across, with distinct, transparent window with a few pale marks, the "window" surrounded by scattered dark dots, 5–12 irregularly scattered red dots on the window of each leaf; F. yellow.



FIG. 176.—Lithops Dinteri Schwant. (Photo, R. Graessner.) Nat. size.

L. diutina L. Bol. Similar to *L. umdausensis* L. Bol. Body more olive green, $1\frac{1}{8}$–$1\frac{3}{8}$ in. high, $1\frac{1}{8}$ in. ϕ; F. white, 1 in. ϕ, lasting a long time.

L. Eberlanzii Dtr. et Schwant. (fig. 177) (*Mes. Eberlanzii* Dtr. et Schwant.) (named after F. Eberlanz, Lüderitz Bay, S.W. Africa). Forming tufts; bodies obconical, $\frac{3}{4}$–$1\frac{1}{2}$ in. high, at the top $\pm$ circular or crescent-shaped,

convex, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, fissure $\frac{1}{5}$–$\frac{2}{5}$ in. deep; pearl grey to ochre coloured or pale violet, marked with fine or wide branched, indefinite lines; F. white, August–September.

L. elevata L. Bol. (fig. 182). New species. Forming clumps; bodies seen from the side heart-shaped; fissure almost $\frac{5}{8}$ in. deep, gaping; lobes rounded; surface grey, the lobes with markings.



FIG. 177. Lithops Eberlanzii Dtr. et Schwant. Nat. size. (From V.P.B.)

L. Elisabethae Dtr., S.W. Africa (named after Frau Elizabeth Schneider, Okosongomuinja, S.W. Africa). 1–2-headed; bodies similar to *L. pseudotruncatella*; window smooth, coppery red colour, with numerous, irregularly scattered, large, dark greyish-green dots, and short, narrow, broken, almost blood-red lines, which sometimes join 2–10 of the dots; F. golden yellow, *c.* $1\frac{1}{8}$ in. ϕ, September–October.

L. Erniana Tisch. (fig. 182) (named after F. Erni, formerly of S.W. Africa, now Bern). Forming tufts; bodies compressed obconical, $\frac{3}{4}$ in. high, upper surface usually oval, 1–$1\frac{1}{8}$ in. long, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, convex; fissure $\frac{1}{6}$–$\frac{1}{5}$ in. deep, the upper surface divided into two unequal halves; reddish-grey, marked above with branched, strong red-brown lines, which later become more diffused; F. $1\frac{1}{8}$ in. ϕ, white.

L. farinosa Dtr. Like *L. pseudotruncatella v. pulmonuncula*, a closely related species, always single-headed; body blue-green, markings uniform; F. yellow.

L. Framesi L. Bol. (named after Mr P. Ross Frames). Forming clumps; bodies elongated, top-shaped, laterally somewhat compressed, truncate at the top, $1\frac{1}{2}$–2 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ; fissure running right across, $\frac{3}{8}$–$\frac{1}{2}$ in. deep; sides reddish-dove grey, upper surface rounded with a dark grey window, rim of the window bulged and notched, a few dove grey markings scattered over the window; F. $1\frac{1}{8}$ in. ϕ, white.

L. Franciscii Dtr. et Schwant. (*Mes. Franciscii* Dtr.) (named after Franz de Laet, Contich, Belgium). Forming clumps or tufts; bodies obconical, $\frac{5}{8}$–$1\frac{1}{8}$ in. high, truncate at the top, ± convex, rarely flat, upper surface $\frac{1}{2}$–$\frac{3}{4}$ in. ϕ; fissure $\frac{1}{5}$–$\frac{2}{5}$ in. deep; grey-green, flushed with brownish or reddish-yellow, with branched, coalescing, dark transparent lines and dots; the dots partly run together in the centre to form a window; similar to *L. pseudotrun-*

catella, but the ground colour greyer and the fissure deeper; F. $\frac{2}{5}$–$\frac{2}{3}$ in. ϕ, yellow.

L. Friedrichiae N. E. Br. = *Ophthalmophyllum Friedrichiae* Dtr. et Schwant.

L. Fulleri N. E. Br. (fig. 182) (*L. Maughanii* N. E. Br.) (named after the Postmaster, E. R. Fuller, Prieska, Cape Province). Forming small tufts; bodies obconical, $\frac{3}{8}$–$\frac{5}{8}$ in. high, cultivated plants often $1\frac{1}{8}$ in. high, above $1\frac{1}{8}$ in. ϕ in the direction of the $\frac{1}{5}$–$\frac{1}{4}$-in. deep fissure, $\frac{3}{4}$ in. broad, upper ± strongly convex; dove grey to opalescent, upper surface with pitted markings, which consist of branched lines $\frac{1}{50}$ in. wide, brownish, almost violet, at the outer edge the markings often dark-brown to red-brown dots; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, white.

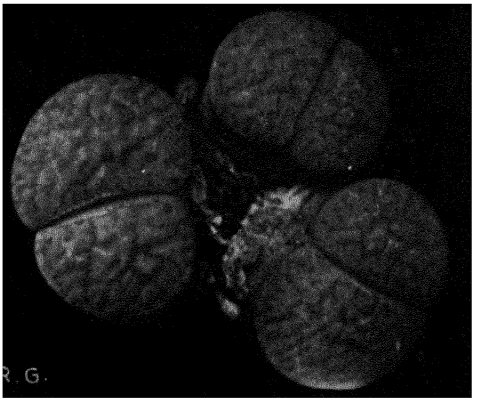


FIG. 178.—Lithops fulviceps N. E. Br. (Photo, R. Graessner.) Nat. size.

L. Fulleri N. E. Br. **v. Tapscottii** L. Bol. Variety of the foregoing species with especially striking markings, the red-brown marks united by red lines. (Found by Mr S. Tapscott in the Hopetown division.)

L. fulviceps N. E. Br. (fig. 178). Usually single-headed, rarely with 2–4, bodies obconical, 1–$1\frac{1}{8}$ in. high, upper surface flat or slightly convex, $\frac{3}{4}$–1 in. long, rather less broad; colour pale grey to coffee or rust brown; markings fairly large, with raised, separate, circular flecks; and between, a few inconspicuous, dark orange to red lines or flecks; F. *c.* $1\frac{1}{8}$ in. ϕ, yellow, lower side whitish.

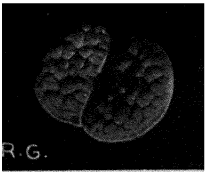


FIG. 179.—Lithops gracilidelineata Dtr. (Photo, R. Graessner.) Nat. size.

L. gracilidelineata Dtr. (fig. 179). Single-headed, bodies top-shaped, $\frac{5}{8}$ in. high, truncate above, upper surface circular, $\frac{3}{4}$–$\frac{7}{8}$ in. ϕ, fissure running right across, $\frac{1}{8}$–$\frac{1}{5}$ in. deep, not gaping; conical part pale yellowish-grey, upper surface divided into about thirty humps, light brown, the humps separated by sharp, dark brown, ± branched lines; F. white?

L. halenbergense Tisch. (named after its habitat, Halenberg, S.W. Africa). Similar to *L. Eberlanzii*; colour of body ochre to brownish or red, with a number of small, dark green dots faintly visible on the upper surface, markings rather darker or ± translucent, consisting of slightly pitted, irregularly distributed lines and dots; F. yellow.

L. Helmutii L. Bol. (fig. 180) (named after Helmut Meyer, Steinkopf, S.W. Africa). Similar to *L. Comptonii* L. Bol.; bodies smaller, at most $1\frac{1}{8}$ in. ϕ; colour bright green, window distinct, also bright green; F. $1\frac{1}{8}$

in. ϕ, golden yellow, smelling like a Cattleya. Needs a deep pot as it forms a taproot up to 4 in. long!

L. Herrei L. Bol. (named after H. Herre, Stellenbosch, S. Africa). Forming clumps often of 10–15 bodies; bodies 1 in. high, $\frac{5}{8}$ in. ϕ; in the resting period brownish-green, greener in the growing period, window freely spotted; F. $\frac{5}{8}$ in. ϕ, yellow.

L. inornata Dtr. (figs. 181 and 182) (*L. Marthae* Loesch. et Tisch.). Bodies many together, obconical, flatly truncate above, *c.* $\frac{3}{4}$ in. high, upper surface oval, $\frac{7}{8}$ in. long, $\frac{5}{8}$ in. broad; fissure running right across, about $\frac{1}{4}$ in. deep;

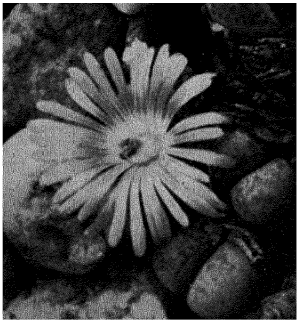


FIG. 180.—Lithops Helmutii L. Bol. (Photo, H. Herre.) (From M.d.d.K.G.) Almost nat. size.

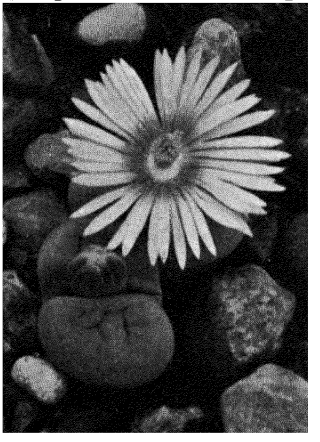


FIG. 181.—Lithops inornata Dtr. Almost nat. size.

colour olive green to violet green, upper surface rather paler or brownish at the edges, in the middle with a few, short, branched purple lines; F. $\frac{3}{4}$ in. ϕ, golden yellow, September.

L. Julii Dtr. et Schwant. (fig. 175) (*Mes. Julii* Dtr. et Schwant.) (named after Dr Julius Derenberg, Hamburg). Forming tufts; bodies obconical, $\frac{3}{4}$–$1\frac{1}{8}$ in. high, truncate, upper surface ± circular or crescent-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, slightly convex, fissure running right across, deep; pearl grey, the colour of limestone, with an opalescent sheen and a reddish tinge on the sides, upper surface with shallow, branched, transparent grooves on the lip of the fissure, and sometimes also on the outer edge with an ochre brown line or dots; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, white.

L. Julii Dtr. et Schwant. **v. pallida** Tisch. Like the foregoing; both edges of fissure with four brown dots united by brown lines, otherwise very indistinct, grey-brown markings.

L. Julii Dtr. et Schwant. **v. reticulata** Tisch. (fig. 175). With very distinct, dark brown, reticulate markings.

L. karasmontana N. E. Br. (fig. 183) (*L. damarana* N. E. Br., *Mes.*

damaranum N. E. Br., *Mes. karasmontanum* Dtr. et Schwant.). Forming tufts; bodies obconical, $1\frac{1}{8}$–$1\frac{1}{2}$ in. high, upper surface level or slightly convex, almost circular, $\frac{5}{8}$–1 in. ϕ, sometimes crescent-shaped when fissured, fissure



FIG. 182.—Lithops umdausensis L. Bol.; L. elevata L. Bol.; L. inornata Dtr.; L. Erniana Tisch.; L. Fulleri N. E. Br.

deep, going right across; pearl grey to pale bluish-yellow; upper surface pitted and wrinkled, these branched, usually brownish to ochre coloured; the old leaves persist a long time; L. 1–$1\frac{1}{8}$ in. ϕ, glossy white, October–November. Dislikes excess moisture! (Named after its natural habitat, the Karasbergen, S.W. Africa.)

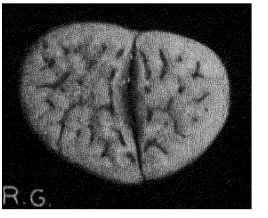


FIG. 183.—Lithops karasmontana N. E. Br. (Photo, R. Graessner.) Nat. size.

L. kuibisensis Dtr. (named after the station Kuibis, S.W. Africa). Growing in clumps of 3–4 bodies; bodies obconical, almost cylindrical, $1\frac{3}{8}$–$1\frac{1}{2}$ in. high, truncate, upper surface almost circular or slightly oval, flat, *c.* $1\frac{1}{8}$ in. ϕ, fissure going right across, shallow; yellow-brown to reddish, with sunken, red-brown network of branching lines and stripes; F. yellow.

L. kunjasensis Dtr. (fig. 175) (named after the natural habitat at Kunjas, S.W. Africa). Forming tufts; bodies obconical, *c.* $1\frac{1}{8}$ in. high, truncate above, upper surface almost circular, $\frac{3}{4}$ in. ϕ, almost flat or slightly convex, with many furrows; fissure $\frac{1}{8}$–$\frac{1}{6}$ in. deep, running right across; grey, reddish-yellow with numerous dark dots and stripes in the grooves; F. yellow.

L. lactea Schick et Tisch. 1–3-headed; bodies $\frac{3}{4}$–$1\frac{1}{8}$ in. high, $\frac{5}{8}$–$\frac{3}{4}$ in.

wide, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, fissure going right across, $\frac{1}{5}$–$\frac{1}{3}$ in. deep, dividing the body into two unequal lobes, these slightly convex; upper side grey-white, often marked with ± distinct brown to red dots at the edge of the fissure, united by ± distinct lines, the middle or the edge of the upper surface often with red dots; F. not projecting far beyond the fissure, $1\frac{1}{8}$ in. ϕ, shining white, scent like almonds; likes lime.

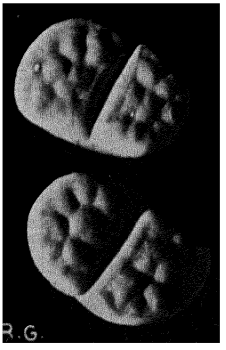


FIG. 184.—Lithops lateritia Dtr. (Photo, R. Graessner.) Nat. size.

L. lateritia Dtr. (fig. 184). Forming tufts; bodies short, compressed, *c.* $\frac{3}{4}$ in. high; upper surface truncate, fairly flat, broadly oval, $\frac{3}{4}$–1 in. long, $\frac{5}{8}$–$\frac{2}{3}$ in. wide, with shallow grooves; brick or rust red, with few markings, conical part and edge of the upper surface the colour of grey indiarubber; fissure $\frac{1}{8}$–$\frac{1}{6}$ in. deep; F. $1\frac{1}{4}$ in. ϕ, white.

L. Lericheana Dtr. et Schwant. (fig. 175) (*Mes. Lericheanum* Dtr. et Schwant.) (named after le Riche, S.W. Africa). Forming tufts; bodies obconical, $\frac{3}{4}$–$1\frac{1}{2}$ in. high, truncate, upper surface ± circular, $\frac{5}{8}$–$1\frac{1}{8}$ in. ϕ, fissure $\frac{1}{8}$–$\frac{1}{6}$ in. deep; reddish-bluish, ochre coloured, the fissure reddish-grey with a transparent network of broad radiating markings, varying towards the edge; F. on $\frac{1}{2}$-in. long stalks, $1\frac{1}{8}$ in. ϕ, white, smelling like Heliotrope, in October, dislikes excess moisture.

L. Lesliei N. E. Br. (fig. 185) (*Mes. ferrugineum* Schwant., *Mes. Lesliei* N. E. Br.) (named after T. N. Leslie, collector in the Transvaal, S. Africa). Usually with 1–2, rarely more heads; bodies bluntly obconical, $1\frac{1}{8}$–$1\frac{3}{4}$ in. high, upper surface flat or slightly concave, up to $1\frac{1}{2}$ in. long and *c.* $1\frac{1}{8}$ in. broad, fissure running right across, shallow; coffee coloured or rust brown, also light brown with green; upper surface pitted with a network of dark greenish-brown markings and grooves; F. *c.* $1\frac{1}{8}$ in. ϕ, golden yellow, in September.

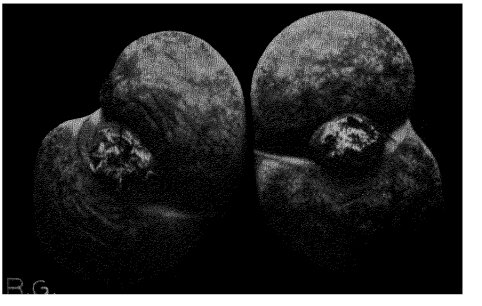


FIG. 185.—Lithops Lesliei N. E. Br. (Photo, R. Graessner.) Nat. size.

L. Loganae L. Bol. is identical with *L. Aucampiae* L. Bol. Markings bright and striking.

L. Lydiae L. Bol. (fig. 197) (named after Frau Lydia Triebner, Windhoek). Forming clumps; shape of the body like *L. turbiniforme*, *c.* 1 in. high; upper surface not quite circular, *c.* $1\frac{1}{8}$ in. ϕ, fissure running right across, shallow; upper surface tuberculate, brownish, with raised, $\frac{1}{25}$ in. across, grey-green dots set fairly close, isolated, fine, red lines in between; conical part blue-grey; the old leaves remaining long on the plant; F. $\frac{5}{8}$–$1\frac{1}{8}$ in. ϕ, golden yellow, smelling like Heliotrope.

L. Marlothii N. E. Br. = *Conophytum pellucidum* Schwant.

L. marmorata N. E. Br. Bodies up to $1\frac{1}{8}$ in. high, $1\frac{1}{8}$ in. wide, $\frac{3}{4}$ in. thick, upper surface rather concave; fissure $\frac{3}{8}$ in. or more deep; grey-green, with markings which consist of pale grey branched lines; F. 1 in. ϕ, white; slightly scented.

L. Marthae Loesch. et Tisch. is identical with *L. inornata* Dtr.

L. Maughanii N. E. Br. = *L. Fulleri* N. E. Br.

L. Meyeri L. Bol. (named after G. Meyer, Steinkopf, S. Africa). Forming clumps; bodies up to $1\frac{1}{8}$ in. high, $\frac{3}{4}$ in. thick below, the two halves gaping, separated by a $\frac{3}{4}$-in. deep fissure; L. in the free part *c.* $\frac{7}{8}$ in. wide, *c.* $\frac{5}{8}$ in. thick, upper surfaces rather crescent-shaped, inner surfaces swollen out at the base, the swelling glassy green and transparent; colour of the body dark bluish grey-green, the upper surface slightly rounded and paler bluish-green, without markings; F. $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, yellow.



FIG. 186.—Lithops mickbergensis Dtr. (Photo, R. Graessner.) Nat. size.

L. mickbergensis Dtr. (fig. 186). Forming tufts; bodies obconical, 1–$1\frac{1}{8}$ in. high, upper surfaces truncate, slightly concave, broadly oval, $\frac{3}{4}$–$\frac{7}{8}$ in. long, $\frac{5}{8}$–$\frac{2}{3}$ in. wide; grooved, pale reddish-grey, markings in the interconnected branched grooves yellowish-brown, fissure $1\frac{1}{8}$–2 in. deep, conical part and edge the colour of grey indiarubber; F. 1–$1\frac{1}{8}$ in. ϕ, white. (Named after its natural habitat at Mickberg, S.W. Africa.)

L. Mundtii Tisch. = *L. pseudotruncatella* N. E. Br. *v. Mundtii* Tisch.

L. olivacea L. Bol. Bodies several together in a clump, *c.* $\frac{3}{4}$ in. high, above $\frac{3}{4}$–1 in. broad, about $\frac{5}{8}$ in. thick, the upper surfaces divided right across by a $\frac{1}{5}$-in. deep fissure into two roundish halves; colour dark olive to brownish, upper surfaces with distinctly margined, somewhat paler coloured, somewhat flecked, dull windows, edged with black towards the fissure, towards the outer edge irregularly marked; F. yellow; likes lime.

L. opalina Dtr. (fig. 187). Bodies obconical, $1\frac{1}{8}$–$1\frac{1}{2}$ in. high; upper surface $\frac{5}{8}$–1 in. ϕ; light blue; F. white.

L. optica N. E. Br. (fig. 188) (*Mes. opticum* Marl.), Namib. Forming tufts, 20–30 bodies on one plant is not uncommon; bodies obconical, $\frac{3}{4}$–$1\frac{1}{8}$ in. high, fissure cut deep into the middle of the body, the two sides very convex, spreading, usually of different lengths and somewhat oblique, up to $\frac{3}{8}$–$\frac{5}{8}$ in. deep; grey to fawn, on the tips of the leaves an opalescent, almost translucent, window; F. $\frac{5}{8}$–$\frac{3}{4}$ in. ϕ, white, somewhat reddish, in September and October.

L. optica N. E. Br. **v. rubra** Tisch. (*L. rubra* N. E. Br.). Like *L. optica*, body purple-red, the window very prominent on account of the red colouring. Valuable rarity!

L. Orpenii L. Bol. is identical with *L. Lesliei* N. E. Br. The markings are often window-like.

L. Peersii L. Bol. Forming clumps; bodies like *L. turbiniforme*, *c.* 1 in. high; upper surface flat, *c.* $1\frac{1}{8}$ in. ϕ, in the direction of the fissure of the $\frac{1}{3}$-in.

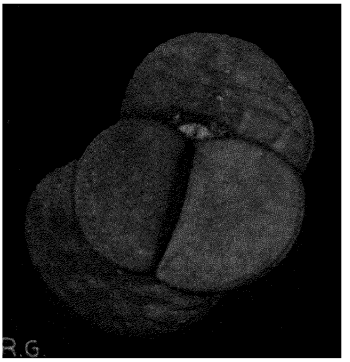


FIG. 187. Lithops opalina Dtr. (Photo, R. Graessner.) Nat. size.



FIG. 188.—Lithops optica N. E. Br. (Photo, R. Graessner.) Nat. size.

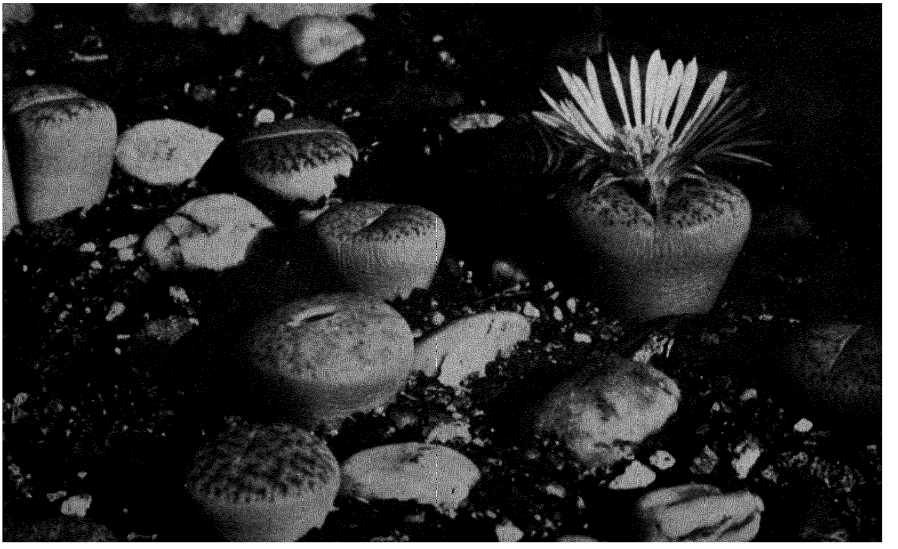


FIG. 189.—Lithops pseudotruncatella N. E. Br. (Photo, Dr W. Kriechbaum.) (From V.P.B.)

deep fissure *c.* 1 in. ϕ, bodies ochre coloured to greenish, the upper surface with numerous, $\pm$ coalescing, dark grey dots; edge of the upper surface and fissure somewhat paler ochre colour; F. 1 in. ϕ, shining yellow, October.

L. Pillansii L. Bol. is identical with *L. Ruschiorum* Dtr. et Schwant.

L. pseudotruncatella N. E. Br. (fig. 189) (*Mes. pseudotruncatellum*

Bgr.). Forming tufts; bodies obconical, low truncate, $\frac{3}{4}$–$1\frac{1}{8}$ in. high, upper surface convex, roundish, 1–$1\frac{1}{8}$ in. ϕ; fissure ± running right across; smooth, pale brownish-grey, with a network of veins and dots on the upper surface, flushed with brown and marbled; markings very variable; F. $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, golden yellow, September–October, free growing, widely distributed species; suitable for growing in quantity.

L. pseudotruncatella N. E. Br. **v. albiflora**. Varying in the white flowers.

L. pseudotruncatella N. E. Br. **v. Mundtii** Tisch. (*L. Mundtii* Tisch.) (named after Farmer Mundt, Windhuk, S.W. Africa). Usually 1–2-headed, bodies bluntly obconical, usually broader than high, $1\frac{1}{8}$–$1\frac{1}{2}$ in. high, upper surface fairly flat or slightly convex; fissure running right across, up to $\frac{1}{5}$ in. deep; divided usually into unequal halves; greyish-brown to reddish-brown, the upper surfaces with numerous dark grey-green dots, with rust brown, ± wide, somewhat depressed lines running between and over them; F. $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, yellow to orange with reddish tips, August-September. Large, striking variety which grows easily.

L. pseudotruncatella N. E. Br. **v. pulmonuncula** Dtr. Similar to the species, redder with red-brown, diffused, branching lines; F. yellow.

L. rubra N. E. Br. = *L. optica* N. E. Br. *v. rubra* Tisch.

L. rugosa Dtr. (fig. 190). Forming tufts; bodies obconical, $\frac{3}{4}$ in. high, upper surface very convex, broadly oval, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. broad, grooved,

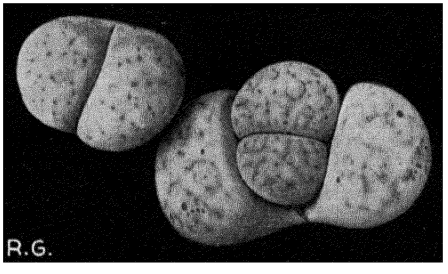


FIG. 190.—Lithops rugosa Dtr. (Photo, R. Graessner.) Nat. size.



FIG. 191.—Lithops Ruschiorum Dtr. et Schwant. (Photo, R. Graessner.) Nat. size.

and therefore tuberculate; greyish-red with numerous, usually roundish, indistinct, red, branched stripes lying in the cuticle and numerous transparent, blue-green dots below the cuticle; fissure $\frac{1}{5}$–$\frac{1}{4}$ in. deep; colour of the conical part blue-green; F. yellow, $\frac{3}{4}$ in. ϕ.

L. Ruschiorum Dtr. et Schwant. (fig. 191) (*Mes. Ruschiorum* Dtr. et Schwant.) (named after the family of Farmer E. Rusch, Lichtenstein, near Windhoek, S.W. Africa). Forming clumps, bodies obconical, $\frac{3}{4}$–$1\frac{3}{4}$ in. high, very convex at the top, $\frac{5}{8}$–$1\frac{1}{2}$ in. broad; fissure $\frac{1}{5}$–$\frac{3}{4}$ in. deep; milk white, pearl grey, also yellow to ochre coloured, without markings or with isolated yellow or reddish, small, elongated pits or fine lines; F. $\frac{3}{4}$–1 in. ϕ, yellow.

L. Schwantesii Dtr. (fig. 192) (named after Dr G. Schwantes, Kiel). Forming tufts; bodies obconical, $1\frac{1}{8}$–$1\frac{1}{2}$ in. high; upper surface almost circular or broadly oval, $\frac{3}{4}$–1 in. ϕ, truncate and very convex; smooth, dull glossy, reddish brownish-grey, with faintly transparent windows, markings consisting of irregularly scattered blood-red dots and stripes, surrounded by a $\frac{1}{12}$-in. wide, pale rust yellow band; fissure $\frac{1}{6}$–$\frac{1}{4}$ in. deep; F. yellow. The old leaves persist for one year usually, often for two years.



FIG. 192.—Lithops Schwantesii Dtr. (Photo, R. Graessner.) Nat. size.

L. summitatum Dtr. (fig. 193). Bodies obconical, $\frac{3}{4}$ in. high, truncate above; upper surface almost circular or oval, $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ; fissure running right across, shallow; above the soil level the conical part pale grey-blue, upper part pale yellowish-brown, markings wide, heavily flushed with brown; F. white.

L. terricolor N. E. Br. Body compressed obconical, $\frac{3}{4}$ in. high, truncate; upper surface oval, 1–$1\frac{1}{8}$ in. long, $\frac{3}{4}$–$\frac{7}{8}$ in. wide, not very convex; sides grey-blue, slightly brownish above, often pink, almost red or pale green, with numerous dark grey dots, with fine red-brown lines in between; the young L. bright pale reddish-brown with greyish-blue dots, or even $\pm$ distinctly windowed and the dots $\pm$ receding; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, yellow.

L. translucens L. Bol. appears to be identical with *L. Herrei* L. Bol.

L. Triebneri L. Bol. (fig. 197) (named after Wilhelm Triebner, Windhoek). Forming clumps; bodies obconical, *c.* $\frac{3}{4}$ in. high, truncate, upper surfaces $\pm$ oval, slightly convex, *c.* 1 in. ϕ, in the direction of the fissure *c.* $\frac{5}{8}$ in. ϕ, one leaf top usually larger than the other, fissure $\frac{1}{8}$–$\frac{1}{6}$ in. deep; fissure and conical part blue-green to greenish, upper surface terra-cotta with an indistinct network of grey markings, with scattered red dots or short stripes; F. 1 in. ϕ, golden yellow, September.

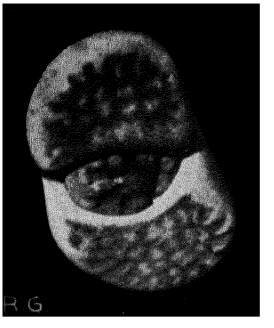


FIG. 193.—Lithops summitatum Dtr. (Photo, R. Graessner.)

L. turbiniformis N. E. Br. (fig. 194) (*Mes. truncatellum* Hook. f., *Mes. turbiniforme* Haw., *Mes. Hookeri* Bgr.). Body obconical-ovate, $\frac{3}{4}$–1 in. high, truncate, upper surface slightly convex, almost circular, $\frac{3}{4}$–1 in. ϕ, fissure running right across, sides grey, upper surface brownish, warty and uneven, with dark brown branching lines between the wart-like protuberances. The bodies are burst asunder by the succeeding pair of leaves, and remain beside them for a whole year. F. $1\frac{3}{5}$–$1\frac{1}{2}$ in. ϕ, yellow.

L. umdausensis L. Bol. (fig. 182) (named after its natural habitat at Umdaus, S. Africa). Possibly a geographical variation of *L. marmorata* N. E. Br.; bodies up to $1\frac{1}{8}$ in. ϕ, fissure running right across, $\frac{3}{8}$ in. and more deep; olive green to brown, the grey-green flecks consisting of branching lines; F. 1 in. ϕ, white. (This species was originally named *L. Herrei* by L. Bolus, but the name was soon withdrawn and used for another species.)

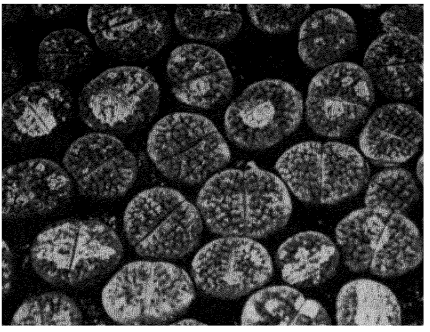


FIG. 194.—Lithops turbiniforme N. E. Br. (Photo, K. Josefsky.) Almost nat. size.

L. urikosensis Dtr. (fig. 195). Body small, conical, *c.* $\frac{3}{4}$ in. high, truncate, slightly convex, broadly oval, *c.* $\frac{3}{4}$ in. long, in the direction of the fissure $\frac{1}{2}$–$\frac{5}{8}$ in. wide, fissure $\frac{1}{4}$–$\frac{1}{3}$ in. deep, the upper surface divided into two unequal halves, grooved; grey-green, with indistinct brown dots and stripes, the window not very prominent; F. 1 in. ϕ, yellow.

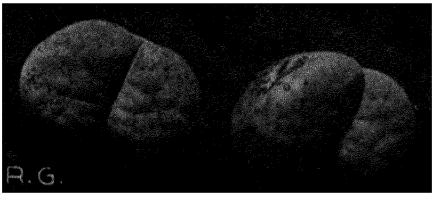


FIG. 195.—Lithops urikosensis Dtr. (Photo, R. Graessner.) Nat. size.

L. Vallis-Mariae Dtr. et Schwant. (fig. 196) (*Mes. Vallis-Mariae* Dtr. et Schwant.) (named after its native habitat, Mariental, S.W. Africa). Forming clumps; bodies wide, obconical, $\frac{3}{4}$–1 in. high, truncate, upper surface $\pm$ circular, $\frac{3}{4}$–2 in. ϕ, or the individual leaves crescent-shaped, slightly convex, often with small, pitted dots and wrinkled or warty protuberances; fissure deep; above bluish-white, patterned in pale lilac, with a purple over-skin; F. 1–$1\frac{3}{8}$ in. ϕ, yellow.



FIG. 196.—Lithops Vallis-Mariae Dtr. et Schwant. (Photo, R. Graessner.) Nat. size.

L. Vanzijlii L. Bol. (fig. 197) (named after Mr van Zijl, S. Africa). Bodies several, up to $1\frac{1}{2}$ in. across; upper surface flattened, semicircular,



FIG. 197. 1. Lithops Vanzijlii L. Bol. 2. L. Lydiae L. Bol. 3. L. Triebneri L. Bol. $\frac{3}{4}$ nat. size.

fissure very shallow; colour whitish grey-brown, markings consisting of irregular dark brown lines and stripes; F. $\frac{5}{8}$ in. ϕ, orange yellow. Very beautiful but very rare species. Dislikes excess moisture.

Machairophyllum Schwant.

Allied to *Bergeranthus*; cultivation the same, but rather warmer. Occurrence: Little Namaqualand (S. Africa).

Machairophyllum albidum Schwant. (*Bergeranthus albidus* Schwant., *Carruanthus albidus* Schwant., *Mes. albidum* L.). Stemless plants forming clumps when old; L. crowded, decussate, curved inwards, 3–4 in. long, united at the base and $\frac{3}{4}$ in. wide, narrowing above, upper side flat, lower side semi-cylindrical, keeled above, 3-angled, bluntish and with a spiny tip, upper surface smooth, whitish, without markings; F. in threes, on long, 2-angled stalks, $2\frac{1}{2}$ in. ϕ, yellow inside, red outside, in August.

Mentocalyx Muiri N. E. Br. = *Gibbaeum Muiri* Schwant.
Mentocalyx velutina N. E. Br. = *Gibbaeum velutinum* Schwant.

Mesembrianthemum (L.) Schwant.

Half-shrubs with erect, spreading or prostrate branches, usually compressed. L. usually united at the base, numerous, cylindrical or triangular, blunt or tapering, ± curved. F. solitary or several together, terminal or axillary, medium sized, white, pink or violet, in summer. Occurrence: Cape Province.

Usually very free flowering bushes, suitable for planting out in summer. Useful for pots or baskets, in a light greenhouse or window. In winter should have a light position not over 50° F., and be fairly moist. Propagation from seed, quicker from cuttings, which root easily. Recommended for growing in quantity.

Mes. abbrevicatum Haw. = *Carpobrotus aequilateralis* Schwant.

Mes. acinaciforme DC. = *Semnanthe lacerum* N E Br

Mes. acinaciforme L. = *Carpobrotus acinaciformis* Schwant.

Mes. aequilateralis Haw. = *Carpobrotus aequilateralis* Schwant

Mes. agninum Haw = *Stomatium agninum* Schwant

Mes. albertense N. E. Br. = *Conophytum Purpusii* N. E. Br.

Mes. albidum L. = *Machairophyllum albidum* Schwant.

Mes. albinotum Haw. = *Rabiea albinota* N. E. Br

Mes. albipunctum Haw = *Rabiea albipuncta* N. E. Br.

Mes. aloides Haw = *Nananthus aloides* N E. Br.

Mes. aloides hort = *Nananthus vittatus* N. E. Br

Mes. altile N. E. Br. = *Conophytum altile* N. E. Br.

Mes. anatomicum Haw. = *Scletium anatomicum* L. Bol.

Mes. androsaceum Marl. = *Ruschia androsacea* Marl. et Schwant.

Mes. Angelicae Dtr. et Schwant. = *Conophytum Angelicae* Dtr. et Schwant.

Mes. amoenum Salm. Similar to *Mes. conspicuum*, but branches shorter; L. 1½ in long, cylindrical to 3-angled, green, smooth; F. on 2–3¼-in. long stalks, 1⅜–1½ in. ϕ, purple-red.

Mes. apetale Thbg. = *Dorotheanthus gramineus* Schwant. *v. albus.*

Mes. aurantiacum Haw. (*Mes. aurantium* Willd., *Mes. glaucoides* Haw.). Erect, sparsely branched, 8–40 in. high; L. bluntly 3-angled, ½–1 in. long, ⅕ in. broad, tapering, with fine spiny tip, grey-green, frosted grey, with pale, transparent dots; F. solitary, on 1½–2-in long stalks, 1½–2 in. ϕ, shining orange, numerous, June to autumn. Recommended!

Mes. aurantium Willd. = *Mes. aurantiacum* Haw.

Mes. aureum L. Erect, 12–16 in. high, stout; L. uniformly 3-angled, 1½–2½ in. long, up to ⅕ in. wide, the sides somewhat concave, bluntish, with short, reddish, awn-like tip, fresh green, with a light frosting of grey, smooth, with fine, transparent dots; F. on *c.* 2½-in. long stalks, 2–2½ in. ϕ, golden yellow to orange, numerous, July–September.

Mes. asperulum Salm. = *Drosanthemum asperulum* Schwant.

Mes. Astridae Dtr. = *Titanopsis Hugo-Schlechteri* Dtr. et Schwant.

Mes. barbatum Curtis = *Trichodiadema stelligerum* Schwant.

Mes. barbatum L. = *Trichodiadema barbatum* Schwant.

Mes. barbatum L. **v. densum** Willd. = *Trichodiadema densum* Schwant.

Mes. bellidiflorum L. = *Acrodon bellidiflorus* N. E. Br.

Mes. bellum Dtr. = *Lithops bella* N. E. Br.

Mes. Bergerianum Dtr. = *Hereroa hesperantha* Dtr. et Schwant.

Mes. bibracteatum Haw. = *Cheiridopsis bibracteata* N E. Br

Mes. bicolor Curt. = *Mes. coccineum* Haw.

Mes. bicolorum L. (*Mes. coccineum* Eckl. et Zeyh., *Mes. emarginatum* Eckl. et Zeyh., *Mes. tenuifolium* Thbg). Branches stiff and erect, grey; L. erect, $\frac{5}{8}$–$1\frac{3}{8}$ in. long, $\frac{1}{12}$ in. broad, semicylindrical, somewhat 3-angled above, tapering, green with transparent dots; F. on 2-in long stalks, $1\frac{3}{8}$ in. ϕ, at first orange yellow, later reddish, outside scarlet.

Mes. bifidum Haw. = *Cheiridopsis bifida* N. E. Br.

Mes. bilobum Marl. = *Conophytum bilobum* N. E. Br.

Mes. blandum Haw. Erect, up to 20 in. high; branches erect, rigid, rust red; L. compressed triangular, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, shortly tapering, pale grey-green, with fine transparent dots, F. on $2\frac{1}{2}$–3-in. long stalks, $2\frac{1}{2}$ in. ϕ, pink, August–September.

Mes. Böhmerianum Dtr. = *Conophytum saxetanum* N. E Br.

Mes. Bolusii Hook. f. = *Pleiospilos Bolusii* N. E. Br.

Mes. Bosscheanum Bgr. = *Faucaria Bosscheana* Schwant.

Mes. brevicaule Haw. = *Conicosia brevicaulis* Schwant.

Mes. brevifolium Ait. = *Drosanthemum brevifolium* Schwant.

Mes. Brownii Hook. f. (named after R. Brown, London). Erect, branched, 8–12 in. high; branches slender, rather angular, with numerous short shoots; L. $\frac{1}{3}$–$\frac{2}{5}$ in. long, semicylindrical, wider above and compressed 3-angled, bluntish with a red tip, grey-green, slightly raised dots; F. on $\frac{3}{4}$–$1\frac{1}{2}$-in. long stalks, *c.* $\frac{5}{8}$ in. ϕ, at first dull orange red inside, yellow outside.

Mes. Brunnthaleri Bgr. = *Delosperma Brunnthaleri* Schwant.

Mes. bulbosum Haw. = *Trichodiadema bulbosum* Schwant.

Mes. calamiforme L. = *Cylindrophyllum calamiforme* Schwant.

Mes. calcareum Marl. = *Titanopsis calcarea* Schwant.

Mes. calculus Bgr. = *Conophytum calculus* N. E. Br.

Mes. calendulaceum Haw. = *Apatesia helianthoides* N. E. Br.

Mes. calycinum Haw. = *Drosanthemum calycinum* Schwant.

Mes. Candollei Haw. = *Apatesia helianthoides* N. E. Br.

Mes. caninum Haw. = *Carruanthus caninus* Schwant.

Mes. canum Bgr. = *Aloinopsis Peersii* L. Bol.

Mes. canum Haw. A species which can hardly be confirmed. (The description of *Mes. canum* Haw. in A. Berger's *Mesembrianthemum und Portulacaceen* does not agree with Haworth's original description!)

Mes. capitatum Haw. = *Conicosia capitata* Schwant.

Mes. carinans Haw. = *Hereroa carinans* Dtr. et Schwant.

Mes. carinatum Vent. = *Semnanthe lacerum* N. E. Br.

Mes. Caroli-Schmidtii Dtr. et Bgr. = *Cheiridopsis Caroli-Schmidtii* N. E. Br.

Mes. caulescens Mill. = *Oscularia caulescens* Schwant.

Mes. cigarettiferum Bgr. = *Cheiridopsis cigarettifera* N. E. Br.

Mes. ciliatum Thbg., also Ait. = *Trichocyclus ciliatus* N. E. Br.

Mes. cinereum Marl. = *Namibia cinerea* Dtr. et Schwant.

Mes. clavatum Haw. = *Dorotheanthus gramineus* Schwant.

Mes. claviforme DC. = *Dorotheanthus gramineus* Schwant.

Mes. clivorum N. E. Br. = *Conophyllum clivorum* Schwant.

Mes. coccineum Eckl. et Zeyh. = *Mes. bicolorum* L.

Mes. coccineum Haw. (*Mes. bicolor* Curt., *Mes. tenuifolium* Eckl. et Zeyh.). Branches lax, erect, brown, up to 30 in. high; L. spreading, $\frac{5}{8}$–1 in. long, 3-angled compressed, bluntish, with a spiny tip, dull green, with slightly raised transparent dots; F. on 2–4-in. long stalks, $1\frac{1}{2}$ in. ϕ, scarlet. Flowering the whole summer.



FIG. 198.—Mesembrianthemum conspicuum Haw. (Photo, Grünhagen.) (From V.P.B.)

Mes. cognatum N. E. Br. = *Conophyllum cognatum* Schwant.

Mes. compactum Ait. = *Pleiospilos nobilis* Schwant.

Mes. concavum Haw. = *Sceletium concavum* L. Bol.

Mes. conspicuum Haw. (fig. 198). Up to 18 in. high, stout; branches long, curved, erect at the tips; L. crowded, semicylindrical to triangular, $2\frac{1}{2}$–3 in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. broad, incurved, erect or spreading, narrowed above and tapering, with a red tip, green, dotted; F. on $3\frac{1}{4}$–$3\frac{3}{4}$-in. long stalks, 2 in. ϕ, purple-red or carmine, August–September. Recommended! Young plants from cuttings flower very freely.

Mes. cordifolium L. f. = *Aptenia cordifolia* Schwant.

Mes. cordifolium L. f. **v. variegatum** hort. = *Aptenia cordifolia* Schwant. *v. variegata* hort.

Mes. crassicaule Haw. = *Sceletium crassicaule* L. Bol.

Mes. crassifolium L. = *Disphyma crassifolia* L. Bol.

Mes. crassulinum DC. = *Disphyma crassulina* N. E. Br.

Mes. crassuloides Haw. = *Disphyma crassulina* N. E. Br.

Mes. criniflorum Houtt. = *Dorotheanthus criniflorus* Schwant.

Mes. crocerum Jacq. = *Hymenocyclus crocerus* Schwant.

Mes. cruciatum Haw. = *Glottiphyllum cruciatum* N. E. Br.

Mes. cryptanthum Hook. f. = *Hydrodea cryptantha* N. E. Br.

Mes. crystallinum L. = *Cryophytum crystallinum* N. E. Br.

Mes. cultratum S.D. = *Glottiphyllum latum* N. E. Br. *v. cultratum.*

Mes. cylindricum Haw. = *Calamophyllum cylindricum* Schwant.

Mes. cylindricum v. teretifolium Haw. = *Calamophyllum teretifolium* Schwant.

Mes. damaranum N. E. Br. = *Lithops karasmontana* N. E. Br.

Mes. decipiens Haw. = *Cephalophyllum decipiens* N. E. Br.

Mes. Delaetianum Dtr. = *Dracophilus Delaetianus* Dtr. et Schwant.

Mes. deltoides Mill. = *Oscularia deltoides* Schwant

Mes. deltoides Mill. **v. muricatum** Bgr. = *Oscularia deltoides* Schwant. *v. muricata.*

Mes. densum Haw. = *Trichodiadema densum* Haw.

Mes. Derenbergianum Dtr = *Ebracteola Derenbergiana* Dtr. et Schwant.

Mes. deserticolum Marl. = *Juttadinteria deserticola* Schwant.

Mes. difforme Haw. = *Glottiphyllum difforme* N E. Br

Mes. digitatum Ait. = *Dactylopsis digitata* N E. Br.

Mes. digitiforme Thbg. = *Dactylopsis digitata* N. E. Br.

Mes. Dinterae Dtr. = *Chasmatophyllum musculinum* Dtr. et Schwant.

Mes. dissitum Haw. = *Cephalophyllum dissitum* Schwant.

Mes. diversiphyllum Haw = *Cephalophyllum diversiphyllum* N. E. Br.

Mes. dolabriforme L. = *Rhombophyllum dolabriforme* Schwant.

Mes. duale N. E. Br. = *Antimima dualis* N. E. Br.

Mes. Eberlanzii Dtr. et Schwant = *Lithops Eberlanzii* Dtr. et Schwant.

Mes. echinatum Ait. = *Delosperma echinatum* Schwant.

Mes. Ecklonis Salm. = *Delosperma Ecklonis* Schwant.

Mes. edule L. = *Carpobrotus edulis* N. E. Br.

Mes. elongatum Haw. = *Conicosia elongata* Schwant.

Mes. emarginatum Eckl. et Zeyh. = *Mes. bicolorum* L.

Mes. erigeriflorum Jacq. = *Drosanthemum brevifolium* Schwant.

Mes. erminium Haw. = *Stomatium erminium* Schwant.

Mes. falcatum L. Freely and intricately branched; branches thin; L. 1½–3 in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. wide, 3-angled, sickle-shaped, angles blunt, narrowed at both ends, with a short tip, grey-green, with scattered, translucent dots; F. on 1½–2-in. long thin stalks, ½–⅝ in. wide, pink, sweet scented. Popular little plant.

Mes. falcatum Thbg. = *Semnanthe lacerum* N. E. Br

Mes. falciforme Haw. Similar to *M. falcatum* L. Larger on the whole; L. ⅜–⅝ in. long, triangular, lateral flanks ⅕ in. broad, upper side ⅛ in. broad, angles sharp, sickle-shaped; F. 1½ in. ϕ, pale pink, numerous.

Mes. familiare Schwant. = *Conophytum Purpusii* N. E. Br.

Mes. felinum Haw. = *Faucaria felina* Schwant.

Mes. ferrugineum Schwant. = *Lithops Lesliei* N. E. Br.

Mes. ficiforme Haw. = *Conophytum ficiforme* N. E. Br.

Mes. fissum N. E. Br. = *Rimaria dubia* N. E. Br.

Mes. flavum Haw. = *Drosanthemum flavum* Schwant.

Mes. floribundum Haw. = *Drosanthemum floribundum* Schwant.

Mes. fragrans S.D = *Glottiphyllum fragrans* Schwant.

Mes. Franciscii Dtr. = *Lithops Franciscii* Dtr. et Schwant.

Mes. Friedrichiae Dtr = *Ophthalmophyllum Friedrichiae* Dtr. et Schwant.

Mes. fulvum Haw = *Aridaria noctiflora* Schwant. *v. fulva.*

Mes. geminatum Haw = *Echinus geminatus* L Bol.

Mes. geminum N. E Br = *Gibbaeum geminum* N. E. Br.

Mes. glaciale Haw = *Cryophytum crystallinum* N. E Br.

Mes. gladiatum Jacq = *Semnanthe lacerum* N. E. Br.

Mes. glaucescens Haw = *Carpobrotus aequilateralis* Schwant

Mes. glaucoides Haw. = *Mes. aurantiacum* Haw.

Mes. glaucum L. Erect, up to 2 ft high, branches rigid; L. 3-angled, $\frac{5}{8}$–$1\frac{1}{8}$ in long, blunt, with a short, awn-like tip, dark green, dusted with grey, dotted, especially the keel, F. long stalked, $2\frac{1}{2}$–3 in. ϕ, shining pale yellow.

Mes. glebula Schwant = *Conophytum leviculum* N E. Br.

Mes. glomeratum L (*Mes. inflexum* Haw) Erect, 8–12 in high, branches slender, brown, later grey, short shoots numerous, L not united, erect spreading, $\frac{1}{2}$–$\frac{5}{8}$ in. long, $\frac{1}{12}$ in broad, semicylindrical, somewhat thickened above, compressed 3-angled, tapering, green, often reddish, with transparent, raised dots, F. on branching stems, on 1-in. long stalks, 1 in ϕ, brilliant violet. Very free flowering.

Mes. gramineum Haw = *Dorotheanthus gramineus* Schwant.

Mes. grandiflorum Haw. = *Glottiphyllum grandiflorum* N. E. Br.

Mes. granulatum N E Br = *Hereroa granulata* Dtr et Schwant.

Mes. granulicaule Haw = *Psilocaulon granulicaule* N. E Br.

Mes. gratum N. E. Br = *Conophytum gratum* N. E. Br.

Mes. Haagei Bgr. = *Faucaria Haagei* Tisch.

Mes. halenbergense Dtr et Schwant. = *Conophytum halenbergense* N E. Br

Mes. Haworthii Don (named after A. H Haworth, London). Freely branched, up to 2 ft. high, branches erect, brown; L. hardly united, crowded, 1–$1\frac{1}{2}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, semicylindrical, somewhat thicker in the middle, compressed above, upper side flat, tapering, a little incurved, smooth, pale green, powdered with grey, F. terminal, on $1\frac{1}{2}$-in. long stalks, 2–3 in. ϕ, beautiful purple-red. Very desirable, beautiful species.

Mes. Heathii N. E. Br = *Rimaria Heathii* N. E. Br.

Mes. helianthoides Ait. = *Apatesia helianthoides* N. E. Br.

Mes. hesperanthum Dtr. et Bgr. = *Hereroa hesperantha* Dtr. et Schwant.

Mes. heteropetalum Haw. = *Erepsia heteropetala* Schwant.

Mes. hispidum L. = *Drosanthemum hispidum* Schwant.

Mes. hispidum L. **v. pallidum** Haw. = *Drosanthemum floribundum* Schwant.

Mes. Hookeri Bgr. = *Lithops turbiniformis* N. E. Br.

Mes. Hugo-Schlechteri Tisch. = *Titanopsis Hugo-Schlechteri* Dtr. et Schwant.

Mes. imbricatum Haw. = *Ruschia multiflora* Schwant

Mes. inclaudens Eckl. et Zeyh. = *Erepsia inclaudens* N. E. Br.

Mes. inclaudens Haw. = *Erepsia inclaudens* N. E Br

Mes. incurvum Haw. **v. roseum** DC. = *Mes. roseum* Willd.

Mes. inflexum Haw. = *Mes glomeratum* Haw

Mes. intonsum Haw. = *Trichodiadema intonsum* Schwant.

Mes. Johannis-Winkleri Dtr. et Schwant. = *Conophytum Johannis-Winkleri* N. E. Br.

Mes. Julii Dtr. et Schwant = *Lithops Julii* Dtr et Schwant

Mes. junceum Haw. = *Psilocaulon junceum* N. E Br.

Mes. karasmontanum N. E. Br. = *Lithops karasmontana* N E. Br.

Mes. kovisimontanum Dtr. = *Juttadinteria kovisimontana* Dtr. et Schwant.

Mes. lacerum Haw. = *Semnanthe lacera* N E. Br

Mes. laeve Thunb. = *Cephalophyllum laeve* Schwant.

Mes. laevigatum Haw. = *Carpobrotus acinaciformis* Schwant.

Mes. lapidiforme Marl. = *Didymaotus lapidiformis* N. E. Br

Mes. lateritiflorum DC. = *Drosanthemum brevifolium* Schwant

Mes. latum Haw. = *Glottiphyllum latum* N. E Br.

Mes. lectum N. E. Br. = *Cheiridopsis lecta* N. E Br

Mes. Lehmannii Eckl. et Zeyh. = *Corpuscularia Lehmannii* Schwant

Mes. Lericheanum Dtr. et Schwant = *Lithops Lericheana* Dtr et Schwant.

Mes. Lesliei N. E. Br. = *Lithops Lesliei* N. E. Br

Mes. leviculum N. E. Br. = *Conophytum leviculum* N. E. Br

Mes. lineare Thbg. = *Dorotheanthus gramineus* Schwant. *v albus.*

Mes. linguiforme L. = *Glottiphyllum linguiforme* N. E. Br.

Mes. linguiforme S.D. = *Glottiphyllum longum* N. E. Br.

Mes. linguiforme L. **v. cultratum** Bgr. = *Glottiphyllum latum* N. E Br. *v. cultratum.*

Mes. linguiforme L. **v. fragrans** Bgr. = *Glottiphyllum fragrans* Schwant

Mes. linguiforme L. **v. grandiflorum** Bgr. = *Glottiphyllum grandiflorum* N. E. Br.

Mes. linguiforme L. **v. latum** S.D. = *Glottiphyllum latum* N. E. Br.

Mes. linguiforme L. **v. longum** Bgr. = *Glottiphyllum longum* N E. Br.

Mes. linguiforme L. **v. obliquum** Bgr. = *Glottiphyllum latum* N. E. Br.

Mes. linguiforme L. **v. pustulatum** Bgr. = *Glottiphyllum longum* N. E. Br.

Mes. longum Haw. = *Glottiphyllum longum* N. E. Br.

Mes. lucidum Mill. = *Glottiphyllum linguiforme* N. E. Br.

Mes. lupinum Haw. = *Faucaria lupina* Schwant.

Mes. luteoviride Haw. = *Gibbaeum luteoviride* N. E. Br.

Mes. luteum Haw. = *Hymenocyclus luteus* Schwant.
Mes. magnipunctatum Haw. = *Pleiospilos magnipunctatus* Schwant.
Mes. magnipunctatum Schwant. = *Pleiospilos Purpusii* Schwant.
Mes. Margaretae Schwant = *Lapidaria Margaretae* Schwant
Mes. Marlothianum Pax = *Conophyllum Marlothianum* Schwant.
Mes. Marlothii N E Br = *Conophytum pellucidum* Schwant.
Mes. Marlothii Pax. = *Trichocyclus Marlothii* N. E. Br.
Mes. Matthewsii L. Bol = *Echinus geminatus* L. Bol.
Mes. maximum Haw = *Astridia maxima* Schwant.
Mes. medium Haw = *Glottiphyllum latum* N E Br.
Mes. micans L. = *Drosanthemum micans* Schwant.
Mes. microspermum Dtr et Derenbg = *Dinteranthus microspermus* Schwant
Mes. minusculum Schwant = *Conophytum Purpusii* N E Br
Mes. mitratum Marl = *Mitrophyllum mitratum* Schwant.
Mes. modestum Dtr. et Bgr. = *Psammophora modesta* Dtr. et Schwant.
Mes. molle Ait. appears to have disappeared.
Mes. molle Bgr. = *Ruschia mollis* Schwant.
Mes. moniliforme Schwant = *Monilaria moniliforme* Schwant
Mes. Montis Draconis Dtr. = *Dracophilus Montis Draconis* Dtr. et Schwant
Mes. Montis Moltkei Dtr = *Ebracteola Montis Moltkei* Dtr. et Schwant.
Mes. multiceps Salm = *Bergeranthus multiceps* Schwant
Mes. multiflorum Haw. = *Ruschia multiflora* Schwant.
Mes. multipunctatum S D. = *Cheiridopsis bifida* N. E. Br.
Mes. multiradiatum Jacq. = *Mes. roseum* Willd.
Mes. muricatum Haw. = *Oscularia deltoides* Schwant *v. muricata.*
Mes. murinum Haw = *Stomatium murinum* Schwant.
Mes. musculinum Haw. = *Chasmatophyllum musculinum* Dtr. et Schwant.
Mes. mustellinum Salm = *Stomatium mustellinum* Schwant.
Mes. mutabilis Eckl. et Zeyh. = *Erepsia inclaudens* N. E Br.
Mes. nanum Schltr. = *Oophytum nanum* L. Bol.
Mes. namibense Marl. = *Trichocyclus namibense* N. E. Br.
Mes. necopinum N. E. Br. = *Argyroderma necopinum* N. E. Br.
Mes. nigrescens Haw. = *Carpobrotus aequilateralis* Schwant.
Mes. Nissenii Dtr = *Psammophora Nissenii* Dtr. et Schwant.
Mes. nobile Haw. = *Pleiospilos nobilis* Schwant.
Mes. noctiflorum L. = *Aridaria noctiflora* Schwant
Mes. noctiflorum L. **v. fulvum** S.D. = *Aridaria noctiflora* Schwant. *v. fulva.*
Mes. obconellum Haw. = *Conophytum obcordellum* N. E. Br.
Mes. obcordellum Haw. = *Conophytum obcordellum* N. E. Br.
Mes. obcordellum Marl. = *Conophytum Purpusii* N. E. Br.
Mes. obliquum Willd. = *Glottiphyllum latum* N. E. Br.

Mes. obmetale N. E. Br. = *Conophytum obmetale* N. E. Br.
Mes. obtusum L. Bol., hort. (Haw. ?) = *Gibbaeum Nelii* Schwant.
Mes. octophyllum Verl. = *Argyroderma octophyllum* Schwant.
Mes. octophyllum v. roseum Haw. = *Argyroderma roseum* Schwant.
Mes. opticum Marl. = *Lithops optica* N. E. Br.
Mes. Orpenii N. E. Br. = *Aloinopsis Orpenii* N. E. Br.
Mes. oviforme N. E. Br. = *Oophytum oviforme* N. E Br.
Mes. Pagae N. E. Br. = *Conophytum Pagae* N E Br
Mes. pallens Ait. = *Prenia pallens* N. E. Br
Mes. pallidum N. E. Br. = *Conophytum pallidum* N. E Br.
Mes. parvifolium Haw. = *Drosanthemum parvifolium* Schwant.
Mes. perfoliatum Mill. = *Ruschia perfoliata* Schwant
Mes. perpusillum Haw = *Conophytum perpusillum* N E Br.
Mes. perviride Haw. = *Gibbaeum perviride* N E. Br
Mes. pilosum Haw. = *Apatesia helianthoides* N E Br
Mes. pinnatifidum L. f. = *Aethephyllum pinnatifidum* N. E. Br
Mes. pisiforme Schwant. = *Monilaria pisiformis* Schwant.
Mes. pisinnum N. E. Br. = *Conophyllum pisinnum* N. E. Br
Mes. Pole Evansii N. E. Br. = *Dinteranthus Pole Evansii* Schwant.
Mes. pomeridianum L = *Carpanthea pomeridiana* N. E Br
Mes. Pomonae Dtr. = *Namibia Pomonae* Dtr et Schwant
Mes. ponderosum Dtr. = *Namibia ponderosa* Dtr et Schwant
Mes. praepingue Haw. = *Glottiphyllum praepingue* N. E Br.
Mes. proximum N. E. Br. = *Conophyllum proximum* Schwant
Mes. pseudotruncatellum Bgr. = *Lithops pseudotruncatella* N E Br
Mes. pubescens Haw = *Gibbaeum pubescens* N E Br.
Mes. pugioniforme DC. = *Conicosia elongata* Schwant.
Mes. pugioniforme L. = *Conicosia pugioniforme* Schwant.
Mes. purpureo-croceum Haw = *Hymenocyclus croceum* Schwant
Mes. purpureo-croceum Haw. **v. flavocroceum** = *Hymenocyclus luteus* Schwant.
Mes. Purpusii Schwant. = *Conophytum Purpusii* N. E. Br
Mes. Puttkammeriana Bgr et Dtr. = *Hereroa Puttkammeriana* Dtr et Schwant.
Mes. pyropaeum Haw = *Dorotheanthus gramineus* Schwant
Mes. pyropaeum v. album Haw. = *Dorotheanthus gramineus* Schwant. *v. albus.*
Mes. pyropaeum v. roseum Haw = *Dorotheanthus gramineus* Schwant. *v. roseus.*
Mes. quadrifidum Haw. = *Cheiridopsis rostrata* N. E. Br.
Mes. recumbens N. E. Br. = *Chasmatophyllum musculinum* Dtr et Schwant.
Mes. Rehneltianum Bgr. = *Hereroa Rehneltiana* Dtr. et Schwant.
Mes. relaxatum Willd. = *Prenia relaxata* N. E. Br.
Mes. retroversum Kensit = *Diplosoma retroversum* Schwant.

Mes. rhomboideum S.D. = *Rhombophyllum rhomboideum* Schwant.

Mes. rhopalophyllum Schl. et Diels = *Fenestraria rhopalophylla* N. E. Br.

Mes. rigidum Haw. = *Ruschia rigida* Schwant.

Mes. robustum Haw. = *Delosperma robustum* L. Bol.

Mes. Roodiae N E. Br. = *Pleiospilos Roodiae* Schwant.

Mes. roseatum N. E Br = *Lapidaria Margaretae* Schwant.

Mes. roseum Willd. (*Mes. multiradiatum* Jacq , *Mes. incurvum* Haw. *v roseum* DC) Erect, spreading, up to 2 ft. high; L. 1–1$\frac{1}{8}$ in long, up to $\frac{1}{6}$ in. wide, compressed 3-angled, narrowed at both ends, with a short spiny tip, grey-green, with slightly raised, transparent dots; F on 2-in long stems, 1$\frac{1}{2}$ in ϕ, pale pink, May–June

Mes. Rossii Haw. = *Carpobrotus aequilateralis* Schwant.

Mes. rostratum L = *Cheiridopsis rostrata* N. E Br.

Mes. rostratum S D. = *Cheiridopsis tuberculata* N E. Br.

Mes. rostratum S.D. **v. bibracteatum** = *Cheiridopsis bibracteata* N E Br.

Mes. rosulatum Kensit = *Aistocaulon rosulatum* von Poelln.

Mes. rubrolineatum N. E Br = *Nananthus rubrolineatus* N. E. Br.

Mes. Rothii hort. = *Pleiospilos Rothii* hort.

Mes. rubricaule Haw = *Ruschia rubricaulis* L. Bol.

Mes. rubrocinctum Eckl et Zeyh = *Carpobrotus acinaciformis* Schwant.

Mes. Ruschiorum Dtr. et Schwant. = *Lithops Ruschiorum* Dtr. et Schwant

Mes. Salmii Haw = *Glottiphyllum Salmii* N. E. Br.

Mes. saxetanum N. E. Br = *Conophytum saxetanum* N. E. Br.

Mes. scalpratum Haw. = *Glottiphyllum linguiforme* N. E. Br.

Mes. scapigerum Haw = *Bergeranthus scapiger* N. E. Br.

Mes. Schenkii Schinz. = *Trichocyclus ciliatus* N. E. Br.

Mes. Schickianum Bgr = *Conophytum Schickianum* Tisch.

Mes. Schlechteri Schwant = *Conophytum Schlechteri* Schwant.

Mes. Schwantesii Dtr. = *Titanopsis Schwantesii* Schwant.

Mes. semicylindricum Haw = *Glottiphyllum semicylindricum* N. E. Br.

Mes. semidentatum Salm = *Ruschia semidentata* Schwant

Mes. Simpsonii Dtr = *Juttadinteria Simpsonii* Schwant.

Mes. simulans Marl = *Pleiospilos simulans* N E. Br.

Mes. speciosum Haw = *Drosanthemum speciosum* Schwant.

Mes. spectabile Haw Branches prostrate, leaves in tufts; L. curved outwards, 3-angled, keeled and somewhat compressed laterally, 2–3$\frac{1}{4}$ in. long, $\frac{1}{4}$ in. wide, narrowing above with a short tip and reddish awn, green, frosted with pale green, with fine dots; F. on 3$\frac{1}{4}$–6-in. long stalks, 2–3 in. ϕ, purple-red, May–July. Beautiful flowering plant.

Mes. spinosum L = *Eberlanzia spinosa* Schwant

Mes. spinosum L **v. micranthum** = *Eberlanzia micrantha* Schwant.

Mes. splendens L. = *Aridaria splendens* Schwant.
Mes. stellatum Mill. = *Trichodiadema stellatum* Schwant.
Mes. stelligerum Haw. = *Trichodiadema stelligerum* Schwant
Mes. stramineum Willd. = *Cephalophyllum tricolorum* N. E. Br.
Mes. striatum Haw. = *Drosanthemum striatum* Schwant.
Mes. suavissima Dtr. = *Juttadinteria suavissima* Schwant.
Mes. subcompressum Haw. = *Drosanthemum subcompressum* Schwant.
Mes. subincanum Haw. = *Delosperma subincana* Schwant.
Mes. subulatum Mill = *Acrodon subulatus* N. E. Br.
Mes. succumbens Dtr. = *Schwantesia succumbens* Dtr.
Mes. Taylorianum Dtr. et Schwant = *Conophytum Taylorianum* Dtr. et Schwant.
Mes. Taylori N. E. Br. = *Carpobrotus Taylori* Schwant.
Mes. tenuifolium Eckl. et Zeyh = *Mes coccineum* Haw.
Mes. tenuifolium L. 20–24 in. high, branches spreading, curved, slender, greyish-brown; L. semicylindrical, awl-shaped tapering, $1\frac{1}{8}$–$1\frac{1}{2}$ in long, $\frac{1}{12}$–$\frac{1}{8}$ in. thick, smooth, green, with translucent dots; F. on 1–$1\frac{1}{2}$-in. long stalks, $1\frac{1}{2}$ in. ♂, shining orange scarlet. Attractive!
Mes. tenuifolium Thbg. = *Mes. bicolorum* L.
Mes. teretifolium Haw. = *Calamophyllum teretifolium* Schwant.
Mes. teretiusculum Haw. = *Calamophyllum teretiusculum* Schwant.
Mes. testiculare Ait. = *Argyroderma testiculare* N. E. Br.
Mes. testiculare Jacq. **v. roseum** Haw. = *Argyroderma rosea* Schwant.
Mes. thecatum N. E. Br. = *Conophytum minutum* N. E Br.
Mes. tigrinum Haw. = *Faucaria tigrina* Schwant.
Mes. torquatum Haw. = *Drosanthemum floribundum* Schwant.
Mes. tortuosum L. = *Sceletium tortuosum* N. E. Br.
Mes. tricolor Willd. = *Dorotheanthus gramineus* Schwant.
Mes. tricolorum Haw. = *Cephalophyllum tricolorum* N. E. Br.
Mes. truncatellum Haw. = *Conophytum truncatellum* N. E. Br.
Mes. truncatellum Hook. f. = *Lithops turbiniformis* N. E. Br
Mes. tuberculatum Mill. = *Cheiridopsis tuberculata* N. E. Br
Mes. tuberculosum Rolfe = *Faucaria tuberculosa* Schwant.
Mes. Tugwelliae L. Bol. = *Bijlia cana* N. E. Br.
Mes. tumidulum Haw. = *Ruschia tumidula* Schwant.
Mes. turbiniforme Haw. = *Lithops turbiniformis* N. E. Br.
Mes. umbellatum L. = *Ruschia umbellata* Schwant.
Mes. uncinatum Mill. = *Ruschia uncinata* Schwant.
Mes. uncinellum Haw. = *Ruschia uncinella* Schwant.
Mes. uvaeforme Haw. = *Conophytum uvaeforme* N. E. Br.
Mes. uvaeforme Purp. = *Conophytum Purpusii* N. E. Br.
Mes. validum S.D. (Haw.?) = *Cephalophyllum dissimile* N. E. Br.
Mes. Vallis-Mariae Dtr. et Schwant. = *Lithops Vallis-Mariae* Dtr. et Schwant.

Mes. variabile Haw. Similar to *Mes. coccineum*. Branches more prostrate or wide spread; F. at first yellow, then becoming rosy red.

Mes. varians Haw. = *Sceletium tortuosum* N. E. Br.

Mes. velutinum Dtr = *Astridia velutina* Dtr.

Mes. velutinum L. Bol. = *Gibbaeum velutinum* Schwant.

Mes. vescum N. E. Br. = *Cheiridopsis cigarettifera* N. E. Br.

Mes. vespertinum Bgr. = *Bergeranthus vespertinus* Schwant.

Mes. virescens Haw. = *Carpobrotus aequilateralis* Schwant.

Mes. vittatum N. E. Br. = *Nananthus vittatus* N. E. Br.

Mes. Wettsteinii Bgr. = *Conophytum Wettsteinii* N. E. Br.

Mes. Zeyheri Salm. Branches curved, slender, with numerous short shoots; L. curved, spreading, 1½ in. long, ⅛–⅙ in. broad, 3-angled to cylindrical, blunt tipped, the sides of the keel usually broader than the upper surface, soft, smooth, glossy green, with transparent dots; F. solitary, on 2½–3¼-in. long stalks, 2–2½ in. ϕ, violet-purple, from March to summer. One of the most beautiful species.

Meyerophytum Schwant.

(Named after G. Meyer, Steinkopf, S.W. Africa.)

Occurrence: Little Namaqualand (S. Africa).

Meyerophytum Meyeri Schwant. (fig. 199) (*Mitrophyllum Meyeri* Schwant.). Dwarf shrub of tufted growth; stems *c.* ⅖–½ in. long, *c.* 1/12 in. thick, internodes elongated or much shortened; L. united to small, thick bodies; thick, round, barely cleft bodies alternate with oblong bodies *c.* ⅖ in. long and ⅙ in. thick, the latter are cleft 1/12–⅛ in. deep above, but the free parts are not separated but first pushed apart when the younger body breaks through; colour of the bodies dark green to yellowish, reddish with age, when young shining with papillae. Both types of body together form a year's growth; F. short, stalked, fiery red, rare.



FIG. 199.—Meyerophytum Meyeri Schwant. Almost nat. size.

Interesting little succulent, allied to *Mitrophyllum*. Growing period and cultivation the same as for these.

Mitrophyllum Schwant.

Occurrence: S. Africa.

These species are the rarest and most interesting of the family. The plants develop two different forms of leaves, those which are almost entirely united to the tip forming cylindrical bodies, and others which are united at the base and linguiform. The latter are developed within the former and push out upwards or laterally from them, or they gradually absorb the substance till only a thin skin remains,

leaves which are united all the way up serve as protectors of transpiration for the other leaves. F. appear very rarely, yellow, white or pink.

The growing period begins with August or even later. The linguiform leaves push out of the others. Some time later there appear between them the pair of leaves for the resting period, which are fully formed during the course of the winter. The plants want to be in full sun under glass with a moderate amount of water, and



FIG. 200.—Mitrophyllum mitratum Schwant.; Mitr. grande N. E. Br. $\frac{1}{7}$ nat. size.

completely dry during the resting period. As with other difficult species it is recommended not to water the plants themselves, but to sink the pots in gravel which is kept moist. The soil should be very sandy. Propagation by seed. Cuttings are difficult to root.

Mitr. clivorum Schwant. = *Conophyllum clivorum* Schwant.

Mitr. cognatum Schwant. = *Conophyllum cognatum* Schwant.

Mitr. dissitum Schwant. = *Conophyllum dissitum* Schwant.

Mitr. grande N. E. Br. (fig. 200). Similar to *Mitr. mitratum* Schwant. Bodies about 8 in. long, $1\frac{1}{2}$–2 in. wide at the base.

Mitr. Marlothianum Schwant. = *Conophyllum Marlothianum* Schwant.

Mitr. Meyeri Schwant. = *Meyerophytum Meyeri* Schwant.

Mitr. mitratum Schwant. (fig. 200) (*Mes. mitratum* Marl.). Forming clumps; stems thick and soft, becoming woody later, the nodes thickened

apex free for $\frac{2}{5}$–$\frac{1}{2}$ in. long, pale green; L. 2nd type, $3\frac{1}{4}$–4 in. long, *c.* $\frac{2}{5}$ in. thick at the base, wide spread, slightly convex above, flat or trough-like, back roundish, keeled, pale green, when young shining with papillae; L. with very soft flesh; F. on $\frac{3}{8}$-in. long stalks, 1–$1\frac{1}{8}$ in. ϕ, white, with reddish tip.

Mitr. moniliforme Schwant. = *Monilaria moniliformis* Schwant.

Mitr. pisiforme Schwant. = *Monilaria pisiformis* Schwant.

Mitr. proximum Schwant. = *Conophyllum proximum* Schwant.

Mitr. roseum L. Bol., Namaqualand. Shoots pendent, later prostrate, about 12 in. long, internodes 1–$2\frac{1}{2}$ in. long; skin blackish-brown, with grey dots; L. elongated oval, $2\frac{3}{4}$ in. long, $\frac{1}{4}$ in. wide, upper side channelled; pale green, covered with shining papillae; F. on $1\frac{3}{4}$-in. long stalks, 2 in. ϕ, deep pink. Beautiful rare species!

Monilaria Schwant.

(*Schwantesia* L. Bol.)

(Figs. 201 and 202)

Allied to the genera *Mitrophyllum* and *Conophyllum*; cultivation the same as for these. Very low plants, forming clumps. Stems short and thick, jointed like a necklace. L. various; long, ± semi-cylindrical, little united leaves with bright papillae alternate with leaves united into almost spherical bodies. The latter envelop the other younger and smaller pair during the dry period. The two different pairs of leaves represent a year's growth. Fig. 202 shows a plant during the dry period, fig. 201 shows one in the growing period. F. long stalked. Occurrence: Little Namaqualand.

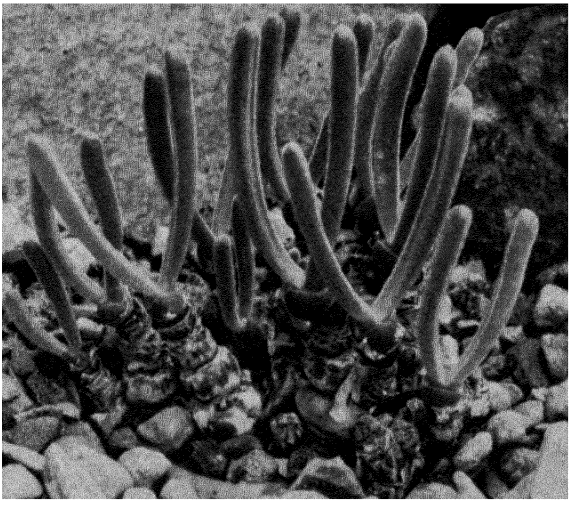


FIG. 201. — Monilaria spec. $\frac{1}{3}$ nat. size.

Mon. moniliformis Schwant. (*Conophyllum moniliforme* Schwant., *Mes. moniliforme* Schwant., *Mitrophyllum moniliforme* Schwant., *Schwantesia moniliforme* L. Bol.). 3–4 in. high, branched; stems and branches $\frac{1}{3}$ $\frac{1}{2}$ in. thick, internodes constricted, roundish; L. 1st type almost united up to the apex to form a fleshy, elliptical, almost spherical body, *c.* $\frac{1}{2}$ in. long, dark green; L. 2nd type for *c.* $\frac{1}{3}$ in. long united at the base, the united part buried

in the pairs of leaves of 1st type, 4–6 in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. wide, blunt above, semi-circular, ± recurved, soft, when young with glistening papillae; F. on 2-in. long stalks, white. Growing period November–February.

Mon. pisiforme Schwant. (*Conophyllum pisiforme* Schwant., *Mes. pisiforme* Schwant., *Mitrophyllum pisiforme* Schwant., *Schwantesia pisiforme* L. Bol.). Stems low, much branched, *c.* $\frac{3}{4}$–$1\frac{1}{8}$ in. long; branches



FIG. 202.—Monilaria vestita Schwant. $\frac{3}{4}$ nat. size.

jointed like a necklace, the remains of the dead leaves in knots; L. 1st type very short, united almost to the apex into small, round, fleshy, dark green bodies the size of a pea, when young glistening with papillae; F. $1\frac{1}{8}$ in. ϕ, yellow, red in the middle, with a white edge. Growing period November–February.

Mon. vestita Schwant. spec. nov. (fig. 202). Recently discovered species (M. Schlechter, 1932).

Muiria N. E. Br.

(Named after Dr J. Muir)

Muiria Hortenseae N. E. Br. (fig. 203). Occurrence: S. Africa. Stemless, very succulent plant with short fibrous roots. Growths consisting of two united leaves, ± compressed, ovate to spherical, often somewhat angular, $\frac{3}{4}$–1 in. high, $\frac{5}{8}$–$\frac{2}{3}$ in. thick; fissure hardly visible, rather below the apex; fleshy, very soft, pale green, covered closely with velvety hairs; F. solitary, not projecting far through the fissure, pinkish-white.

Interesting but rare species. Growing period July to September, needs a very light, warm position, but only a little water; during the resting period none. The plants shrivel a little in spring. Propagation only by seed. Only grows well with lime in the soil.



FIG. 203.—Muiria Hortenseae N. E. Br. $\frac{2}{3}$ nat. size.

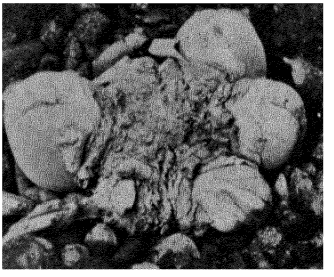


FIG. 204.—Muirio-Gibbaeum spec. N. E. Br. $\frac{3}{4}$ nat. size.

Muirio-Gibbaeum N. E. Br.

Muirio-Gibbaeum spec. N. E. Br. (fig. 204). Natural hybrid (*Gibbaeum album* N. E. Br. (?) × *Muiria Hortenseae* N. E. Br.). In habit the plants resemble *Gibbaeum*, the fissure is $\frac{2}{5}$–$\frac{1}{2}$ in. wide, the colouring and hairy covering is like *Muiria*. Very rare! It is very doubtful if this is really a natural hybrid, for *Gibbaeum album* and *Muiria hortenseae* occur about 40 miles apart, Muirio-Gibbaeum N. E. Br. about the middle between these two localities. Since it has not yet been possible to examine the flower, the relationship of this plant to any given genus remains to be decided.

Namibia Dtr. et Schwant.

(Named after the Namib, a desert region of S. Africa)

Allied to the genus *Juttadinteria*. Forming clumps. L. very thick, larger and softer than in *Juttadinteria*. F. large, white or violet. Occurrence: S.W. Africa. Cultivation as for *Juttadinteria*.

Namibia cinerea Dtr. et Schwant. (*Mes. cinereum* Marl., *Juttadinteria cinerea* Schwant.). L. short and thick, $\frac{5}{8}$ in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. wide at the base, up to $\frac{1}{2}$ in. thick, upper side roundly triangular, the end recurved, not very convex, back boat-shaped, roundly keeled; surface grey-green, with whitish dots visible under a lens and hence slightly rough. (Description from year-old seedlings.)

Namibia Pomonae Dtr. et Schwant. (*Juttadinteria Pomonae* Schwant., *Mes. Pomonae* Dtr.), Great Namaqualand. Forming cushions 8 in. wide, 4 in. high; on the woody branches are 2–3 pairs of leaves, very crowded, $\frac{2}{5}$–$\frac{1}{2}$

in. wide, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, broadly boat-shaped, with a distinct margin on the upper side, keel distinct or blunt; leaf tip with a small spine; surface whitish-grey or pale grey-green, with small, white, round papillae; F. on $\frac{2}{5}$–$\frac{1}{2}$-in long stalks, $1\frac{1}{8}$ in. ϕ, white. Rare!

Namibia ponderosa Dtr. et Schwant (*Mes ponderosum* Dtr.). Similar to the preceding species; L. shorter and keels sharper, covered with more or less distinct dots which stand in definite rows on the edges and keel. (Description from year-old seedlings.)

Nananthus N. E. Br.

Very small, perennial plant with a thick fleshy root stock, growths with 4–6 pairs of leaves; L. erect ascending, or spreading, opposite, linear-lanceolate, or lanceolate, or ovate, rarely club-shaped (never truncate at the apex), sharply 3-angled, or 3-angled towards the tip, usually several times as long as broad, smooth, ± flecked; F. nearly or quite sessile, medium sized, yellow or yellowish.

Occurrence: S. and S.W. Africa. Chief growing period in summer, needs a very light position and a moderate amount of moisture, in winter not below 60° F. and dry. Grow in very tall pots in sandy, stony soil. (See remarks on *Aloinopsis*.)

Nan. albinotus N. E. Br. = *Rabiea albinota* N. E. Br.

Nan. albipunctus N. E. Br. = *Rabiea albipuncta* N. E. Br.

Nan. aloides N. E. Br. (*Aloinopsis aloides* Schwant., *Mes. aloides* Haw.). L. 6–8, crowded, the young ones erect, the older ones spreading, 2 in. long, obliquely lanceolate or narrowly rhomboidal, tapering, with a small, spiny tip; upper side flat or with shallow grooves, lower side convex, keeled above, triangular, dark green, with numerous, raised, white, wart-like dots, edges rather rough above; F. short stalked, 1 in. ϕ, yellow, August–September.

Nan. aloides N. E. Br. **v. striata** L. Bol. L. rather shorter, F. $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, petals yellow, with red stripes or edges.

Nan. canus L. Bol. = *Aloinopsis Peersii* L. Bol.

Nan. Comptonii L. Bol. = *Rabiea albinota* N. E. Br.

Nan. Jamesii L. Bol. L. 4–6, oblong-lanceolate, semicylindrical or almost cylindrical, with a hardened tip; 1–$1\frac{1}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide and thick, upper side ± convex, back round, roundly keeled in the upper third, smooth, grey-green, with dark violet dots.

Nan. Loganae L. Bol. L. 2 or 4, long spatulate, $\frac{3}{4}$–$\frac{7}{8}$ in. long, at first $\frac{1}{6}$ in. wide and thick, $\frac{1}{3}$ in. wide in the upper quarter, then shortly tapering, triangular; upper side flat or slightly concave, back rounded, bluish grey-green; in the lower part smooth, the upper half with very coarse, not much raised, pale warts, the grooves between them dark green.

Nan. Pole Evansii N. E. Br. (*Aloinopsis Pole Evansii* N. E. Br.) (named after Dr I. B. Pole Evans, Pretoria). Growths with 2–3 pairs of leaves; L. spreading, oblong, the last third elongated triangular, with a fine spiny tip, $1\frac{1}{2}$ in. long, $\frac{1}{3}$ in. wide, rather narrower at the base, $\frac{1}{3}$ in. thick; upper side

flat, back boat-shaped and obliquely keeled; smooth, reddish glaucous, powdery white with a waxy coating, with uniformly arranged, slightly raised, dark green dots; edges and keel reddish; F. 1 in. ϕ, shining golden yellow, with red central line, July–August.

Nan. rosulatus N. E. Br. = *Aistocaulon rosulatum* v. Poelln.

Nan. rubrolineatus N. E. Br. (*Aloinopsis rubrolineata* Schwant., *Al. Dyeri* L. Bol., *Mes. rubrolineatum* N. E. Br.). Plants with long, fleshy roots, forming clumps; L. decussate, 4 or 6, more or less prostrate and somewhat recurved, acute ovate, about 1 in. long, $\frac{2}{5}$ in. wide at the base, stem at the middle widened to $\frac{3}{4}$ in., and broadly roundish triangular, tapering; $\frac{1}{5}$ in. thick; upper side ± flat, back round at first, then bluntly keeled; surface smooth in the lower quarter then rough with whitish warts, back warty and grey in the upper third and towards the edges; F. yellowish, the petals with a fine red central line.

Nan. Soehlemannii Hge. jr. = *Aloinopsis Peersii* L. Bol.

Nan. vittatus N. E. Br. (*Aloinopsis vittata* Schwant., *Mes. vittatum* N. E. Br., *Mes. aloides* hort.). Roots fleshy; L. 6–8, opposite but of different lengths, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, obliquely lanceolate, acute, with short spiny tip, semicylindrical, with a wide oblique keel above; dull green, rough with numerous raised, warty dots; F. on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, $\frac{3}{4}$–1 in. ϕ, shining pale yellow, the petals with a fine red middle line, April.

Nelia Schwant.

(Named after Prof. G. C. Nel, Stellenbosch, S. Africa)

Stemless, forming clumps or domed mounds. Very succulent plants. L. very crowded, united at the base, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, linear or rhomboidal, semicylindrical, lower side ± keeled, smooth, glossy, green or with a waxy grey-green coating, without dots. F. short stalked, with two large bracts on the stalk, white or yellowish, in summer. Occurrence: Little Namaqualand (S. Africa).

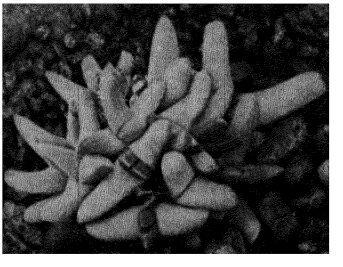


FIG. 205.—Nelia Meyeri Schwant. ½ nat. size.

Small, easily grown plants, which grow in summer. Need a light position in greenhouse or window. In summer keep fairly moist, in winter not too dry, not below 55° F.

N. Meyeri Schwant. (fig. 205) (*Sterropetalum Pillansii* N. E. Br.) (named after G. Meyer, Steinkopf, S.W. Africa). Dwarf growths with 1–2 pairs of leaves; L. united for $\frac{1}{5}$ in., $1\frac{1}{8}$ in. long, $\frac{2}{5}$ in. wide, $\frac{1}{3}$ in. thick, elongated triangular, acutely tapering, upper side flat, back sharply keeled up to the middle, below semicylindrical; smooth, bluish-green, shining as though varnished; F. on $\frac{3}{8}$-in. long stalks, 2–$2\frac{1}{2}$ in. ϕ, whitish-yellow.

N. robusta Schwant. L. $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{5}$–$\frac{1}{2}$ in. wide, $\frac{1}{5}$–$\frac{1}{2}$ in. thick, upper side linear, sometimes narrowed towards the tip, shortly triangular at the apex, ending in a small tip, below keeled from the middle to the tip, below semicylindrical, surface yellowish-green with glossy waxy coating.

N. Schlechteri Schwant. (named after Max Schlechter, Port Nolloth, Little Namaqualand, S. Africa). Growths with 1–2 pairs of leaves, wide spread; L. $\frac{2}{3}$–1 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide and thick; upper side flat or slightly convex; linear, rather wide above, then tapering abruptly or rhomboidal and ending in a spine, lower side rounded, sharply keeled above, drawn forward like a chin, the end of the lower side often rather twisted laterally; smooth, glossy, pale blue-green or whitish grey-green, the edges often tinged with red; F. on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, $\frac{2}{3}$ in. ϕ, white.

Neorhine Pillansii Schwant. = *Rhinephyllum Pillansii* N. E. Br.

Odontophorus N. E. Br.

Dwarf shrubs with fleshy roots. Branches ascending, or prostrate on the ground and forming close tufts. Growths with 1–2 pairs of

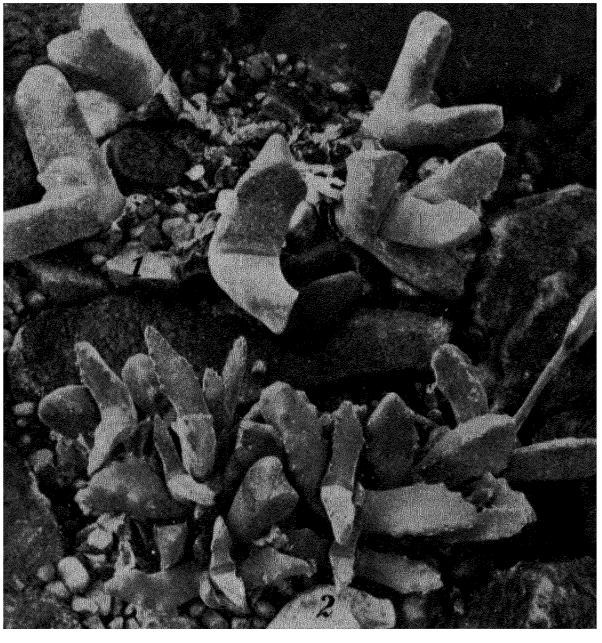


FIG. 206.—1. Odontophorus primulinus L. Bol. 2. O. Marlothii N. E. Br. $\frac{1}{2}$ nat. size.

leaves; L. very thick and with soft flesh, grey-green, warty, with soft hairs, toothed. F. stalked, yellow or white, in autumn. Occurrence: S. Africa.

Growing period July to November. Need a light, warm position in a greenhouse. In winter not below 55° F. and not dry. In summer in full sun and fairly moist. They dislike stagnant moisture, and the soil should be very porous with much sand and rubble.

Od. Marlothii N. E. Br. (fig. 206) (named after Dr Marloth, Cape Town). Short shoots with 2–3 decussate leaves, with longer, at first erect, then prostrate, shoots from the leaf axils; L. united at the base, 1–1$\frac{3}{8}$ in. long, swollen at the base, $\frac{1}{4}$–$\frac{1}{3}$ in. broad and thick, upper side slightly convex, wider above and elongated triangular, often obliquely tipped, lower side roundish at first, keeled above and laterally compressed, not or only slightly drawn forward over the tip; edges with 6–7 stout teeth above, which have a down-curved, brown, awn-like tip, which ± later falls off; surface grey to dark green, with roundish raised warts, with fine white hairs, and hence rough; F. on $\frac{1}{2}$-in. long stalks, 1$\frac{1}{8}$ in. ϕ, yellow; November.

Od. nanus L. Bol. Like *Od. primulinus*, but smaller. Growths very short; F. white.

Od. primulinus L. Bol. (fig. 206). Branches $\frac{3}{4}$–1$\frac{1}{8}$ in. long, covered with the remains of the old leaf sheaths; L. similar to those of *Od. Marlothii*, but stouter on the whole, up to 1$\frac{1}{2}$ in. long, $\frac{2}{3}$ in. broad, *c.* $\frac{5}{8}$ in. thick, upper side short and roundly triangular towards the tip, lower side almost semi-cylindrical, with 4–5 short, stout teeth towards the tip along the edges.

Oophytum N. E. Br.

Small, perennial, very succulent plants of tufted habit. Growths consisting of ovate, soft bodies, which are buried in the whitish, dry skins of older bodies. Occurrence: Namaqualand. Cultivation as for *Conophytum*.

Oophytum nanum L. Bol. (*Mes. nanum* Schlechter). Plants only $\frac{3}{4}$ in. high, bodies almost spherical, 2–3 in. ϕ, green, with fine, almost invisible hairs; F. $\frac{3}{8}$ in. ϕ, white inside, edge reddish.

Oophytum oviforme N. E. Br. (fig. 207) (*Conophytum oviforme* N. E. Br., *Mes. oviforme* N. E. Br.). Bodies $\frac{1}{2}$–$\frac{3}{4}$ in. ϕ, with a small fissure, closed or gaping slightly; surface olive green, also often fiery red, finely rough with glistening papillae; F. solitary, up to $\frac{7}{8}$ in. ϕ, white inside with a reddish edge.

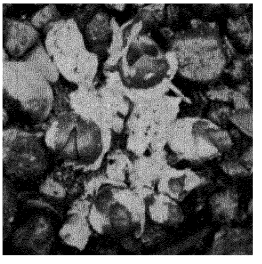


FIG. 207.—Oophytum oviforme N. E. Br. ½ nat. size.

Ophthalmophyllum Dtr. et Schwant.

Dwarf, stemless, very succulent plants with fibrous roots, as a rule with one or a few shoots. Bodies consisting of a pair of united leaves, cylindrical or obconic, very fleshy and juicy, notched at the

usually glossy, often with very fine papillose hairs, green or reddish to red-purple; the lobes usually with transparent windows, the flanks with transparent dots; F. short stalked, white, pink or lilac, $\frac{3}{8}$–$1\frac{1}{8}$ in. ϕ, September to October. Occurrence: S.W. Africa.

Valuable plant. Chief growing period from September to February. Needs a very light position in a greenhouse or sunny window; the plants much dislike stagnant moisture and temperature below 60° F. The soil should be $\frac{3}{4}$ coarse sand with the addition of loam. In the resting period the Ophthalmophyllum should be kept absolutely dry. Repotting every year is not recommended, but should be carried out if root bug is present. The old bodies dry up to a papery skin and so protect the young growths from the scorching sun. Propagation not difficult from seed, but the resting period must be observed even for young seedlings.



FIG. 208. Ophthalmophyllum Dinteri Schwant. $\frac{1}{4}$ nat. size.

Ophth. cornutum Schwant. = *Conophytum cornutum* Schwant.

Ophth. Dinteri Schwant. (fig. 208) (named after Professor K. Dinter, Bautzen). (Till now considered as a red-flowered form of *Ophth. Friedrichiae*.) Growths usually solitary; body almost cylindrical, often up to $1\frac{1}{2}$ in. high, *c.* $\frac{7}{8}$ in. broad, $\frac{5}{8}$ in. thick, obliquely truncate; fissure running right across, not gaping, about $\frac{1}{8}$ in. deep; smooth, bare; ± glossy, dark green, but usually with a coppery red to purple sheen, the lobes ± rounded, with reddish, ± transparent windows, and along the lower edges of these windows here and there a few transparent dots; F. up to $1\frac{1}{8}$ in. ϕ, lilac red, September.

Ophth. Friedrichiae Dtr. et Schwant. (figs. 209 and 210) (*Conophytum Friedrichiae* Schwant., *Lithops Friedrichiae* N. E. Br., *Mes. Friedrichiae* Dtr.) (named after Frl. Margarete Friedrich, Warmbad, S.W. Africa). Growths usually solitary; bodies cylindrical, 1–$1\frac{1}{8}$ in. long, $\frac{5}{8}$ in. broad, $\frac{2}{5}$–$\frac{1}{2}$ in. thick; fissure running right across, $\frac{1}{5}$–$\frac{1}{4}$ in. deep, gaping; lobes roundish, distinctly roundly keeled, bare, smooth; green, with a coppery-red tinge in the resting period; ends of lobes with very transparent windows, the window with a few large pale dots along the lower edge; F. white, $\frac{1}{2}$–$\frac{3}{4}$ in. ϕ, September.

Ophth. Fulleri Lavis (named after the Postmaster, E. R. Fuller, Prieska, Griqualand, Cape Province). Bodies solitary, broadly obconical, soft green,

yellowish above, $\frac{7}{8}$ in. long, in the middle about $\frac{1}{2}$ in. wide, above at the fissure 1 in. wide; L. united for about $\frac{1}{2}$ in., the tips convex, gaping $\frac{1}{2}$-$\frac{3}{4}$ in. apart, the free part with fine hairs; F. opening by day, 1 in. ϕ, rosy purple, scented. New species!



FIG. 209.—Ophthalmophyllum Friedrichiae Dtr. et Schwant. $\frac{3}{5}$ nat. size.

Ophth. Herrei Lavis (fig. 211) (named after H. Herre, Stellenbosch, S. Africa). Growths usually solitary; $\frac{3}{4}$–$1\frac{3}{4}$ in. long, about $\frac{3}{8}$ in. wide at the



FIG. 210.—Ophthalmophyllum Friedrichiae Dtr. et Schwant. $\frac{4}{5}$ nat. size.

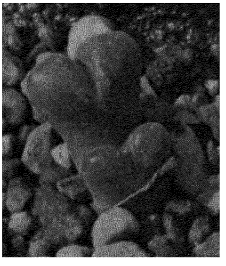


FIG. 211.—Ophthalmophyllum Herrei Lavis. $\frac{4}{5}$ nat. size.

base, wider above, at the top $\frac{5}{8}$–$\frac{7}{8}$ in. wide, fissure about $\frac{3}{8}$ in. deep, opening $\frac{1}{4}$–$\frac{1}{3}$ in., $\frac{3}{8}$ in. wide at the base of the fissure, lobes saddle-shaped above; olive

Ophth. Jacobsenianum Schwant. (named after H. Jacobsen, Kiel). Growths solitary or several, bodies $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{2}{5}$–$\frac{2}{3}$ in. wide, $\frac{1}{5}$–$\frac{1}{3}$ in. thick, compressed cylindrical, 2-lobed and ± truncate, lobes $\frac{1}{5}$–$\frac{1}{3}$ in. long, adpressed, roundly truncate at the top; fissure going right across, almost $\frac{2}{5}$ in. deep; lobes distinctly windowed and with large dark dots; fleshy and juicy; smooth, covered with minute dots seen under a lens, often pubescent and with a velvety feel; green, brownish in the upper part and on the sides; F. with long tubes, $\frac{7}{8}$ in. ϕ, beautiful, bright lilac pink, September. (This species was earlier introduced as *Conophytum praesectum* N. E. Br. and by Schwantes considered to be *Ophth. praesectum*, and has been distributed under both names. The diagnosis of the flower makes it certain that it is an *Ophthalmophyllum*!)

Ophth. Marlothii Schwant. = *Conophytum pellucidum* Schwant.

Ophth. Maughanii Schwant. (fig. 212) (*Conophytum Maughanii* N. E. Br.) (named after Dr R. Maughan Brown). Growths solitary or several on a plant. Bodies $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, rather less thick, compressed cylindrical, seen from the side oblong or squarely oblong, notched at the top or with 2 short lobes, the somewhat gaping fissure $\frac{1}{4}$–$\frac{1}{3}$ in. deep, the lobes rounded or rather conical at the top, very blunt or often weakly keeled; fleshy, juicy; smooth, bare; uniformly light green in the lower part, the tops of the lobes translucent or almost transparent, the windows passing into large transparent dots on the lower side, the windows pale yellowish-green; if the body has formed two new bodies inside itself it becomes ovate and almost $1\frac{1}{8}$ in. ϕ; F. $\frac{5}{8}$ in. ϕ.

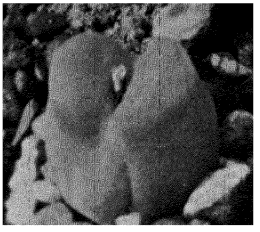


FIG. 212.—Ophthalmophyllum Maughanii Schwant. $\frac{1}{5}$ nat. size.

Ophth. Pillansii L. Bol. (named after Dr N. F. Pillans, Pretoria). Bodies solitary, obconical, $\frac{3}{4}$–$\frac{7}{8}$ in. high, $\frac{5}{8}$ in. broad, $\frac{2}{5}$ in. thick, truncate above, lobes slightly rounded, fissure $\frac{1}{5}$ in. broad, not gaping; bodies yellowish-green, smooth, the lobes covered with very numerous, about $\frac{1}{25}$ in. large, dark green, ± transparent dots, which ± coalesce on the tops of the lobes. F. $\frac{1}{3}$ in. ϕ, pink.



FIG. 213.—Ophthalmophyllum Schlechteri Schwant. $\frac{1}{5}$ nat. size.

Ophth. praesectum Schwant. (See under *Ophth. Jacobsenianum* Schwant.)

Ophth. rufescens Schwant. (See under *Conophytum rufescens* N. E. Br.)

Ophth. Schlechteri Schwant. (fig. 213) (named after Max Schlechter, Port Nolloth, S. Africa). Growths solitary or in twos; bodies elongated, ovate, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, in the middle $\frac{5}{8}$ in. wide, somewhat less thick, thinner at top and base, fissure $\frac{1}{5}$–$\frac{1}{4}$ in. broad, not going quite across, lobes conical tapering; smooth, bare; dull

visible against the light, the tops of the lobes with pale but not transparent windows.

Ophth. Schuldtii Schwant. (fig. 214) (named after Hans Schuldt, of the firm Albert Schenkel, Blankensee). Growths solitary; bodies $\frac{5}{8}$–1 in. long, $\frac{1}{2}$–$\frac{5}{8}$ in. broad, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, often quite cylindrical, elliptical-cylindrical or somewhat obconical, 2-lobed, fissure $\frac{1}{6}$–$\frac{1}{4}$ in. wide, little depressed, the lobes rounded; juicy, fleshy; smooth, bare; dark purple, not glossy, the tops of the lobes with transparent windows, the other part of the body sprinkled with transparent dots; before the resting period begins the surface becomes glossy; F. 1–$1\frac{1}{8}$ in.

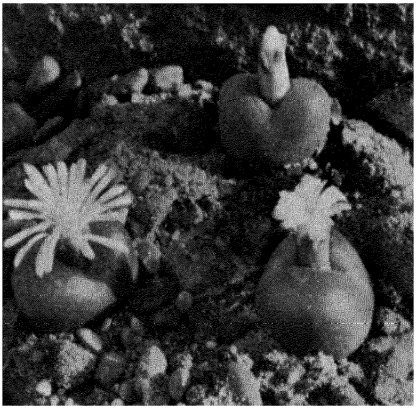


FIG. 214. Ophthalmophyllum Schuldtii Schwant. $\frac{4}{5}$ nat. size.



FIG. 215.—Ophthalmophyllum Triebneri Schwant. $\frac{3}{4}$ nat. size.

ϕ, often only $\frac{5}{8}$ in. ϕ, creamy white, flowering at night, September–October. Striking species! (Locality: Vaaldoorn, 25 miles east of Warmbad, Little Namaqualand.) (See under *Conophytum rufescens* N. E. Br.)

Ophth. Triebneri Schwant. (fig. 215) (named after Wilhelm Triebner, Windhoek). Growths solitary; bodies obconical, somewhat compressed laterally, $\frac{5}{8}$–$\frac{2}{3}$ in. high, $\frac{3}{4}$–$\frac{7}{8}$ in. wide, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, truncate above, fissure going right across, $\frac{1}{5}$–$\frac{1}{4}$ in. deep, the top divided into 2 thick, somewhat flattened lobes which are faintly, roundly keeled on the back; smooth, bare; the lower part dark lilac to brownish-red, above more ochre coloured, the upper part of the sides with transparent red dots as well as the lobes, where they ± coalesce to form a window; F. with very broad petals, 1 in. ϕ, shining white, slightly scented, September–October.

Ophth. verrucosum Lavis. Growths solitary as a rule, obconical, abruptly truncate above, *c.* 1 in. long, $\frac{5}{8}$ in. wide, near the fissure *c.* $\frac{7}{8}$ in. ϕ; fissure *c.* $\frac{1}{5}$ in. deep, going right across, opening $\frac{1}{8}$–$\frac{1}{6}$ in. wide; ends of lobes $\frac{1}{4}$–$\frac{3}{8}$ in. ϕ, closely covered with obvious, small, usually dark green warts; lower part of body sooty green, above reddish-brown; soft; F. *c.* $1\frac{1}{8}$ in. ϕ, shining white, diurnal.

Orthopterum L. Bol.

Orthopterum Waltonae L. Bol., S. Africa (fig. 216). Perennial, short-stemmed plants forming clumps by branching; branches with 6–8 opposite, almost erect, somewhat unequal leaves; L. linear-lanceolate, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{3}$ in. broad, $\frac{1}{5}$ in. thick, with a small spine at the tip; upper side flat or slightly convex, back rounded, keeled towards the top, edges with one or two small tubercles with translucent, recurved teeth; smooth, pale green, uniformly dotted with dark green; F. sessile, up to $1\frac{3}{4}$ in. ϕ, golden yellow, reddish below. Cultivation as for *Rhombophyllum*.

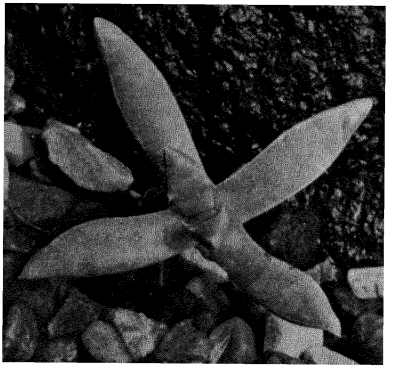


FIG. 216.—Orthopterum Waltonae L. Bol. Almost nat. size.

Oscularia Schwant.

Small sub-shrubs with erect or spreading branches. L. somewhat united at the base, 3-angled, short, narrower at the base, wider above, with a short tip, toothed along the edges or on the keel also, grey-green. F. in threes, small, short stalked, pink to red, in early spring to summer. Occurrence: Cape Province.



FIG. 217.—Oscularia caulescens Schwant. $\frac{2}{3}$ nat. size.

Very easily grown, pleasing, free-flowering plants. Growing time spring and summer, may be planted out of doors in a sunny position. In winter in a light place, in a window or a greenhouse at 50° F. Propagation easy from seed, quicker from cuttings, which soon flower. Especially useful for growing in quantity.

Osc. caulescens Schwant. (fig. 217) (*Mes. caulescens* Mill.). Branches spreading, reddish, with numerous short shoots in the axils; L. $\frac{3}{4}$ in. long, $\frac{2}{5}$ in. wide, erect, incurved, triangular to 3-angled, rather tapering, with a

short tip, with 2–3 small teeth on the edges towards the top, the edge of the keel often smooth; pale grey, powdery, edges and teeth slightly red; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, pink, scented.

Osc. deltoides Schwant. (*Mes. deltoides* Mill.). Freely branched shrub, branches reddish, crowded and with numerous short shoots in the axils; L. incurved, erect, triangular, 3-angled, bent inwards, $\frac{3}{8}$–$\frac{5}{8}$ in. long, $\frac{1}{3}$ in. broad, toothed on all three edges, pale grey, powdered; F. $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, pale pink, often in spring.

Osc. deltoides Schwant. **v. muricata** (*Mes. deltoides* Mill. *v. muricatum* Bgr., *Mes. muricatum* Haw.). Like the foregoing, but smaller; L. $\frac{1}{4}$–$\frac{1}{3}$ in. long, blue-grey.

Platythyra pallens L. Bol. = *Prenia pallens* N. E. Br.

Pleiospilos N. E. Br.

Stemless, often forming clumps by division, very succulent plant; L. usually 1–2 pairs, but sometimes 3–4 pairs, decussate, very



FIG. 218.—"Living Stones," Pleiospilos. (Botanic Garden, Kiel.)

thick, upper side flat, lower side very convex, very blunt or acute, united at the base or ± swollen, grey-green or dark green, with ± transparent dots. F. sessile or short stalked, solitary or several, red, yellow; September and October. Occurrence: Karroo (Cape

Remarkable plants which in their very succulent habit and their colouring resemble closely pieces of granite (fig. 218). Growing period August to December; except during this period the plants should be kept completely dry; need a position in full sun with free ventilation not under 60° F., in a greenhouse or bright window. Water may be given freely whilst the leaves are developing, but should be reduced when this is complete. The soil should be very sandy; even in pure sand with a little loam the plants grow into large specimens. It is not always an advantage to repot, and if the roots come through the pot may be put inside a larger one. Propagation easy from seed. Seedlings sometimes flower the first year. Since the species hybridise very easily, care should be taken when raising from seed.

Pl. Archeri L. Bol. (fig. 219). Growths with one pair of leaves; L. *c.* 1 in. long, $\frac{3}{4}$ in. wide at the base, narrowing to the roundish tip, not very convex



FIG. 219.—1. Pleiospilos Archeri L. Bol. 2. Pl. dimidiatus L. Bol. 3. Pl. magnipunctatus Schwant. 4. Pl. Hilmari L. Bol. 5. Pl. Dekenahi N. E. Br. 6. Pl. minor L. Bol. 7. Pl. simulans N. E. Br. $\frac{1}{2}$ nat. size.

on the upper side, back round or roundly keeled, the back at one side drawn forward about $\frac{1}{3}$ in. over the upper surface; colour grass green, often reddish, with small transparent dots and, here and there, larger ones; F. sessile, $1\frac{1}{2}$ in. ϕ, golden yellow.

Pl. Bolusii N. E. Br. (fig. 220) (*Mes. Bolusii* Hook. f.) (named after Harry Bolus, Cape Town). When old, sparsely forked, branched, growths usually with one pair of leaves; L. often broader than long on the upper side,

1½–3 in. long, semicylindrical, thickened like a club above, upper side flat, the lower side very considerably, often for as much as ¾–1⅛ in., drawn forward over the upper side like a chin; surface smooth, the chin-like portion usually rather warty, in a bright position reddish to brownish-green with numerous dark green dots, the upper side paler and with fewer dots; F. 1–4 to each pair of leaves, almost sessile, 2½–3¼ in. ϕ, golden yellow. Plants in which the chin is not much developed are generally not true; fertile hybrids occur between *Pl. Bolusii* × *Pl. simulans*.

Pl. compacta Schwant. = *Pl. nobilis* Schwant.

Pl. Dekenahi N. E. Br. (fig. 219) (*Punctillaria Dekenahi* N. E. Br.). With several growths; growths with two pairs of leaves; L. spreading, about 2½ in. long, ⅝ in. wide at the base, about 1 in. wide in the middle, then tapering abruptly; upper side slightly concave, back round at first, then sharply keeled and chin-like; surface grey-green, rough with raised dark green dots, with a slight waxy coating, keel and edges ± reddish; F. 1¾ in. ϕ, pale yellow.

Pl. dimidiatus L. Bol. (fig. 219). Growths with two or three pairs of leaves; L. 3¼ in. long, 1⅛ in. wide at the base, not much wider in the middle, the tip rather recurved, back at first roundish, then sharply keeled, surface smooth, grey-green, with numerous large dark green dots uniformly arranged; keel and edges ± reddish; F. sessile, 2½–3 in. ϕ, yellow, August. Very free flowering.

Pl. Hilmari L. Bol. (fig. 219). Growths usually with one pair of leaves, L. *c.* 1 in. long, about ⅝ in. broad at the base, slightly narrowed towards the end, upper side slightly convex, back semicylindrical and drawn forward over the upper side for nearly ⅜ in., edges much rounded; colour reddish-green, with ± dark dots, which run together at the tip of the leaf to form a ± distinct window; F. sessile, 1 in. ϕ, golden yellow.

Pl. magnipunctatus Schwant. (fig. 219) (*Mes. magnipunctatum* Haw., *Punctillaria magnipunctata* N. E. Br.). Similar to *Pl. Purpusii*; L. broader, very thick, upper side flat, tapering abruptly, glaucous, with numerous green dots, F. sessile, yellow, smaller than in *Pl. Purpusii*.

Pl. minor L. Bol. (fig. 219). Growths with two or three pairs of leaves; L. *c.* 1⅛ in. long, ⅜ in. broad at the base, the upper third forming a roundish triangle ¾ in. wide, upper side slightly rounded, the tip slightly drawn forward, back roundish, keeled boat-shaped, edges roundish, surface smooth, grey-green, uniformly and openly covered with dark green dots; F. 2¼ in. ϕ, sessile, yellow, whitish in the middle.

Pl. Nelii Schwant. (fig. 220) (*Punctillaria Nelii* N. E. Br.) (named after Dr C. G. Nel, Stellenbosch, S. Africa). Similar to *Pl. Bolusii*. L. quite level on the upper side, lower side very markedly drawn forward like a chin, so that the leaves are almost hemispherical, fissure deep, not gaping much, with a few slightly raised dark dots; F. short stalked. Rarely flowers.

Pl. nobilis Schwant. (*Mes. nobile* Haw., *Mes. compactum* Ait., *Pl. compacta* Schwant., *Punctillaria compacta* N. E. Br., *Punct. nobilis* N. E. Br.). When old, branched in tufts; L. 4–6, 2–2½ in. long, straight when young, curved

later, broadly linear, widened to $\frac{5}{8}$–$\frac{3}{4}$ in. towards the end, short tipped, upper side smooth near the base, then somewhat sunken, lower side round at first, keeled and 3-angled towards the tip, keel ± indented, bluntish at the tip; surface dirty grey-green with numerous raised dots; F. solitary, short stalked, 2–2$\frac{1}{2}$ in. φ, yellow.

Pl. pedunculatus L. Bol. Growths often with two pairs of leaves; L. united for about $\frac{3}{8}$ in. at the base, about 1$\frac{3}{8}$ in. long, 3 in. broad, the upper side relatively small, the back much rounded and slightly drawn forward like



FIG. 220.—1. Pleiospilos Bolusii N. E. Br. 2. Pl. Nelii Schwant. 3. Pl. simulans N. E. Br. 4. Pl. Roodiae Schwant. $\frac{2}{3}$ nat. size.

a chin, the younger leaves about 1$\frac{1}{2}$ in. broad, 1$\frac{1}{2}$ in. φ; dark grey-green, closely covered with small dark dots, which are especially prominent on the younger leaves; F. up to 1$\frac{3}{4}$ in. φ, coppery yellow, white in the centre.

Pl. Purpusii Schwant. (*Mes. magnipunctatum* Schwant.) (named after J. A. Purpus, Darmstadt). Growths with 2–4 leaves; L. 2–3 in. long, $\frac{5}{8}$ in. wide, above the middle widening to 1$\frac{1}{8}$ in., flat towards the base, then somewhat incurved, tapering triangular-acute, lower side rounded near the base, not drawn forward like a chin; dark green or yellowish-green, with numerous raised red dots; F. sessile, up to 3$\frac{3}{4}$ in. φ, yellow. Especially beautiful! Seedlings often flower the first year.

Pl. Roodiae Schwant. (fig. 220) (*Mes. Roodiae* N. E. Br., *Punctillaria Roodiae* N. E. Br.) (named after Miss E. Rood, S. Africa). Growths usually with one pair of leaves; L. 1$\frac{3}{8}$–1$\frac{1}{2}$ in. long, straight, *c.* 1$\frac{1}{8}$ in. broad at the base, broader in the middle, shortly triangular, bluntly tapering, $\frac{1}{2}$ in. thick at the base, thicker towards the tip, upper side flat, lower side slightly convex, roundly keeled towards the tip, edges and tip very round; surface smooth, green, with numerous dark dots; F. 1$\frac{1}{2}$ in. φ, yellow.

Pl. Rothii hort. × (*Mes. Rothii* hort. ×) (named after Dr Roth, Bernburg). Hybrid: *Pl. Bolusii* × *Pl. magnipunctatus*.

Pl. simulans N. E. Br. (figs. 219 and 220) (*Mes. simulans* Marl.). Similar to *Pl. Bolusii*, L. usually in twos, $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, 2–3 in. broad, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, spreading, ovate-triangular, upper side flat or trough-like and then recurved, back keeled, thickened towards the tip, never drawn forward like a chin; surface reddish to brownish-green under strong sunlight, otherwise dark green, the upper side much dotted, slightly wavy and tuberculate; F. 1–4, almost sessile, yellow, pale yellow or even orange. Beautiful plants with white flowers have been observed here and there, which may be a separate species. Hybrids of *Pl. simulans* × *Pl. magnipunctatus* are not rare.

Prenia N. E. Br.

Low shrubs; stems short, branched; branches elongated, curved or with prostrate flowering branches, papillose. L. crowded, ± flat and lanceolate. F. 1–5, large, red or white, July to October. Occurrence: Cape Colony.

Cultivation and treatment as for *Delosperma*.

Prenia pallens N. E. Br. (*Mes pallens* Ait., *Platythyra pallens* L. Bol.). Stems fleshy, short or prostrate, with leaves crowded at the top; L. linear-lanceolate, acute, 2 in. long, $\frac{3}{8}$ in. wide; upper side grooved, lower side keeled, pale green frosted with grey, papillose, flowering branches 12–16 in long, ± prostrate, L. shorter, blunt tipped; F. $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, white.

Prenia relaxata N. E. Br. (*Mes. relaxatum* Willd.). Like the foregoing; F. bright red.

Psammophora Dtr. et Schwant.

Low, tufted, very succulent plants with almost woody, very leafy shoots; branches growing above or buried in the soil so that only the leaves are visible. L. short, close, decussate, in cross-section triangular, with rounded keel and edges, to nearly semicylindrical, tapering to a point, or wider with the lower side drawn forward like a chin, surface dull glossy, bluish grey-green, sticky. In its natural habitat the leaves are protected from excessive transpiration by a coating of sand or dust. F. terminal, solitary, rare, stalked, rosy violet or white, in summer. Occurrence: S.W. Africa.

The plants grow from May to October and need a position in full sun under glass, moderately damp. In winter they should be kept fairly dry, not below 60° F. Propagation is not difficult from seed, and possible also from cuttings.

Ps. Herrei L. Bol. (fig. 221) (named after H. Herre, Stellenbosch, S. Africa). Growths with 4–6 L.; L. $\frac{3}{4}$ in. long, $\frac{2}{5}$ in. wide at the base, rather broader towards the top and short triangular, upper side rather convex, the

tip markedly curved, back round, sharply keeled at the end and drawn forward over the tip; surface very rough, brownish-green; F. $\frac{7}{8}$–1 in. ϕ, white.



FIG. 221. Psammophora Herrei L. Bol. Nat. size.

Ps. longifolia L. Bol. (fig. 222). Shoots with 4–6 L.; L. $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, about $\frac{1}{2}$ in. wide, rather less thick, upper side linear, short tipped, flat, lower side round or roundly keeled, the keel drawn rather obliquely over the upper side, edges much rounded; surface very rough, pale grey-green to brownish, the young L. olive green, reddish at the base, rough, dull glossy, sticky; F. white.

Ps. modesta Dtr. et Schwant. (*Mes. modestum* Dtr. et Bgr.). Low shrub, *c.* 2 in. high, not much branched; L. $\frac{1}{2}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide, roundly triangular, acute, grey-green, not very red, rough, sticky; F. on $\frac{3}{8}$-in. long stalks, violet.

Ps. Nissenii Dtr. et Schwant. (fig. 222) (*Mes. Nissenii* Dtr.). Low, woody sub-shrub, 2–4 in. broad, the branches usually buried in the soil; L. in 2–3 pairs, united at the base, *c.* $\frac{1}{2}$ in. long (in its natural habitat up to $1\frac{1}{2}$ in. long). One leaf of the pair shorter, $\frac{1}{4}$ in. wide at the base; upper side flat or slightly hollow, with triangular, wider tip, lower side semicylindrical or roundly keeled; surface rough, the young L. especially sticky, grey-green, also whitish or reddish; F. $\frac{1}{2}$ in. ϕ, fairly long stalked, white or violet, rare. Slow growing.

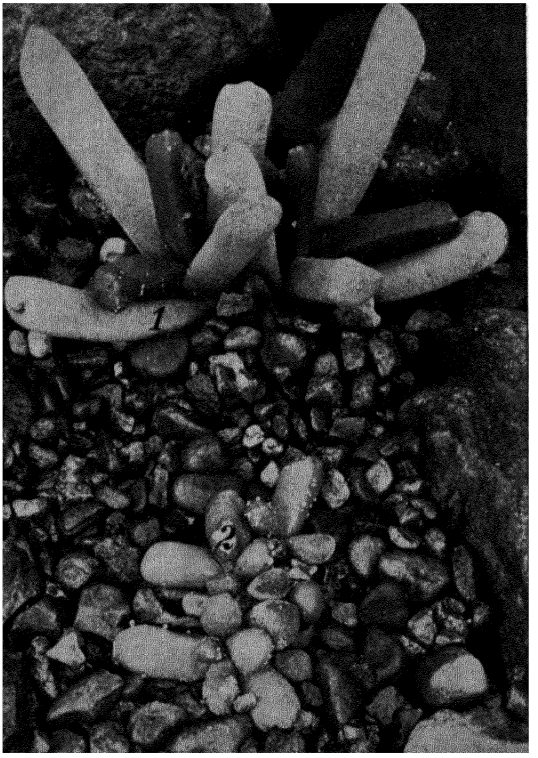


FIG. 222. 1. Psammophora longifolia L. Bol. 2. Ps. Nissenii Dtr. et Schwant. $\frac{3}{5}$ nat. size.

Psilocaulon N. E. Br.

Erect, ± branched shrubs with angular branches, much constricted where the leaves are attached and therefore appearing to be jointed; internodes cylindrical, often almost spherical, bare or rough, or even with fine hairs; L. small, ± cylindrical, united at the base, soft, soon drying up and

falling off; F. small, short stalked, white or reddish. Occurrence: Cape Colony, Karroo. Cultivation as for *Trichocyclus*.

Psilocaulon granulicaule N. E. Br. (*Mes. granulicaule* Haw.). About 16 in. high, freely branched, branches erect, slender, jointed, dull grey-green, roughly hairy; F. at the tips of the branches, 1–2, $\frac{1}{4}$–$\frac{1}{3}$ in. ϕ, white.

Psilocaulon junceum N. E. Br. (*Mes. junceum* Haw.). About 30 in. high, branches few, jointed, soon becoming bare; internodes unequally long, smooth; L. usually longer than the internodes, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{12}$ in. wide; F. terminal, 3 or more, whitish-violet.

Punctillaria compacta N. E. Br. = *Pleiospilos nobilis* Schwant.

Punctillaria Dekenahi N. E. Br. = *Pleiospilos Dekenahi* N. E. Br.

Punctillaria magnipunctata N. E. Br. = *Pleiospilos magnipunctatus* Schwant.

Punctillaria Nelii N. E. Br. = *Pleiospilos Nelii* Schwant.

unctillaria nobilis N. E. Br. = *Pleiospilos nobilis* Schwant.

unctillaria Roodiae N. E. Br. = *Pleiospilos Roodiae* Schwant.

Rabiea N. E. Br.

Stemless, very succulent plants with firm, deep, fleshy roots, forming clumps; L. opposite, often in a rosette, united at the base, 3–4 pairs, ascending or spreading, lanceolate, linear-lanceolate or ovate, acute, upper side flat, back rounded below, keeled above and 3-angled; smooth and flecked, or with small white or grey warts, with or without raised dots (these rather velvety); F. solitary, almost sessile or stalked, yellow. Occurrence: S. Africa.

Allied to *Nananthus* and *Aloinopsis*. Cultivation as for these (see remarks under *Aloinopsis*).

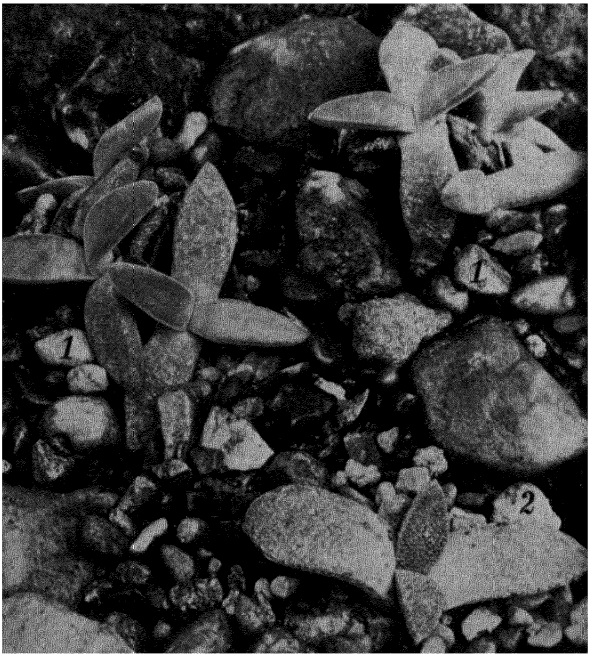


FIG. 223.—1. Aloinopsis Peersii L. Bol. 2. Rabiea albinota

Rabiea albinota N. E. Br. (fig. 223) (*Aloinopsis albinota* Schwant., *Mes. albinotum* Haw.. *Nanan-*

thus albinotus N. E. Br., *Nananthus Comptonii* L. Bol.). L. 6–8, up to 4 in. long (according to Berger), $\frac{2}{5}$ in. broad, sabre-shaped, 3-angled above, with recurved spiny tip, appearing white on account of the numerous raised flecks; F. $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, yellow, September.

Rabiea albipunctata N. E. Br. (*Aloinopsis albipuncta* Schwant., *Mes. albipunctum* Haw., *Nananthus albipunctus* N. E. Br.). L. 6–8, 1–$1\frac{1}{2}$ in. long, at first $\frac{1}{5}$–$\frac{1}{4}$ in. broad, wider above, $\frac{2}{5}$–$\frac{1}{2}$ in., shortly and obliquely tapering at the apex; upper side flat, lower side at first semicylindrical, keeled above, ending in a fine spine; glossy green, roughened with many warty whitish dots; F. on $1\frac{1}{8}$-in. long stalks, $1\frac{1}{8}$ in. ϕ, straw coloured, flesh coloured, petals with a red middle nerve, November.

Rhinephyllum N. E. Br.

Stemless, perennial, succulent plants; growths with 2–4 pairs of opposite leaves; L. clavate or thicker towards the end, upper side flat, back round or keeled; surface rough with little hard whitish warts; F. solitary, terminal, $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, yellowish-white, flowering at night. Occurrence: Little Karroo.

Easily grown. Cultivation as for *Stomatium*.

Rhin. Muiri N. E. Br. (fig. 224) (named after Dr J. Muir). Plants with fleshy root stocks, the many growths forming clumps; L. erect spreading, $\frac{3}{8}$–1 in. long, $\frac{1}{5}$–$\frac{2}{5}$ broad, above $\frac{1}{6}$–$\frac{1}{5}$ in. thick, the back slightly drawn forward over the tip; surface bare, green or even reddish, the lower part smooth, the upper part with very small whitish warts, edges and keel with a horny white margin; F. on $\frac{2}{5}$ $\frac{1}{2}$-in. long stalks, $\frac{1}{2}$–$\frac{5}{8}$ in. ϕ, yellowish-white, October.



FIG. 224.—Rhinephyllum Muiri N. E. Br. Almost nat. size.

Rhin. Pillansii N. E. Br. (*Neorhine Pillansii* Schwant.) (named after Dr N. S. Pillans, Pretoria). Similar to the preceding species; L. more spatulate-clavate, angles less distinctly sharp, instead of the horny margin a row of white warts; surface bare, grey-green, closely covered with small prominent rough dots.

Rhombophyllum Schwant.

Small shrubs or tufted succulent plants with fleshy, often turnip-like, roots. L. crowded, decussate, somewhat united at the base, semicylindrical, keeled above, lower side drawn forward like a chin, upper side ± linear, wider towards the middle or obliquely rhomboidal, edge entire or with 1–2 short teeth; surface smooth, ± glossy, sap green, with whitish dots or dots visible against the light. F. 3–7, on the same stalk, golden yellow, June to September.

Easily grown and free flowering. Growing period from June to November. Position in summer in a sunny, airy greenhouse or window; in winter in a light place at 55° F., fairly dry. During the growing period enough but not too much water must be given. Propagation easy from seed, and also by cuttings.

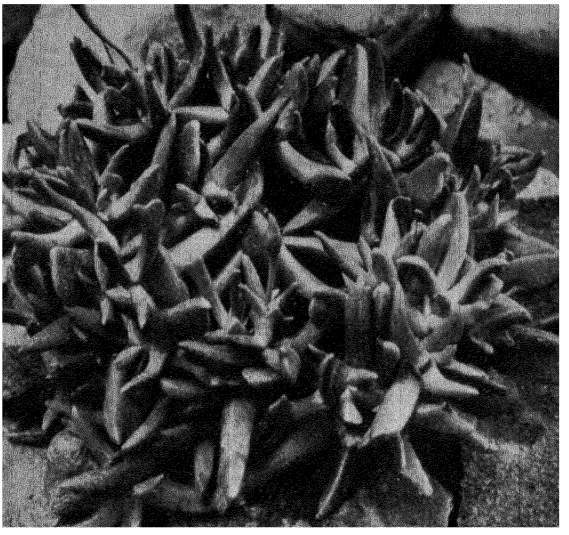


FIG. 225.—Rhombophyllum dolabriforme Schwant. (Photo, K. Josefsky.)

Rh. dolabriforme Schwant. (fig. 225) (*Mes. dolabriforme* L.). Young plants forming tufts; shrubby when older, up to 12 in. high, freely branched; branches erect, grey skinned, *c.* $\frac{1}{4}$–$\frac{1}{3}$ in. thick; L. spreading, 1–1$\frac{1}{8}$ in. long, upper side tapering gradually, flat, lower side semi-cylindrical, with a wedge-shaped, widened ($\frac{2}{5}$–$\frac{5}{8}$ in.), prolonged keel and a tooth-like projecting tip; surface smooth, grey-green, with transparent dots; inflorescence with 3–5 F.; F. up to 1$\frac{1}{2}$ in. ϕ, golden yellow, June–August.

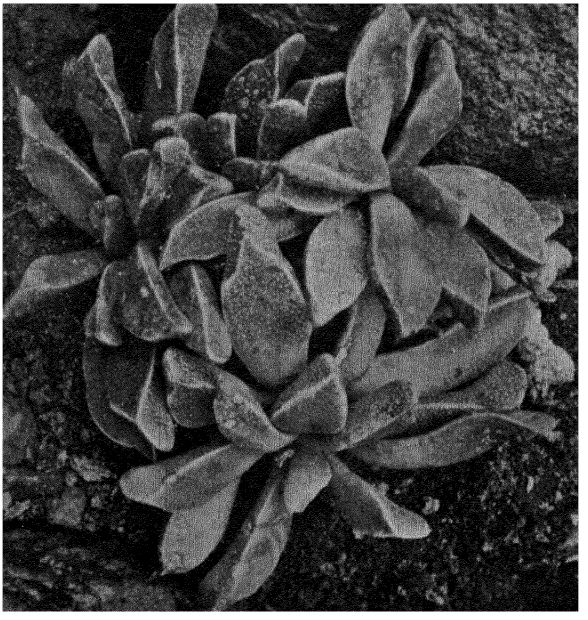


FIG. 226.—Rhombophyllum rhomboideum Schwant. Almost nat. size.

Rh. rhomboideum Schwant. (fig. 226) (*Bergeranthus rhomboideus* Schwant., *Mes. rhomboideum* S.D.). Stemless, forming tufts; leaf rosettes lying close to the ground, with 8–10 leaves; L. somewhat unequal, 1–2 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. wide, rhomboidal in outline, upper side slightly con-

like a chin and somewhat compressed laterally; the edges whitish, unarmed, rarely with 1–2 little teeth; surface smooth, dark grey-green, with numerous whitish dots; F. on $1\frac{1}{8}$-in. long stalks, $1\frac{1}{8}$ in. ϕ, golden yellow, reddish outside, June–September.

Rimaria N. E. Br.

Deep rooting, very succulent plants, whose pairs of leaves are united to form green, ± spherical bodies. Growing period from May to September. Need to be very bright and warm in winter, fairly moist in summer. Otherwise, cultivation as for *Lithops*. Occurrence: Karroo (S. Africa).

R. dubia N. E. Br. (*Mes. fissum* N. E. Br., non Haw.!). Similar to *R. Heathii*; in cultivation often producing short branches from the root stock, growths $\frac{1}{2}$–1 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. broad, $\frac{1}{3}$–$\frac{5}{8}$ in. thick, obovate, slightly compressed laterally, the adpressed leaves ± unequal in length and rounded at the top, the fissure about $\frac{2}{5}$ in. deep; surface smooth, bare, uniformly glaucous, without dots.

R. Heathii N. E. Br. (fig. 227) (*Mes. Heathii* N. E. Br.) (named after Dr F. H. Rodier Heath, Kew). Forming clumps; growths from the root stock or in cultivation often on short branches; bodies almost round, $\frac{3}{4}$–$1\frac{1}{8}$ in. high, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, consisting of two hemispherical or oval, ± equal leaves, united together for half their length; fissure reaching to the middle of the body; surface smooth, bare, grass green to whitish-green, often somewhat reddish; F. $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, white to cream coloured, August–September, opening at noon.

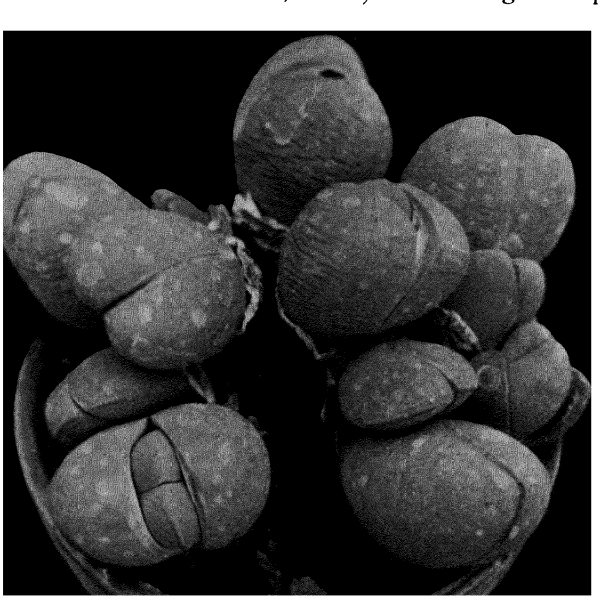


FIG. 227.—Rimaria Heathii N. E. Br. (Photo, K. Josefsky.) Almost nat. size.

R. microsperma N. E. Br. = *Dinteranthus microspermus* Schwant.

R. Pole-Evansii N. E. Br. = *Dinteranthus Pole-Evansii* Schwant.

R. Roodiae N. E. Br. (named after Mrs E. Rood, S. Africa). Bushmanland. Growths $\frac{7}{8}$–$1\frac{1}{8}$ in. high, the L. united for about $\frac{5}{8}$–$\frac{7}{8}$ in., the free part $\frac{1}{2}$–1 in. broad, almost the same thick, oval or hemispherical, upper side flat, back usually rounded, ± distinctly keeled, angles and keel ± distinctly toothed; surface smooth, green, with microscopic fine hairs; young L. with

distinct, ± transparent dots; F. on about $\frac{7}{8}$-in. long stalks, about 1 in. ϕ, orange yellow. (Possibly this species belongs to *Cheiridopsis*.)

Roodia digitifolia N. E. Br. = *Argyroderma Braunsii* Schwant.

Ruschia Schwant.

(Named after Farmer E. Rusch, Lichtenstein, near Windhoek, S.W. Africa)

Larger or smaller branched bushes with erect, usually unilaterally branched, stems, or these prostrate; in a few species forming small tufts; L. usually with a very long sheath clasping the stem, 3-angled, with a spiny tip, edge of keel entire or with blunt teeth, stiff, glaucous, nearly always with dark transparent dots. F. axillary or terminal, solitary or several, stalked or sessile, red, pink, violet or white, in summer. Occurrence: S.W. Africa.

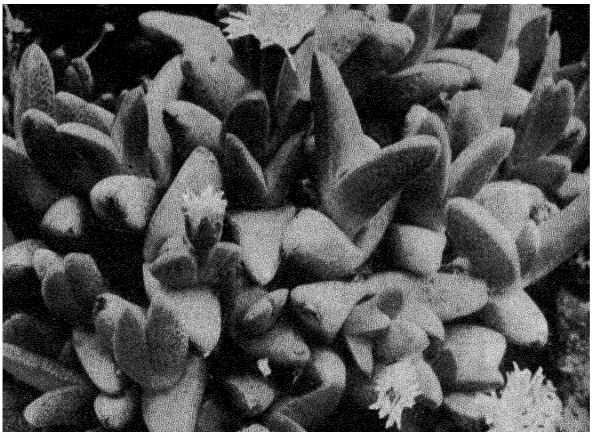


FIG. 228.—Ruschia Herrei Schwant. (Photo, R. Graessner.)

The taller shrubby species usually flower freely and grow well. Position during the summer in a bright sunny place in an airy greenhouse or window or out of doors. The tufted kinds should be kept under glass, since they ± dislike excessive moisture. Position in winter in a light place at 50–60° F., fairly damp. Propagation easy by seed, and also from cuttings.

R. amoena Schwant. Hemispherical cushions up to 6 in. ϕ are formed; growths with 1–2 pairs of leaves, L. separated, up to 1 in. long, up to $\frac{1}{3}$ in. wide, united at the base for $\frac{1}{3}$ in.; upper side long triangular, recurved above with a spiny tip, flat or rather convex, lower side half round, with a keel like a seam; surface with microscopic, fine short hairs, bright bluish-green, with pale transparent dots, edges and keel somewhat transparent; F. solitary, terminal, up to $\frac{3}{4}$ in. long in the stalk, $\frac{5}{8}$ in. ϕ, red-purple.

R. androsacea Marl. et Schwant. (*Mes. androsaceum* Marl.). Dwarf, prostrate shrublets; branches enveloped in the dry leaf sheaths, leaf sheath $\frac{1}{6}$ in. long, $\frac{1}{12}$ in. wide, $\frac{5}{8}$ in. thick, lower side round, keeled towards the top; slightly warted, whitish-green; F. small, red.

R. dualis L. Bol. = *Antimima dualis* N. E. Br.

R. Herrei Schwant. (fig. 228) (named after H. Herre, Stellenbosch, S.

Africa). Forming close, spherical-convex clumps; branches short; growths with 1–2 pairs of leaves united into a $\frac{1}{5}$-in. long sheath, $\frac{7}{8}$ in. long; L. spread $\frac{1}{6}$ in. wide and thick, upper side tapering, flat, back rounded and keeled; glaucous, with large transparent dots, edges and keel transparent.

R. imbricata Schwant. = *R. multiflora* Schwant.

R. Meyerae Schwant. (named after Frau E. Meyer, Steinkopf, S. Africa). Shrub up to 2 in. high; branches covered with close-lying, yellowish-brown, smooth leaf sheaths; L. $\frac{1}{6}$ in. long, $\frac{1}{12}$ in. wide, half ovate; dark green or bluish whitish-green, edges and keel transparent; F. $\frac{5}{8}$ in. ϕ, violet to pink, June–July.

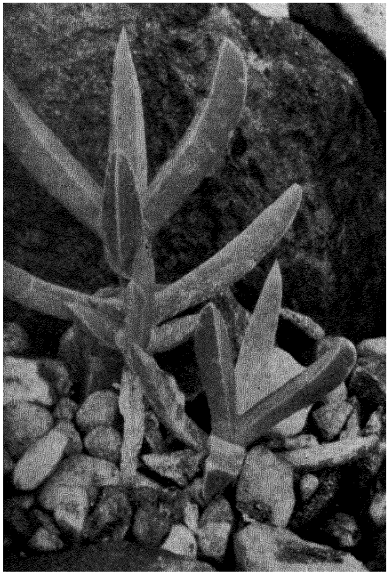


FIG. 229.—Ruschia rubricaulis L. Bol. $\frac{3}{4}$ nat. size.

R. Meyeri Schwant. (named after G. Meyer, Steinkopf, S. Africa). Erect bush 8–16 in. high; branches grey, with numerous short shoots; L. $\frac{2}{5}$ in. long, $\frac{1}{8}$ in. united to form a sheath; in the resting period the young leaves are buried in the dry sheaths of the old leaves; $\frac{1}{6}$ in. wide, $\frac{1}{8}$ in. thick, back sharply keeled, keel and edges with fine hairs, not transparent but smooth, grey-green; F. red.

R. mollis Schwant. (*Corpuscularia molle* Schwant., *Mes. molle* Ait.). Low bushes; branches prostrate, brownish; L. 3-angled with rounded sides, blunt, the angles marked with distinct lines, grey-green, often reddish, finely hairy, $\frac{1}{2}$–$\frac{5}{8}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. wide; F. solitary, $\frac{5}{8}$ in. high, late autumn.

R. multiflora Schwant. (*Mes. imbricatum* Haw., *Mes. multiflorum* Haw., *R. imbricata* Schwant.). Tall bush; L. $1\frac{1}{8}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, uniformly 3-angled; pale grey-green; F. numerous, $1\frac{1}{8}$ in. ϕ, white.

R. nobilis Schwant. Forming clumps with a short stem; growths bunched together; L. $1\frac{1}{8}$ in. long, united at the base for $\frac{1}{5}$–$\frac{1}{4}$ in., $\frac{3}{8}$ in. thick and wide, boat-shaped, upper side rather convex, triangular, back faintly keeled below, sharply keeled above; surface covered closely with very fine hairs, grey-green, hardly dotted; F. terminal, sessile, $\frac{2}{3}$ in. ϕ, rosy lilac.

R. perfoliata Schwant. (*Mes. perfoliatum* Mill.). Shrub with few branches; L. with a $\frac{3}{4}$–1-in. long sheath, spreading, $\frac{3}{8}$–$\frac{5}{8}$ in. long, 3-angled, compressed above, with red thorny tip, with 1–2 short acute teeth on the keel; texture firm; pale grey, slightly reddish; F. solitary, on $\frac{3}{4}$–$1\frac{1}{2}$-in. long stalks, 1 in. ϕ, pinkish-red.

R. pusilla Schwant. Forming low clumps up to 3 in. ϕ; branches quite enveloped in the dry leaf sheaths; free part up to $\frac{1}{6}$ in. long, $\frac{1}{8}$ in. broad, up to

$\frac{1}{12}$ in. thick, blunt, lower side keeled; with fine, pointed warts, green, the dots forming lines along the keel.

R. pygmaea Schwant. Forming small, low, close tufts; branches very short; growths with 1–2 pairs of leaves, $\frac{1}{6}$–$\frac{1}{5}$ in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. thick, united almost to the tip, drying up like parchment and enclosing in this skin a pair of leaves which are not united, but later wide spread; later L. convex on the upper side, back roundly keeled, green; F. $\frac{2}{3}$ in. ϕ. Needs rest in summer.

R. rigida Schwant. (*Mes. rigidum* Haw.). Freely branched bush, up to 16 in. high; branches thin; L. small; F. $\frac{2}{5}$–$\frac{1}{2}$ in. ϕ, white.

R. rubricaulis L. Bol. (fig. 229) (*Mes. rubricaule* Haw.). Smaller bush; branches angled, reddish when young; L. later grey, 1–$1\frac{1}{2}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, 3-angled, somewhat swollen on the upper side towards the base, narrowed above, shortly tapering; faintly grey-green, edges horny, keel finely toothed; F. solitary, on 2-in. long stalks, $1\frac{1}{8}$ in. ϕ, pale purple, in spring.

R. sabulicola Dtr. Sub-shrub, up to 12 in. high, with ascending branches; L. united into a sheath $\frac{5}{8}$–1 in. long, free part erect, $\frac{3}{8}$–$\frac{5}{8}$ in. long, *c.* 1 in. thick, with a spine at the tip, keel with 1–2, rarely 3, little teeth at the top, glaucous; F. on $\frac{5}{8}$-in. long stalks, *c.* $\frac{3}{4}$ in. ϕ, white.

R. semidentata Schwant. (fig. 230) (*Mes. semidentatum* Salm.). Shrub; branches erect, stiff, forked; L. distant, free part straight or recurved, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, uniformly 3-angled, tapering, the keel wider above with 2–4 little teeth; whitish-grey; F. almost $1\frac{1}{2}$ in. ϕ, red.

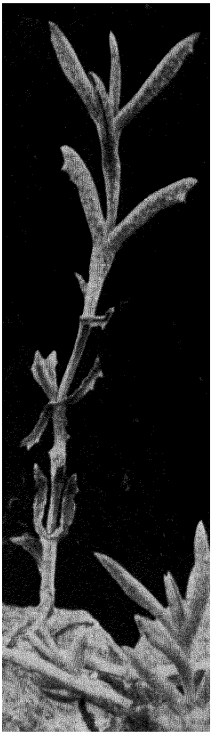


FIG. 230. Ruschia semidentata Schwant. $\frac{3}{4}$ nat. size.

R. Schlechteri Schwant. (named after Max Schlechter, Port Nolloth, S. Africa). Forming close, convex clumps, with buttress roots and short branches, shoots with 1–2 pairs of leaves $\frac{1}{3}$ in. long, united for $\frac{1}{5}$ in. into a sheath, free part $\frac{1}{6}$ in. broad, $\frac{1}{8}$ in. thick, upper side flat, triangular, lower side faintly keeled; rough, glaucous.

R. tumidula Schwant. (*Mes. tumidulum* Haw.). Tall bush; L. united into short, swollen sheaths, free part 1 in. and more long, $\frac{1}{6}$ in. wide, 3-angled; green or dull green; F. in close panicles, $\frac{3}{4}$ in. ϕ, pink, in May.

R. uncinata Schwant. (*Mes. uncinatum* Mill.). Shrub; branches prostrate, $\frac{1}{6}$–$\frac{1}{5}$ in. thick; L. from 2-angled sheaths, free part short, spreading, $\frac{1}{6}$–$\frac{1}{3}$ long, 3-angled, cylindrical, tapering, often with 1–2 stout teeth on the keel, grey-green; F. up to $\frac{3}{4}$ in. ϕ, rose.

R. uncinella Schwant. (*Mes. uncinellum* Haw.). Small shrub, similar to the foregoing species, free part of leaf uniformly 3-angled, the edges with

R. umbellata Schwant. (*Mes. umbellatum* L.). Tall bush; L. united to thickened sheaths, free part 2–3 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. wide, almost round, bluntish; fresh green; F. $1\frac{1}{8}$ in. ϕ, white.

Sceletium N. E. Br.

Small shrubs with short, spreading or prostrate branches, papillose when young. Leaves united at the base, lanceolate, papillose, persisting. F. 1–3 or more on thick stalks, large, whitish or pale yellow in summer. Occurrence: Karroo (S. Africa).

Chief growing period in summer, in winter completely at rest. Needs a very light position in a greenhouse or window, not below 60° F. in winter. Likes porous, loamy soil, fairly moist, dry in winter. Propagation from seed, or as easily from cuttings.

Sc. anatomicum L. Bol. (fig. 231) (*Mes. anatomicum* Haw.). L. narrowed towards the base, elliptical-oblanceolate, short tipped, $\frac{3}{4}$–1 in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, fleshy, pale green, glistening with transparent papillae especially along the edge; the veins of the old leaves persist covered by the transparent skin, remaining long on the plant; F. on $1\frac{1}{2}$–2-in. long stalks, $1\frac{1}{2}$–2 in. ϕ, white, August.

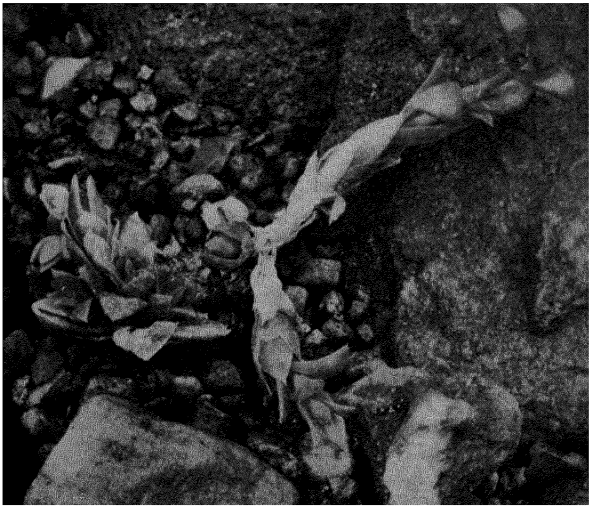


FIG. 231.—Sceletium anatomicum L. Bol. $\frac{3}{4}$ nat. size.

Sc. concavum Schwant. (*Mes. concavum* Haw.). L. close, erect, $\frac{3}{4}$–1 in. long, up to $\frac{2}{5}$ in. wide, elliptical-lanceolate, tapering, upper side slightly concave, lower side rounded, fresh green, finely papillose, the old leaves drying to a skin; F. 1–3, *c.* $1\frac{3}{8}$ in. ϕ, white.

Sc. crassicaule L. Bol. (*Mes. crassicaule* Haw.). Leaves close, erect, somewhat recurved, 2 in. long, $\frac{1}{4}$–$\frac{3}{8}$ in. wide, linear-lanceolate, upper side grooved, lower side convex, green, glistening with small papillae, the leaves of the flowering stems rather more distant and shorter; F. *c.* $1\frac{1}{2}$ in. ϕ, pale yellow.

Sc. tortuosum N. E. Br. (*Mes. tortuosum* L., *Mes. varians* Haw.). Similar to *Sc. concavum*; L. ovate-lanceolate, upper side somewhat channelled, keeled above; F. $1\frac{1}{2}$–2 in. ϕ, yellowish-white.

Schoenlandia L. Bol. = *Corpuscularia* Schwant.

Schwantesia Dtr.

(Named after Dr G. Schwantes, Kiel)

Many headed, forming clumps; stemless, very succulent plants. Growths with rosettes of 2–4 pairs of decussate leaves. L. wider above, rather oblique, acute or toothed at the apex, of very firm texture. F. short stalked, large, pale yellow, in late summer. Occurrence: Great Namaqualand (S.W. Africa).

Very fine succulent of distinctive form and colour; growing period from April to October. The plants need a very light position in a greenhouse or window. In summer keep fairly damp, in winter not below 60° F., and dry. Propagation from seed or by careful division of old plants.

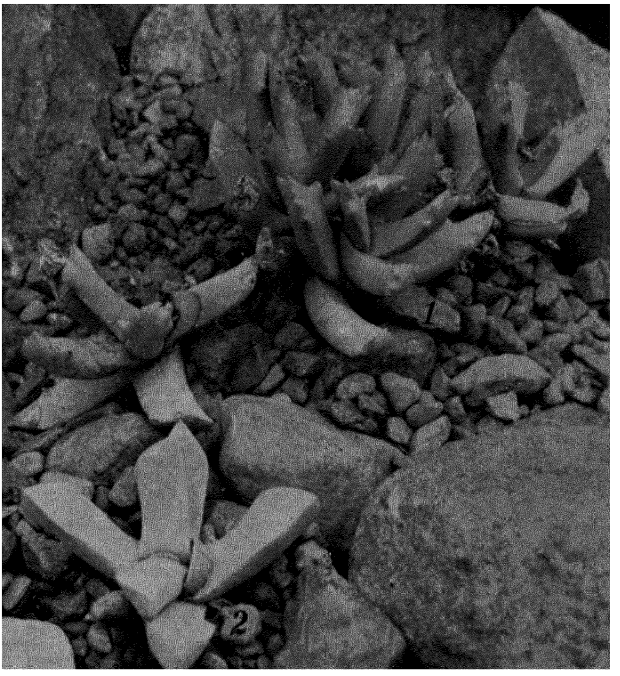


FIG. 232.—1. Schwantesia Rüdebuschii Dtr. 2. Schw. succumbens Dtr. ½ nat. size.

Schw. Herrei L. Bol. (named after H. Herre, Stellenbosch, S. Africa). Forming compact cushions up to $5\frac{1}{2}$ in. ϕ; L. $1\frac{1}{8}$ in. long, $\frac{5}{8}$ in. wide, $\pm$ erect, upper side flat, the keel with edge entire, blunt at the end and somewhat truncate, often with a few teeth, the sides flat or slightly convex, pale bluish or rather grey, smooth; F. $1\frac{1}{4}$–$1\frac{1}{2}$ in. ϕ, yellow.

Schw. moniliforme L. Bol. = *Monilaria moniliforme* Schwant.

Schw. pisiforme L. Bol. = *Monilaria pisiforme* Schwant.

Schw. Rüdebuschii Dtr. (fig. 232) (named after Farmer Rüdebusch, S.W. Africa). Forming round groups *c.* 4 in. high; L. $1\frac{1}{8}$–2 in. long, $\frac{2}{5}$–$\frac{1}{2}$ in. wide, $\frac{2}{5}$ in. thick at the base, rather less thick above, boat-shaped, upper side slightly convex, lower side half round, the leaf edges $\pm$ rounded; pale green, marbled with white; the leaf ends are widened, blunt, with 3–7 stout, broad, spreading blue teeth up to $\frac{1}{6}$ in. long, with brown tips; F. on $1\frac{1}{8}$–$1\frac{1}{2}$-in. long,

Schw. succumbens Dtr. (fig. 232) (*Mes. succumbens* Dtr.). L. 2–2½ in. long, *c.* ⅝ in. broad at the base, widened above, *c.* ⅜ in. thick below, upper side shortly obliquely tipped, flat or only slightly convex, under side roundish, obliquely keeled above, keel and edges sharp, with a fine brown spine at the tip; smooth, whitish bluish-green; F. on ⅜-in. long, laterally compressed stalks, 1⅛–1⅜ in. ϕ, yellow.

Schwantesia L. Bol. = *Monilaria* Schwant.

Semnanthe N. E. Br.

Semnanthe lacera N. E. Br. (fig. 233) (*Mes. carinatum* Vent., *Mes. gladiatum* Jacq., *Mes. acinaciforme* DC., *Mes. falcatum* Thbg., *Mes. lacerum* Haw.). Bush 2–3 ft. high, with spreading, stout, 2-angled branches, at first green, later reddish with grey edges; L. somewhat sabre-shaped, acute, incurved, united at the base, 1⅛–2 in. long, ⅓–½ in. wide, 3-angled, upper side flat or slightly grooved, much compressed laterally, with a small tip at the end, edges horny, finely toothed, edge of keel with coarse horny teeth; smooth, pale green, with transparent dots, grey and frosted; F. 1–2, short stalked, 1½–2 in. ϕ, shining pinkish-red, June to July. Allied to the genus *Erepsia*; treatment and cultivation as for this.



FIG. 233.—Semnanthe lacera N. E. Br. (Photo, K. Josefsky.)

Sterropetalum Pillansii N. E. Br. = *Nelia Meyeri* Schwant.

Stomatium Schwant.

At first stemless, very short stemmed when old, branched and tufted, or plants forming clumps. L. 4–6 and more on a growth, decussate, close, united at the base and ± swollen, fleshy, shortly triangular or broadly spatulate or elongated lanceolate, semicylindrical in cross-section at the base, ± keeled towards the top, the lower side drawn forward like a chin; the edges ± covered with short, broad teeth; surface dull, soft, tuberculate, with ± transparent warts. F. sessile or short stalked, medium sized, yellow, in summer. Occurrence: Cape Province.

Easily grown, growing period in summer; needs a light position

under glass, fairly moist, in winter dry and light, not below 55° F. Propagation easy from seed or cuttings. Recommended for growing in quantity.

St. agninum Schwant. (fig. 235) (*Mes. agninum* Haw.). L. with soft flesh, erect, elliptical, bluntish, 1½–2 in. long, ⅜–⅝ in. wide, upper side flat, lower side very convex and keeled, 3-angled, the edges entire or with 3–5 short, blunt teeth; dull grey-green, roughened with green dots; F. on *c.* ¾-in. long stalks, 1 in. ϕ, pale yellow.

St. albo-roseum L. Bol. Growths very numerous, with 6–8 L.; L. erect, blunt, ½ in. long, ⅕ in. broad and thick, somewhat wider at the end, upper side flat, the tip recurved, back very convex, keeled at the apex; surface grey-green, closely set with warty dots, edges and keel with 3–4 ± prominent teeth at the end, as well as on the outer end of the under side; F. *c.* ¾ in. ϕ, white.

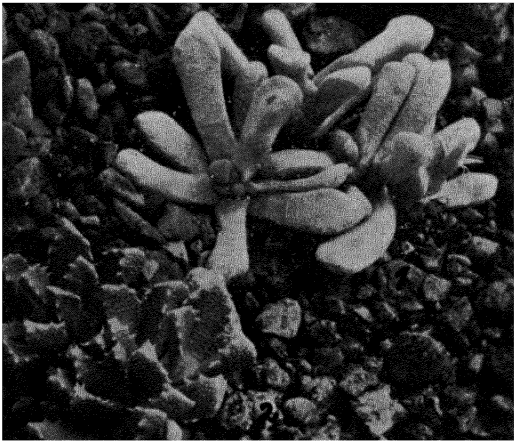


FIG. 234.—1. Stomatium albo-roseum L. Bol. 2. St. patulum L. Bol. ⅔ nat. size.

St. erminium Schwant. (fig. 236) (*Mes. erminium* Haw.). L. crowded and spreading, ⅝–¾ in. long, ⅓–½ in. wide, slightly narrower at the base, bluntish, upper side flat, lower side convex, keeled, the keel not toothed, with 3–4 short, straight teeth on the edges towards the tip; pale grey-green, roughened with numerous raised transparent dots; F. short stalked, ¾–1 in. ϕ, yellow, sweet scented.

St. Fulleri L. Bol. (fig. 235) (named after E. R. Fuller, Prieska, S. Africa). Growths with 6–8 leaves; L. *c.* 1⅛ in. long, about ½ in. broad at the base, wider towards the apex and blunt; upper side slightly convex, the tip somewhat recurved, back very convex, obliquely keeled at the end with 3–4 blunt or ± acute short teeth; surface grass green, with pale grey dots, more on the lower side than the upper; F. *c.* ¾ in. ϕ, yellowish-white, July–August.

St. Meyeri L. Bol. (fig. 235) (named after G. Meyer, Steinkopf, S. Africa). L. crowded, erect, almost linear, ⅔–¾ in. long, *c.* ¼ in. wide, only slightly wider at the tip, tip recurved and blunt; upper side almost flat, lower side half round, distinctly keeled towards the end, and the apex somewhat drawn forward; surface pale grey-green, roughened with large dots; ends of the edges with more or less prominent tubercles.

St. murinum Schwant. (*Mes. murinum* Haw.). Similar to *St. agninum*. L. only 1–1⅛ in. long, ⅓ in. broad, thicker towards the tip, the keel drawn

forward, the edges and the keel with three short teeth; F. scented like Musk.

St. musculinum Schwant. = *Chasmatophyllum musculinum* Dtr. et Schw.

St. mustellinum Schwant. (*Mes. mustellinum* Salm.). Leaf rosettes on prostrate branches; L. up to $\frac{3}{4}$ in. long, $\frac{3}{8}$ in. broad, rhomboidal to broadly spatulate, blunt, upper side flat, lower side half round, keeled above, the sides with 5–7 small acute teeth in the upper half; pale grey-green, finely roughened

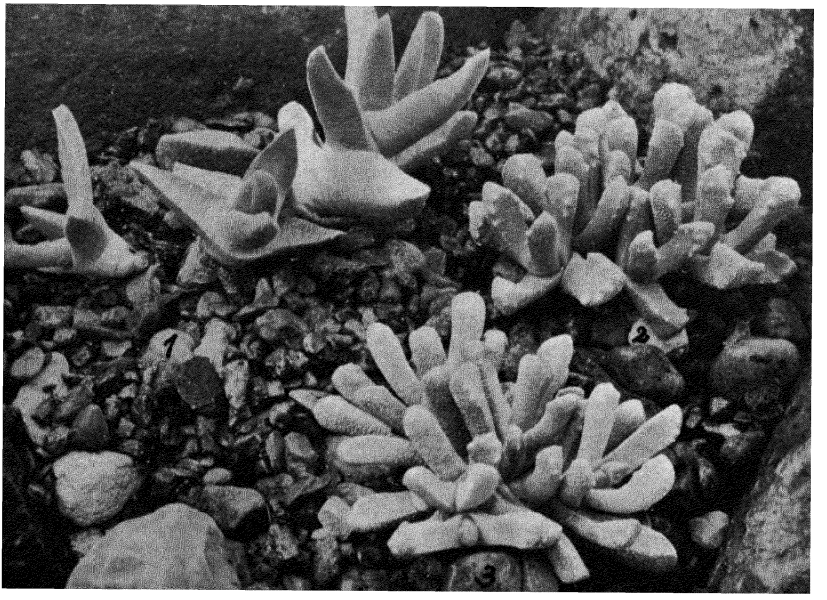


FIG. 235.—1. Stomatium agninum Schwant. 2. St. Fulleri L. Bol. 3. St. Meyeri L. Bol. $\frac{1}{3}$ nat. size.

with fairly large transparent dots; F. on $\frac{3}{4}$-in. long stalks, $\frac{3}{4}$ in. ϕ, yellow, June–July. F. last 10–12 days.

St. patulum L. Bol. (fig. 234). Forming close clumps; L. much crowded, $\frac{2}{3}$–$\frac{3}{4}$ in. long, at first $\frac{1}{5}$ in. wide, above widening to a blunt triangle $\frac{1}{3}$ in. across the base; upper side slightly convex, the tip recurved, back at first half round, at the end $\pm$ obliquely keeled and drawn forward over the tip; surface pale grey-green, roughened with transparent dots, edges with 2–9 stout, fine-tipped tubercles in the upper part, the keel with a few indistinct warts.

St. suaveolens Schwant. (fig. 236). L. very fleshy, $\frac{3}{8}$–$\frac{3}{4}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. broad, erect or spreading, somewhat recurved, thicker and wider above, upper side flat, back very round, distinctly keeled towards the tip, the lower side drawn far forward over the apex, edge entire or with 1–5 small teeth in the upper part on the edges, pale grey-green, finely roughened with pale dots;

in spring the leaves are copper coloured. F. sessile, yellow, August–September.

Thyrasperma helianthoides N. E. Br. = *Apatesia helianthoides* N. E. Br.

Titanopsis Schwant.

Stemless, forming close tufts or clumps, very succulent plants with fleshy roots. Growths with rosettes of 6–8 or more decussate, very crowded leaves. L. narrow to broadly spatulate, with wider triangular tip. Surface glaucous green to reddish- or yellowish-white, the tip or even further down covered with roundish or almost square warts. F. solitary, almost sessile or short stalked, medium sized, yellow or orange, in August. Occurrence: S. Africa, Great Namaqualand.

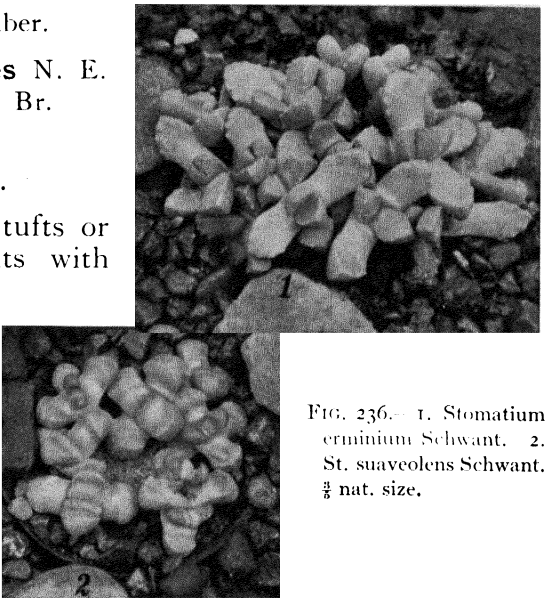


FIG. 236. 1. Stomatium erminium Schwant. 2. St. suaveolens Schwant. $\frac{3}{5}$ nat. size.

Growing period in summer in a light, airy position under glass, with a fair amount of water; in winter at *c.* 60° F., fairly dry. Water should be given very carefully, for water between the leaves soon causes decay. Propagation is easy from seed. Seedlings usually flower in the second year. It is also possible to divide the plants. They like very sandy soil with the addition of old mortar rubble. Interesting species!

Tit. calcarea Schwant. (fig. 237) (*Mes. calcareum* Marl.). Rosettes $2\frac{1}{2}$–$3\frac{1}{4}$ in. wide; L. spreading, up to 1 in. long, spatulate, the apex triangular truncate, the lower part roundish, smooth, below $\frac{1}{3}$ in., $\frac{1}{2}$ in. broad below the tip, the apex closely covered with reddish greyish-white warts, sometimes whitish glaucous like limestone; F. almost sessile, $\frac{3}{4}$ in. ϕ, golden yellow, almost orange. In its natural habitat the plants are buried to the tips of the leaves, which resemble in form and colour the surrounding limestone, a good example of mimicry. The first discovery of the plant by Professor Marloth of Cape Town was quite accidental; when on an excursion (1907) he rested against what he thought was limestone and crushed one of these plants. Suitable for growing in quantity. Plants attain in the first year a diameter of $1\frac{1}{8}$–$1\frac{1}{2}$ in. with 2–3 pairs of leaves.

Tit. Fulleri Tisch. (named after E. R. Fuller, Prieska, Griqualand, Cape Province). Forming thick clumps with numerous growths; rosettes with 5–6 pairs of leaves; L. ± erect, $\frac{3}{4}$–$\frac{7}{8}$ in. long, $\frac{1}{6}$ in. wide at the base, for a

distance of $\frac{5}{8}$ in. widened sinuously to $\frac{3}{8}$ in., then tapering to a roundish triangular tip; upper side flat or slightly trough-shaped, back roundly keeled, lovely blue-green with a reddish tinge, the whole L. covered with barely raised dark dots, which change to greyish-brown warts on the edges of the triangular tip, and are on a purple ground colour.

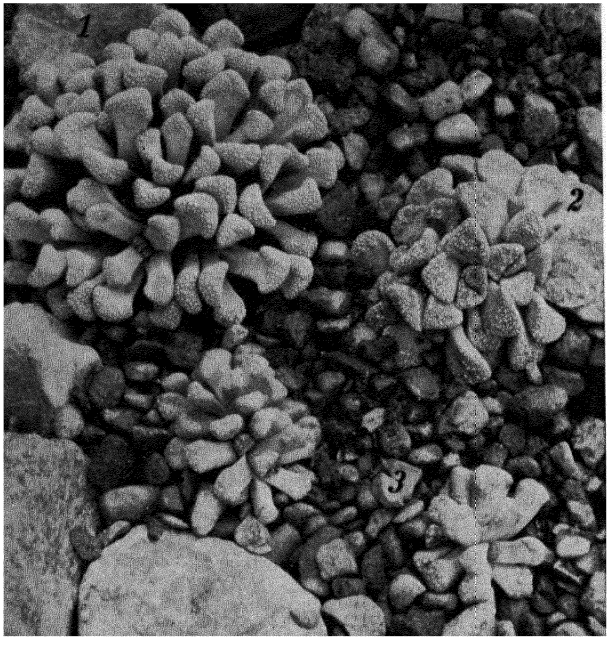


FIG. 237. 1. Titanopsis Schwantesii Schwant. 2. T. calcarea Schwant. 3. T. Hugo-Schlechteri Dtr. et Schwant. $\frac{1}{2}$ nat. size.

Tit. Hugo-Schlechteri Dtr. et Schwant. (fig. 237) (*Mes. Astridae* Dtr., *Mes. Hugo-Schlechteri* Tisch.) (named after Hugo Schlechter, Warmbad, S.W. Africa). Plants many-headed, up to 2 in. ϕ; L. $\frac{1}{2}$–$\frac{5}{8}$ in. long, *c.* $\frac{1}{8}$–$\frac{1}{6}$ in. wide and thick at the base, below the tip $\frac{1}{6}$–$\frac{1}{4}$ in. wide, the leaf tips an isosceles triangle; upper side flat, rounded below, often partly keeled; dull glossy, the lower half somewhat reddish, grey-green above to brownish, the tip, which is almost at right angles to the surface, covered with many warts, large and small, pale grey, rather reddish. Rather difficult to grow.

Tit. Luckhoffii L. Bol. (fig. 238) (named after Dr J. Luckhoff, Cape Town). Rosettes $1\frac{1}{8}$–$1\frac{1}{2}$ in. wide; L. *c.* $\frac{2}{3}$ in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. broad and thick at the base, up to $\frac{1}{2}$ in. wide at the end and triangular, the tip slightly recurved, $\frac{1}{4}$ in. thick in the upper part; back at first round, keeled towards the apex, the keel slightly drawn forward like a chin; surface bluish-grass green; the whole of the back and upper third of the face covered with large, grey-green, uniformly arranged warts; the edges each with 5–6 large, uniformly arranged, pink teeth, and the same on the keel, and also ± irregularly scattered over the upper part of the back.

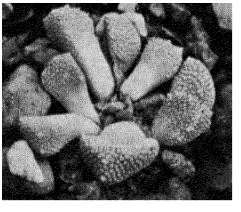


FIG. 238.—Titanopsis Luckhoffii L. Bol. Almost nat. size.

Tit. Lüderitzii Tisch. (*Verrucifera Lüderitzii* N. E. Br.) (named after the merchant Lüderitz, who founded the Colony of this name in former German South-West Africa). Similar to *T. Schwantesii*; L. rather narrower, less wide

at the tip, the rounded tip with *c.* $\frac{1}{25}$-in. large warts, ochre yellow, reddish at the base; F. yellow.

Tit. Primosii L. Bol. Very similar to *Tit. Schwantesii* Schwant.

Tit. Schwantesii Schwant. (fig. 237) (*Mes. Schwantesii* Dtr., *Verrucifera Schwantesii* N. E. Br.) (named after Dr G. Schwantes, Kiel). L. more erect, up to $1\frac{1}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. broad at the base, wider above, the leaf tips then suddenly broadened to a $\frac{1}{2}$-in. roundish triangular end; upper side flat or slightly hollow, lower side rounded; the leaf tips as well as most of the upper part of the upper and lower sides covered with blister-like, roundish, yellowish-brown warts, otherwise pale greyish blue-green; F. short stalked, $\frac{5}{8}$–$\frac{2}{3}$ in. ϕ, pale yellow.

Tit. setifera L. Bol. Forming clumps; rosettes $\frac{3}{4}$–$1\frac{1}{8}$ in. wide, with 2–3 pairs of leaves; L. $\frac{3}{4}$ in. long, $\frac{1}{6}$ in. thick; $\frac{1}{5}$–$\frac{1}{4}$ in. broad, obliquely roundish triangular at the end; upper side flat, the upper side curved backwards towards the tip, back almost half round, roundly keeled towards the apex; surface uniformly rough with warts, blue-grey to dark carmine, the edges of the upper part with five, almost $\frac{1}{25}$ in. long, pale brown, bristle-like teeth each, and on the upper and lower sides towards the tip are 1–3 teeth; F. *c.* 1 in. ϕ, golden yellow to salmon coloured.

Trichocyclus N. E. Br.

Erect, ± branched shrubs, with succulent branches which appear jointed owing to the constriction at the point of attachment of the leaves; internodes cylindrical to almost spherical, bare or finely papillose. L. small, ± cylindrical, soft, soon drying and falling, united at the base and there often ciliate. F. small, solitary or several, terminal, short stalked, white or reddish, in summer. Occurrence: Karroo, Great Namaqualand (S.W. Africa).

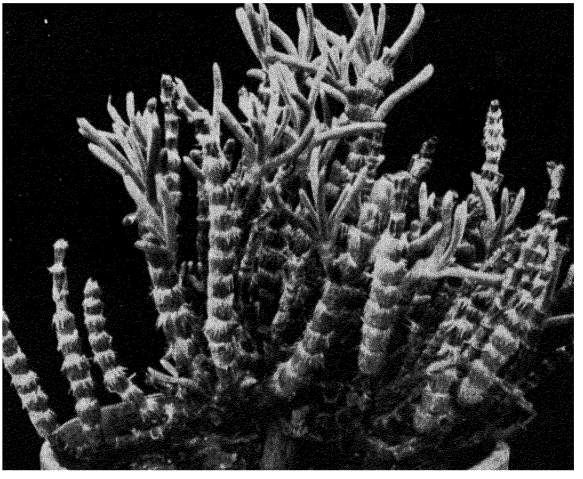


FIG. 239.—Trichocyclus ciliatus N. E. Br. (Photo, De Laet.) (From M.d.d.K.G.)

Rare little shrub having only a short growing period in summer. Needs a very light, warm position, damper when growing, but quite dry during the resting period. Likes very sandy soil.

Tr. ciliatus N. E. Br. (fig. 239) (*Brownanthus ciliatus* Schwant., *Mes.*

ciliatum Thbg., also Ait., *Mes. Schenkii* Schinz). Dwarf bush, internodes 1⅛–3 in long, *c.* ⅛–⅙ in thick, green, L. opposite, united to a short sheath, which at the base has fine, white, downcurved hairs ½–⅙ in. long, free part of leaf ¾–2 in. long, almost cylindrical, finely papillose, flowering shoots branched; F. in 3–7-flowered pseudo-umbels, small, white

Tr. Marlothii N. E. Br. (*Brownanthus Marlothii* Schwant, *Mes. Marlothii* Pax) (named after Dr R Marloth, Cape Town) Much branched; internodes ⅙ in long, L opposite, united to a sheath below, which envelops almost the whole of the internode and bears at the base a crown of ⅕-in long, recurved, white hairs; free part of leaves ¼–⅓ in long, 3-angled, F solitary, on 1–1½-in long branchlets

Tr. namibense N E. Br. (*Mes. namibense* Marl). Similar to *Tr Marlothii*, but without the hairy sleeve, F small, white.

Tr. simplex N. E. Br. Similar to *Tr ciliatus*, internodes not longer than thick, F. solitary or in twos on the tips of the branches

Trichodiadema Schwant.

Bushes with long, slender, arched branches or very short stemmed and of ± tufted habit. Roots woody or fleshy to turnip-shaped; L. united at the base, semicylindrical to cylindrical, glistening with papillae on the surface, the tip with a cluster of ± spreading bristles. F. solitary, short stalked, medium sized to small, red or white, in spring or late autumn to December. Occurrence: Cape Province.

Low bushes which grow easily and flower freely. The plants grow almost throughout the year, with a short resting period in January and February only. Need an airy greenhouse, in summer may be planted out in a sunny position, in winter in a light place not over 50° F. Require plenty of water in summer, should be kept drier in the resting period. Suitable for growing in quantity; one-year-old cuttings will flower. Propagation by seed, quicker from cuttings.

T. barbatum Schwant. (*Mes barbatum* L) Roots turnip-shaped; branches prostrate; L. distant, ⅓–½ in long, ⅛–⅙ in wide, stiff, erect, semi-cylindrical, weakly recurved, grey-green with pointed papillae, with 8–10 black bristles; F. 1⅛ in. ϕ, bright red, in summer

T. bulbosum Schwant. (*Mes. bulbosum* Haw) Roots tuberous; about 8 in. high; L. close, erect, ⅕–⅓ in. long, 1–1⅛ in thick, almost cylindrical, grey-green with papillae, with 8–11 white bristles; F. ¾ in. ϕ, dark red.

T. densum Schwant. (fig. 240) (*Mes. densum* Haw., *Mes barbatum* L. *v. densum* Willd.). Roots fleshy, thickened; stems short, forming clumps, L. crowded, ⅝–¾ in long, ⅙–⅕ in. thick, green, with pointed papillae, with a cluster of 20–25 fairly long white bristles; F. 1½–2 in ϕ, carmine violet, in early spring and in November and December. Grows more easily from seed than from cuttings. Easy plant, recommended for growing in quantity.

T. echinatum L. Bol. = *Delosperma echinatum* Schwant.

T. intonsum Schwant. (*Mes. intonsum* Haw.). L. distant, erect and somewhat recurved, $\frac{1}{2}$ in. long, $\frac{1}{6}$ in. thick, semicylindrical, narrower above, with pointed grey papillae, the edges ciliate, with 8–10 slightly brown bristles; F. long stalked, $\frac{3}{4}$ in. ϕ, pinkish-white.

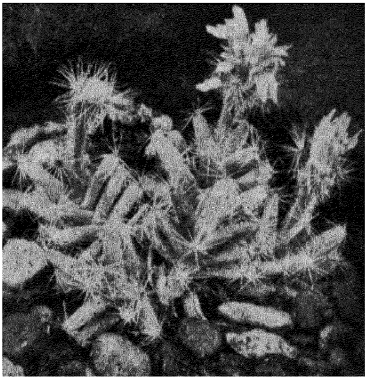


FIG. 240.—Trichodiadema densum Schwant. $\frac{1}{3}$ nat. size.

T. stellatum Schwant. (*Mes. stellatum* Mill.). Roots fleshy; habit tufted, 2–4 in. high; L. crowded, erect, about $\frac{3}{8}$ in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, almost cylindrical, grey-green, rough with papillae, with 12–15 white, $\frac{1}{8}$–$\frac{1}{6}$-in. long, bristles; F. $1\frac{1}{8}$ in. ϕ, pale violet, in early spring and November–December.

T. stelligerum Schwant. (*Mes. barbatum* Curtis, *Mes. stelligerum* Haw.). Intricately branched little plant; L. $\frac{3}{8}$–$\frac{5}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, almost cylindrical, erect, pale green, glossy, with large, pale, flat papillae, with 5–10 white or brownish bristles; F. medium sized, pale red-purple.

Verrucifera Hugo-Schlechteri N. E. Br. = *Titanopsis Hugo-Schlechteri* Tisch.

Verrucifera Lüderitzii N. E. Br. = *Titanopsis Lüderitzii* Tisch.

Verrucifera Schwantesii N. E. Br. = *Titanopsis Schwantesii* Schwant.

Monanthes Haw.

Family: CRASSULACEAE.

Occurrence: Canary Islands, Madeira.

⊙ plants, shrubs or low bushes with interlaced branches, forming clumps. L. crowded into rosettes at the ends of the branches, fleshy, thick ovate or nearly cylindrical, warty. F. small and inconspicuous on thin pedicels, often in small clusters, pink, yellow or whitish-green in summer.

Dainty little pot plants, suitable for growing in a room. Or may be planted out in a shady place in the rock garden in summer; in winter place in a cold house. They like sandy soil and moderate amount of water. Easily propagated by cuttings.

Mon. agriostaphys Christ. = *Mon. laxiflora* Bolle.

Mon. anagensis Praeg. (fig. 241), Teneriffe. Shrub or sub-shrub, spreading, with forked branching; L. almost cylindrical, acute, upper side grooved, bare, green, often reddish; F. 2–6, yellowish-green.

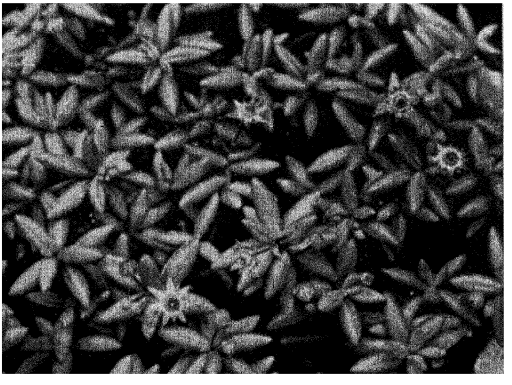


FIG. 241.—Monanthes anagensis Praeg. (Photo, K. Josefsky.)

Mon. laxiflora Bolle (*Mon. agriostaphys* Christ., *Sedum laxiflorum* DC., *Sempervivum agriostaphys* O. Kuntze, *Petrophyes agriostaphys* Webb.). Shrub or low bush; L. decussate, rather more crowded towards the tips of the branches, thick, elliptical to round, rough or wrinkled, green or brownish; flower clusters of 3–5 flowers, with fine red dots. Easily grown.

Mon. laxiflora Bolle **v. chlorotica** Praeg. Like the preceding, with bare, pale green leaves.

Mon. muralis Christ. (*Petrophyes murale* W. et B.), Canary Islands. Shrublet; small, branched; L. alternate, crowded into rosettes towards the ends of the branches, almost cylindrical, upper side flat or somewhat channelled, $\frac{1}{5}$–$\frac{2}{5}$ in. long, warty, sooty green or brownish-red; F. pinkish-white.

Mon. polyphylla Haw. (*Petrophyes polyphyllum* Webb., *Sempervivum Monanthes* Ait.), Canary Islands. ⊙, ☉, or plants with branched stems; L. in small, close rosettes, almost cylindrical, rather flat above, pale blue-green, the tips warty; F. on fine pedicels, yellowish-white.

Monsonia Burmannii DC. = *Sarcocaulon Burmanii* Sweet.

Monsonia L'Heritieri DC. = *Sarcocaulon L'Heritieri* Sweet.

Monsonia multifida E. Mey. = *Sarcocaulon multifidum* R. Knuth.
Monsonia Patersonii DC. = *Sarcocaulon Patersonii* Eckl. et Zeyh.

Moringa Burm.

Family: MORINGACEAE.

Moringa ovalifolia Dtr. et Bgr., S.W. Africa. Little branched ;e, 6–18 ft. high, up to 3 ft. thick, with spongy wood and smooth, le grey bark; branches thick; L. alternate, 16–30 in. long, 16–24 in. de, bipinnate; inflorescence consisting of 16–20-in. long, much anched racemes; F. small, white. Interesting plants, hardly yet cultivation.

Notonia, see *Kleinia.*

Orbea, see *Stapelia variegata* L.

Oliveranthus elegans Rode = *Echeveria elegans* Bgr.

Orostachys Fisch.

Family: CRASSULACEAE.

Orostachys spinosus Bgr. (fig. 242) (*Cotyledon spinosa* L., *mbilicus spinosus* DC.), Eastern Asia. Hardy plant; forming ımps; L. in rosettes, similar to a *empervivum*, elliptical, somewhat edge-shaped, thick, with soft white iny tips; F. in spikes, yellow, in mmer. Treatment as for *Sempervum.* Wants very porous soil.



FIG. 242. Orostachys spinosus Bgr. (Photo, K. Josefsky.)

Othonna L.

Family: COMPOSITAE.

Occurrence: S. Africa. Small .cculent shrub or sub-shrub; L. ternate or basal, cylindrical or ıtter, fleshy and often thick; F. long alked, solitary or in false umbels, ellow.

Easily grown plants for a light cold house or window, not above ;° F. in winter. Grow in rich, sandy soil, fairly moist. Propagation ısy from cuttings, also from seed.

O. aeonioides Dtr., Great Namaqualand (coastal region). Hemi-herical shrub, up to 30 in. high, white skinned; stem up to $2\frac{1}{2}$ in. thick, rming 2–4 branches about 8 in. above the ground, these ascending, repeatedly ıd uniformly forked, ultimate branches with leaves spirally arranged; L. $\frac{3}{8}$ in. apart, *c.* $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{5}{8}$ in. thick, broadly spatulate, fleshy, bare,

sap green, with a short, thick stalk; flower terminal, 7-8, *c.* $\frac{1}{4}$ in. ϕ, ray florets wanting. Resembling in habit a shrubby *Aeonium* (Crassulaceae).

O. clavifolia Marl. (fig. 243), Cape Province. Very low shrub; stems short; branches short and thick; L. at the ends of them, 1 in. long, cylindrical, thickened above to *c.* $\frac{2}{5}$ in., often almost berry-shaped, with a short tip, pale green, greyish-purple during the resting period; F. solitary, long stalked, yellow, in winter. Likes a light position; keep dry in summer.

O. crassifolia Harv. (*O. crassifolia* hort., *O. filicaulis* Eckl.), Eastern Cape Province. Shrub or sub-shrub; stems short, freely and irregularly branched; branches often over 3 ft. long, thin, prostrate or hanging; L. crowded at the forks, cylindrical or almost so, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, blunt or with a soft tip, upper side slightly grooved,

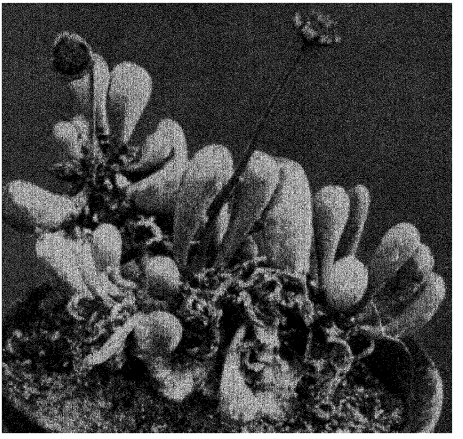


FIG. 243.—Othonna clavifolia Marl.

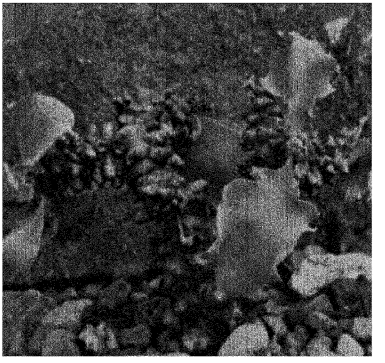


FIG. 244.—Othonna Herrei Pill. $\frac{1}{2}$ nat. size.

flesh soft, pale green, with a light waxy coating; F. in terminal, few-flowered clusters, yellow, in summer, and often later. Very useful plant for baskets. Likes full sun.

O. filicaulis Eckl. = *O. crassifolia* Harv.

O. Herrei Pill. (fig. 244), Namaqualand. Stems short, thickened, 3–$3\frac{1}{4}$ in. high, $\frac{5}{8}$ in. thick, with few branches, knotted with the remains of the old leaves; L. at the ends of the branches, 2–$2\frac{1}{2}$ in. long, about $1\frac{1}{8}$ in. broad, irregularly oval, narrowed into the stalk, ± wavy, the edge ± smooth or with irregular, thorny teeth; green with bluish waxy coating; the leaves fall during the dry period, in summer; F. usually several on the same stem, 2–3-in. long stalk, $\frac{1}{2}$ in. ϕ, yellow; October–November. Dislikes excess moisture. Needs a sunny position.

O. litoralis Dtr., coastal region of Great Namaqualand. Shrub, 8–10 in. high; stem flask-shaped, thick, with a few thick branches; L. crowded at the ends of the branches, long spatulate, with a broader base, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, *c.* $\frac{1}{2}$ in. wide, fleshy, $\frac{1}{12}$ in. thick, glaucous; flowers 2 or 3 at the ends of the branches, $\frac{1}{3}$ in. ϕ.

O. papillosa Dtr , Great Namaqualand. Shrub up to 2 ft. high, 20–24 in wide, stems up to $1\frac{1}{2}$ in thick, loosely branched, pale-skinned, ultimate branches glaucous, with alternate leaves in an open spiral, L with short, thick stalks and broad base, *c.* $\frac{3}{8}$ in long, $\frac{1}{6}$ in thick, cylindrical, upper side rather flat, glaucous, somewhat papillose, F. yellow.

O. protecta Dtr , Great Namaqualand Shrublet; stem slenderly flask-shaped, up to 1 ft high, with a few erect branches, L at the end of the branches, without stalks, base widened, arched, $1\frac{1}{2}$-$2\frac{1}{2}$ in long, almost cylindrical, and narrowly linear, 1–$1\frac{1}{8}$ in. thick, upper side often with a slight groove, bare, with a small tip, dark blue-green to purplish-green, fleshy, flower stems purple, covered with blue wax, with 2–8 flowers

O. pusilla Dtr =*Senecio Klinghardtianus* Dtr

O. rhopalophylla Dtr., Great Namaqualand (S W. Africa). Intricately branched shrub, skin greyish-brown, final branching almost dichotomous, $\frac{3}{4}$-$1\frac{1}{2}$ in long, $\frac{1}{5}$-$\frac{1}{4}$ in thick, L. 10–16 at the ends of the previous branching, crowded, the lowest leaves almost spherical or broadly fig-shaped, $\frac{3}{8}$ in long, broad and thick, others clavate, *c* $\frac{3}{4}$–1 in long, L with a small spiny tip, from the tip to the base run 8–10 sharply drawn, transparent, longitudinal lines, upper side usually with ± impressed longitudinal grooves, grey-green or brownish-green, F on long shoots 4–12 in long, with cylindrical leaves $1\frac{1}{2}$–2 in long and $\frac{1}{6}$-$\frac{1}{5}$ in thick, F. on $1\frac{1}{8}$-in. long stalks.

O. triplinervia DC , Cape Province Shrub, slightly branched from the base, L crowded into rosettes on young shoots, oblanceolate, 2–4 in long, $\frac{3}{4}$-$1\frac{1}{2}$ in. wide, blunt, the edge usually curved, rather fleshy, with three distinct longitudinal veins, F usually 8, in tall racemes, yellow, in winter.

Pachyphytum Link, Klotzsch et Otto.

Family: CRASSULACEAE.

Occurrence: Mexico.

Small succulent shrubs or half-shrubs with thick, erect, little branched stems. L. in elongated rosettes, thick, flat, blunt and thick edged, ± cylindrical, grey-green or with a white coating. F. in simple or forked axillary racemes, hanging at first, close set, 5-partite, usually bell-shaped, white or reddish, in spring; flower stalk with close bracts. Allied to the genus *Echeveria* and often hybridising with it. For the hybrids see under *Echeveria*.

Beautiful plants easily grown in cold house and window. Recommended for growing in quantity. Cultivation as for *Echeveria*, but should not be put out of doors in summer.

P. aduncum Rose=*P Hookeri* Bgr.

P. amethystinum Rose Sub-shrub; L. distant, $1\frac{1}{8}$-$1\frac{1}{2}$ in long, $\frac{5}{8}$-$\frac{2}{3}$ in thick, clavate, flat, but very thick and blunt, bluish-grey with an amethyst tinge, F. in summer Very attractive!

P. bracteosum Link, Klotzsch et Otto (fig 245) (*Cotyledon Pachyphytum*

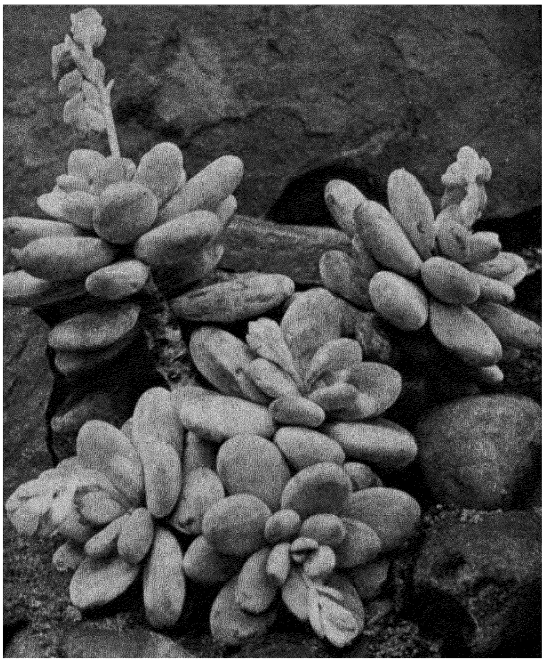


FIG. 245.—Pachyphytum oviferum J. A. Purpus. (Photo, K. Josefsky.)

Hookeri Lem., *Cotyledon adunca* Bak., *P. aduncum* Rose, *P. roseum* hort.). Shrub or sub-shrub, up to 2 ft. high, little branched; L. at first crowded, later distant, fairly erect, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. thick, elliptical, blunt, with a minute tip, almost cylindrical, but sometimes flatter above, grey-green; F. 7–14, $\frac{1}{2}$ in. long, bright red, yellow tipped, in spring.

P. Lingua hort. = *Echeveria linguaefolia* Bak.

P. longifolia Rose. Sub-shrub, up to 4 in. high; L. thick, clavate or linear oblanceolate, $2\frac{1}{2}$ in. long, flattened, blunt, grey-green, the lower L. standing out at right angles, the upper erect; F. 3–6, dark red, in summer.

P. oviferum J. A. Purpus Bak., *Echeveria bracteosa* Lindl. et Paxt., *Echeveria Pachyphytum* Mor.). Stems thick, when old up to 12 in. high; L. oblanceolate to spatulate, thick, 3–4 in. long, 1 in. wide, bluntly rounded with indistinct tip, bluntly rounded at the edge, curved outwards, whitish-grey; flower stem 8–12 in. long. F. 18–20, about $\frac{3}{4}$ in. across, bright red, April–May.

P. compactum Rose. Shrub; stems 4 in. and more high; L. crowded, spreading, cylindrical, shortly tapering, somewhat keeled behind the apex, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, dark green, with greyish-white coating; flower stem 16 in. long; F. reddish.

P. Hookeri Bgr. (*Diotostemon Hookeri* Salm., *Echeveria adunca* Otto, *E.*

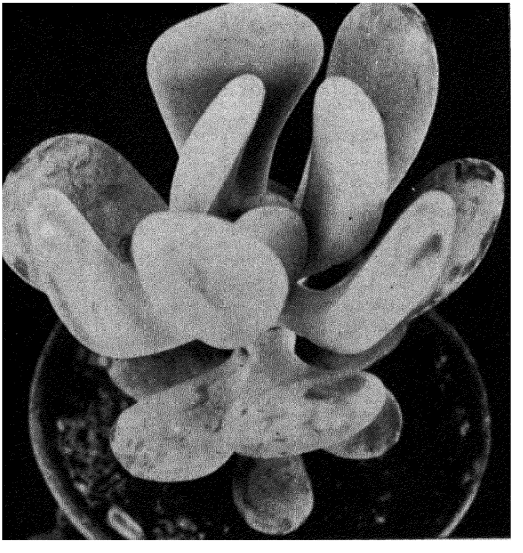


FIG. 246.—Pachyphytum bracteosum Link, Klotzsch et Otto. (Photo, K. Josefsky.)

(fig. 246). Shrub; stems short, with white coating; L. close, almost in a rosette, fleshy, obovate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. broad, somewhat flattened, bluntly rounded above, with reddish or white coating. F. bell-shaped, bright red, in May and June. Attractive!

P. pachyphytoides Bgr. (*Echeveria Bergeriana* Willy Müller, *E. pachyphytoides* L. de Smet) (Hybrid: *Pachyphytum bracteosum* × *Echeveria gibbiflora v. metallica*). Stem 12–16 in. high, $\frac{3}{4}$–$1\frac{1}{8}$ in. thick; L. similar to *P. bracteosum*, greenish-white; flower stem very strong, 16–20 in. long, with numerous leaf-like bracts, and pale pink F. Easily grown, flowers almost throughout the year.

P. roseum hort. = *P. Hookeri* Bgr.

P. uniflorum Rose. Shrub; stem 8 in. high; L. distant, only the young ones somewhat crowded, $1\frac{1}{8}$–2 in. long, blunt, almost cylindrical, pale greenish or reddish; inflorescence with one flower only, reddish, $\frac{1}{2}$ in. long, in spring.

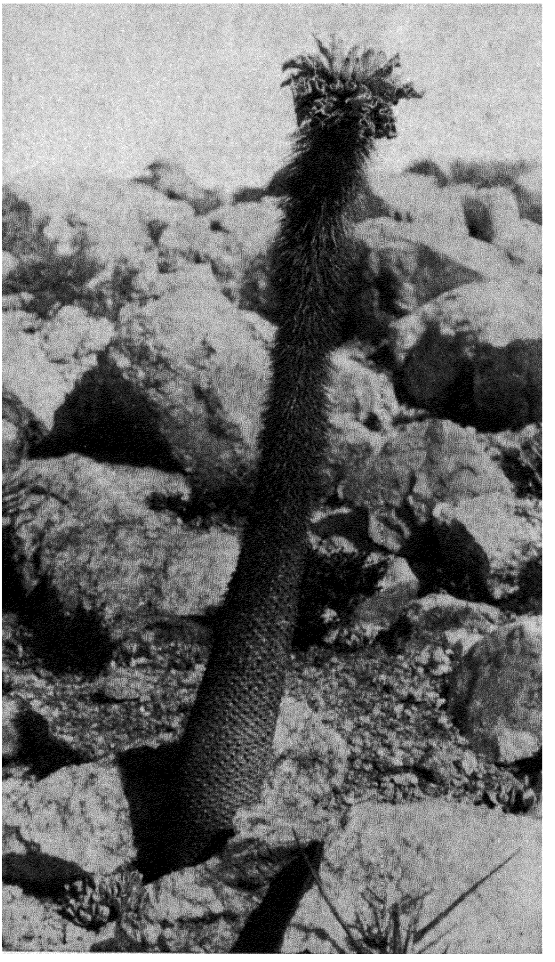


FIG. 247.—Pachypodium namaquanum Welw. (Photo, H. Herre.) (From M.d.d.K.G.)

Pachypodium Ldl.

Family: APOCYNACEAE.

Occurrence: Great and Little Namaqualand, Tropical Africa.

Rare plants. Propagation from seed. Grow in a light, warm greenhouse, not below 60° F., in rich but sandy, stony soil and in deep pots. In our latitudes it grows in summer; keep very dry in winter.

Pachypodium giganteum Engl. Tropical Africa, northern S.W. Africa. Stem succulent, up to 18 ft. high, flask-shaped, dichotomously branched at the ends, covered all over with spreading, stiff spines, in threes, which are very short on the upper branches, elsewhere up to $\frac{3}{4}$–$1\frac{1}{8}$ in. long;

L. sessile or short stalked, oblanceolate, with a short tip, $1\frac{3}{4}$ in long, $\frac{3}{4}$–1 in broad, finely ciliate on the edge; F. terminal, several, white, sweet scented, in March and April, before the leaves.

Pachypodium namaquanum Welw. (fig 247) (*Adenium namaquanum* Wylei). Occurrence: Great and Little Namaqualand, along the Orange River. Stem succulent, $4\frac{1}{2}$–$5\frac{1}{2}$ ft high, usually unbranched, about $\frac{2}{3}$ of the upper part covered with 2-in long spines as protection against browsing animals In winter, during the growing period a head of leaves is developed at the top, L. 4–$4\frac{3}{4}$ in. long, 2 $2\frac{1}{2}$ in wide, falling in the dry period; F numerous from the leaf axils, velvety and reddish, striped with yellow inside

Pectinaria Haw.

Family: ASCLEPIADACEAE.

Occurrence: Cape Province.

Succulent plants, allied to the genera *Duvalia* and *Piaranthus*. Cultivation as for these.

Stems 4–6-angled, notched or tuberculate, ± prostrate, and with the tips pressed into the ground; F. with the tips of the corolla lobes united, leaving a narrow opening, small, solitary or several from the grooves of the young shoots, short stalked.

Pect. arcuata N E. Br. Stems bluntly 4-angled, divided into tuberculate areas, 2–4 in. long and more, $\frac{1}{4}$–$\frac{2}{5}$ in thick, arched and prostrate, growing back into the soil, bare, green, F 1–3, ovate tapering, yellowish outside, smooth, bare, inside creamy white with red markings, the tube dark red

Pect. articulata Haw (*Stapelia articulata* Mass) Low plants with interwoven, spreading, branched stems, joints $1\frac{1}{8}$–2 in long, as thick as a finger, 5–6-angled, the sides divided into hexagonal areas, with a minute leaf on each, grey-green, tinged with red; F. solitary, at the tips of the branches, $\frac{1}{4}$–$\frac{1}{3}$ in. ϕ, green outside with fine hairs, inside blackish with fine hairs

Pect. asperifolia N E. Br Forming clumps, stems prostrate or erect, $\frac{3}{4}$–3 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in thick, spherical to cylindrical, 6–7-angled, the sides divided into spherical, pointed tubercles, bare, reddish-green, F. bell-shaped, with blunt, conical tip, $\frac{1}{6}$–$\frac{1}{5}$ in. ϕ, brownish-red outside, minutely hairy, white inside, sprinkled with red, with large papillae.

Pect. Pillansii N. E Br Stems sharply 4-angled, 6 in. long and more, prostrate, with brownish ($1\frac{1}{8}$–$1\frac{1}{2}$ in long) teeth, bare, dark green, ± tinged with red; F 3 or more, depressed pear-shaped, $\frac{1}{4}$ in ϕ, bare, smooth outside, inside bright red with translucent papillae Occasionally the flowers are produced in the soil.

Pect. saxaltilis N E Br. Stems 4-angled, $1\frac{1}{8}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, sides compressed, with pointed teeth $\frac{1}{6}$–$\frac{1}{3}$ in apart, $\frac{1}{12}$–$\frac{1}{8}$ in long, standing out at right angles; F. 4–7, $\frac{1}{3}$–$\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ in ϕ, broadly ovate, acute, purple-black, minutely hairy.

Pedalinaceae (Family) Genera described: *Pterodiscus, Sesamothamnus*

Pedilanthus Neck.

Family: EUPHORBIACEAE.

Pedilanthus carinatus Spr. (fig. 248) (*Euphorbia carinata* Lodd.). Occurrence: The Antilles (W. Indies). Shrub, over 3 ft. high when old; stem and branches erect, cylindrical, as thick as a finger, green, smooth; L. alternate, lanceolate, $4\frac{3}{4}$ in. long, 2 in. broad, middle vein projecting like a wing and crisply waved, leathery fleshy, green, usually falling in winter; F. beak-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. long, scarlet, in summer. The plants are milky like *Euphorbias*. Treatment as for *Euphorbias*. Propagation from cuttings.



FIG. 248.—Pedilanthus carinatus Spr.

Pelargonium L'Her.

Family: GERANIACEAE.



FIG. 249.—Pelargonium crassicaule L'Her. (Photo, R. Graessner.) Almost nat. size.

Occurrence: S. and S.W. Africa.

Succulent shrubs with forked branching of various heights. L. stalked, heart-shaped, lobed, falling during the resting period. F. usually irregular, few together in an umbel, pink or white, often with red flecks or lines.

Need to be in a light succulent house, dry in winter, hardly over 55° F. Grow in rich, sandy soil. Propagation from seed or cuttings. Most species rest in summer.

Pel. carnosum Ait. (fig. 250), S.W. Africa. Stem short, $1\frac{1}{2}$–2 in. thick, with a few, erect, thick branches; L. lyrate-pinnate, $2\frac{1}{2}$–3 in. long, the lobes crenate, green, minutely hairy; F. pinkish-white.

Pel. crassicaule L'Her. (fig. 249). Stems hardly more than 6 in. high, thick and woody, with dry, spine-like stipules above; L. long stalked, roundish cordate, lobed, the edge

bluntly notched, grey-green, with white hairs especially on the under side, falling in autumn; F. white. Needs more heat.



FIG. 250.—1. Pelargonium carnosum Ait. 2. P. gibbosum L'Her. 3. P. paradoxum Dtr. ⅛ nat. size.

Pel. echinatum Curt. (fig. 251) (*Geraniospermum echinatum* O. Ktz., *Geranium aculeatum* Pat., *G. echinatum* Thbg., *Pel. hamatum* Jacq.). Little branched, low; stems and branches erect, fleshy, *c.* ¼ in. thick, covered with fleshy, spine-like stipules $\frac{1}{6}$–$\frac{1}{5}$ in. long; L. long stalked, cordate oval, 3–5-lobed, rounded with a crenate edge, with white hairs, falling later; F. on long, branched stems, purple-lilac. Interesting free-flowering species.



FIG. 251.—Pelargonium echinatum Curt. ⅔ nat. size.

Pel. gibbosum L'Her. (fig. 250), S.W. Africa. Tall, intricately branched plant; branches thin, $\frac{1}{12}$–$\frac{1}{8}$ in. thick, the nodes much thickened, often up to ¾ in. ϕ; L. pinnate, 3 in. long including the stalk, many lobed, green, minutely hairy.

Pel. hamatum Jacq. = *Pel. echinatum* Curt.

Pel. paradoxum Dtr. (fig. 250), Great Namaqualand. Intricately branched, hemispherical shrub up to 30 in. high; branches thick, pale yellowish-green, smooth skinned; ultimate branches up to 1 in. thick; L. crowded into

a tuft at the ends of 3–4-in. branches, 3–4 in. long, $1\frac{1}{2}$ in. wide, $\frac{1}{12}$ in. thick, spatulate, fleshy, narrowed into a petiole $\frac{1}{12}$ in. thick and $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, the edge crisply curled, crenate, lobed, grey-green, with fine short hairs; inflorescence terminal, branched, later becoming thorny; F. in umbels, 5–10, white.

Pel. tetragonum L'Her. (fig. 252) (*Geranium tetragonum* L. f.). Erect shrubs, up to 30 in. high, branching somewhat forked; branches 3–4-angled, *c.* $\frac{1}{4}$ in. thick, fleshy, blue-green, smooth; L. broadly heart-shaped, 5-lobed, crenate, notched, falling in autumn; F. usually 3, long stalked, with pink or purple veins. Attractive, easily grown.



FIG. 252.—Pelargonium tetragonum L'Her. $\frac{2}{3}$ nat. size.

Petrophyes, see *Monanthes*.

Piaranthus R. Br.

Family: ASCLEPIADACEAE.

Occurrence: S. and S.W. Africa.

Small succulent plants resembling *Duvalia*. Stems short, oblong, usually 4-angled, edges blunt, with pointed teeth, with two small lateral teeth at their base. F. small to medium sized, several, on the upper part of the stems, erect, stalked; corolla with a bell-shaped tube or flat, 5-lobed, lobes triangular acute, with velvety hairs inside, variously coloured and marked. Flowers in summer. Easy to grow and flower. Suitable for a room. Cultivation like *Stapelia*.

P. fascicularis hort. = *Echidnopsis cereiformis* Hook. f.

P. foetidus N. E. Br. Forming clumps; stems elliptical ovate, almost spherical, up to $1\frac{1}{2}$ in. long, 4–5-angled, with warty teeth, green to grey-green, often reddish; F. on $\frac{1}{4}$–$\frac{3}{4}$-in. long stalks, $\frac{5}{8}$–$\frac{7}{8}$ in. ϕ, lobes oblanceolate, acute, the edges somewhat recurved, greenish-red outside, bare, inside with soft hairs, yellow, with red cross-lines and markings, evil smelling. A few varieties: with red flowers marked in yellow, or quite red with round markings.

P. piliferus Sweet = *Trichocaulon piliferum* N. E. Br.

P. Pillansii N. E. Br. Stems prostrate, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, somewhat conical, very blunt angled, bare, pale green, with a reddish tinge; F. usually 2, on $\frac{1}{4}$–$\frac{1}{2}$-in. long stalks, $1\frac{1}{8}$–$1\frac{3}{8}$ in. ϕ, rotate, split almost to the base, lobes narrow lanceolate acute, with short soft hairs inside, yellowish.

Portulaca L.

Family: PORTULACACEAE.

Port. Anacampseros L. = *Anacampseros Telephiastrum* DC.

Port. arachnoides Haw. = *Anacampseros arachnoides* Sims.

Port. filamentosa Haw. = *Anacampseros filamentosa* Sims.

Port. fruticosa Thbg. = *Portulacaria afra* Jacq.

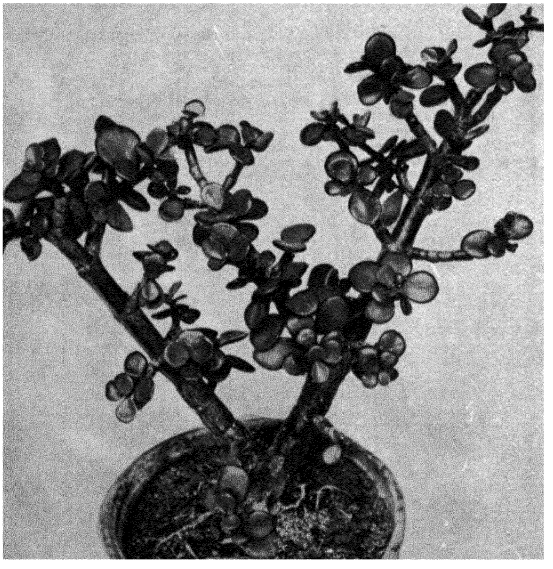
Port. grandiflora Hook., Brazil. Low, annual herb; stem prostrate, wide spread, round; L. cylindrical, fleshy, bare or hairy in the leaf axils, $\frac{3}{4}$ in. long; F. terminal, $\frac{3}{4}$–$1\frac{1}{2}$ in. ϕ, petals 4–6, carmine or red-purple, white in the centre, appearing 10–12 weeks after sowing, opening only in the sun. Of this species many garden forms, single or double, are obtained from seed, white, pink, red, yellow, orange, etc. Should be raised from seed in spring in sandy soil in a hot bed or in pots. Prick out later and plant out of doors at the end of May, 6–8 in. apart. Beautiful, free-flowering plants for a dry, sunny position. The garden forms can also be used as pot plants.

Port. lanceolata Haw. = *Anacampseros lanceolata* DC.

Portulacaceae (Family). Genera described: *Anacampseros*, *Lewisia*, *Portulaca*, *Portulacaria*, *Rülingia*, *Talinum*.

Portulacaria Jacq.

Portulacaria afra Jacq. (fig. 253) (*Crassula Portulacaria* L., *Portulaca fruticosa* Thbg.). Occurrence: S. Africa. Succulent shrub; stems grey skinned, with almost horizontal, jointed, cylindrical branches; L. opposite, sessile, obovate, with or without a short tip, upper side flat, back slightly convex, smooth, glossy green; F. inconspicuous and rare. Cultivation as for *Crassula*. Propagation by cuttings.



Pterodiscus Hook.

Family: PEDALINACEAE.

Occurrence: Tropical and S. Africa.

Remarkable, rare, succulent plant. Grow in sandy loam, warm, in a

light succulent house. Growing period in our latitudes in winter. Resting period in summer. Propagation from seed. Sow in very sandy soil. After the appearance of the cotyledons the seedling swells up considerably and enters the resting period without making further leaves. The formation of new leaves occurs in the next year.

Pterodiscus aurantiacus Welw., Tropical Africa Stem flask-shaped, about a foot high, with thick branches at the end; L. deccusate, elliptical-lanceolate or ovate-spatulate, edges wavy, smooth, bluish, F. funnel-shaped, 2-2½ in long, brilliant yellow

Pterodiscus speciosus Hook, S Africa Similar to the foregoing Stem knobby, F. purple.

Rhodiola, see *Sedum roseum* Scop

Rochea DC.

Family: CRASSULACEAE.

Occurrence: S. Africa.

Succulent shrubs or sub-shrubs. L. opposite or decussate, united at the base, the edges hairy. F. in capitate, false umbels, white, yellow, pink or red.

Good plants for rooms and therefore valuable as florist's plants. Propagation by seed or cuttings in April and May, in peat and sharp sand. Keep shaded at first and fairly moist. Rooted cuttings should be put in pots not too large, in soil consisting of one part old turves, one part soil from a hot bed and peat, one part sand. The plants should be kept in an airy greenhouse or frame. When they begin to grow, pinch them back to make them bushy. Do not keep too moist. Repot twice during the course of the summer, the last time in September, when the addition of horn clippings is recommended. Keep very cool and airy in a greenhouse in winter and not too damp. Increase the watering in January to start the plants into growth They will then flower early in spring.

R. coccinea DC. (fig 254) (*Crassula coccinea* L., *Kalosanthes coccinea* Haw Often erroneously called *Crassula rubicunda*!) Low sub-shrub, 1-2 ft high; stem covered closely with decussate leaves, L imbricate, obovate, acute, green, up to 1 in broad, F in beautiful pseudo-umbels, numerous, scarlet or carmine, from spring to summer

R. coccinea DC **v. flore-albo** hort., with white flowers.

R. coccinea DC **v. bicolor** hort., with reddish-white flowers

R. falcata DC. = *Crassula falcata* Willd.

R. jasminea DC (*Crassula jasminea* Sims, *Kalosanthes jasminea* Haw., *Rochea microphylla* E Mey.). Small shrublet; stem erect or prostrate, crowded with leaves, L. ¾ in. long, spatulate, blunt, ciliate on the edge, upper side green, lower side red, F white, later red, in summer

R. microphylla E Mey. = *R. jasminea* DC.

R. odoratissima DC. (*Crassula capitata* hort., *Cr. odoratissima* Andr., *Kalosanthes odoratissima* Haw.). Low shrublet; stem rough, with erect, loosely leaved branches; L. united into a sheath at the base, erect, linear, acute, channelled, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, green; F. numerous in false umbels, pale yellow or pink, May and June.



R. perfoliata DC. = *Crassula perfoliata* L.

R. versicolor DC. (*Crassula versicolor* Burch., *Kalosanthes versicolor* Haw.). Sub-shrub, 1–2 ft. high, with fleshier stems, leaves crowded, decussate, united to a sheath at the base, elliptical - lanceolate, acute, edge rather horny, dark green; F. numerous in false umbels, white, often shining red outside, pink, yellowish or the whole flower red; spring and summer. Beautiful, widely known species!

Rosularia Stapf.

Family: CRASSULACEAE.

Occurrence: Asia Minor to the Himalayas. Hardy, tufted plants with close rosettes. L. flat, bare or hairy. F. in terminal or axillary panicles, reddish- or yellowish-white, June to July. Treatment and cultivation as for *Sempervivum*. The *Rosularias*, however, require protection from snow!

Ros. Aizoon Bgr. (*Sedum chrysanthum* R. Hamet *v. Aizoon*, *Umbilicus Aizoon* Fenzl.). L. tongue-shaped, $\frac{1}{3}$–$\frac{2}{5}$ in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, with soft hairs, ciliate; F. yellow.

Ros. pallida Stapf. (*Sedum chrysanthum* R. Hamet, *Umbilicus chrysanthus* Boiss., *U. pallidus* Schott et Kotschy). L. elliptical or rather spatulate, $\frac{3}{4}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. broad, with a short triangular tip, pale green, hairy and ciliate; F. whitish-yellow.

Rülingia, see *Anacampseros*.

Salicornia L.

Family: CHENOPODIACEAE.

Salicornia fruticosa L. (fig. 255), Southern Europe, N. Africa. Erect shrub with thin, $\frac{1}{8}$-in. thick, jointed, grey-green branches; internodes $\frac{1}{3}$ in. long, leafless; F. small, solitary, decussate. Attractive plant for the succulent house. Grow in a bright position, in sandy loam. The addition of 2 per cent. common salt to the soil is useful but not essential.

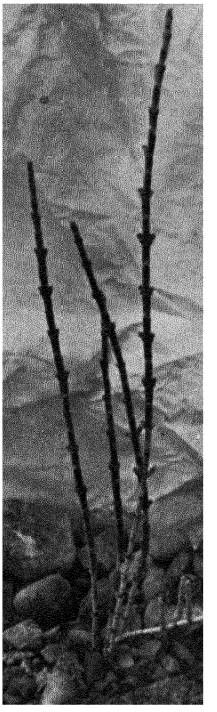


FIG. 255.—Salicornia fruticosa L. $\frac{1}{3}$ nat. size.

Salicornia herbacea L., coasts of the North Sea. Annual, succulent herbs, 6–8 in. high, with fleshy branches. Used to help bind the inundated country along the Dutch coast. To complete a collection of succulents this unusual plant should be included. Grow in summer out of doors or by an open window, in pure or loamy sand, which is kept $\frac{1}{2}$–$\frac{3}{4}$ in. under water. The seeds will only germinate in 3 per cent. sea water. Salt water is not essential for growing it on.

Sarcocaulon Sweet.

Family: GERANIACEAE.

Occurrence: Southern coastal deserts of S.W. Africa, Namaqualand.

Mostly low or little, intricately branched shrubs, sometimes thorny and surrounded by a resinous sheath. L. of various sizes, soon falling. F. solitary, white or pink. Peculiar plant which is leafless almost the whole year and resists extreme drought. Needs a light, warm position in the succulent house in very sandy, porous soil. The plants should only be watered a little during the short growing period, which occurs in winter. Often the plants rest throughout the year.

Sarc. Burmannii Sweet (fig. 256) (*Monsonia Burmanni* DC.), Namaqualand. 4–12 in. high, grey skinned, branches *c.* 1 in. thick, with 1–2-in. long, stout, woody, subulate thorns standing out at right angles; short shoots from the axils of the thorns; L. 3–4, wedge-shaped, short stalked, notched and dentate above, below edge entire; F. solitary between the leaves, on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, about 2–$2\frac{1}{2}$ in. across, white.

Sarc. L'Heritieri Sweet (*Monsonia L'Heritieri* DC.), S.W. Africa, at the edge of the Namib. Branches with four rows of white, sharp-pointed thorns, 3 in. long; L. long heart-shaped, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, glaucous; F. $\frac{7}{8}$ in. ϕ, pink.

Sarc. multifidum R. Knuth (*Monsonia multifida* E. Mey.). Branches horizontal, $3\frac{1}{4}$–4 in. long, as thick as a finger, thornless; L. in bunches from the

tubercles which are arranged in two rows, on $\frac{1}{3}$–$\frac{2}{5}$-in. long stalks, $\frac{1}{4}$–$\frac{2}{5}$ in. long, erect, attractively slit up, with woolly hairs; F. pink, with dark red markings at the base of the petals.

Sarc. Patersonii Eckl. et Zeyh. (fig. 256) (*Monsonia Patersonii* DC.), S.W. Africa, at the edge of the Namib. Irregularly branched; branches

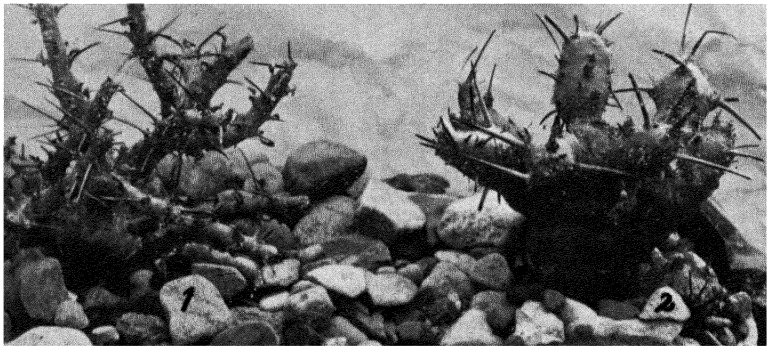


FIG. 256. 1. Sarcocaulon Patersonii Eckl. et Zeyh. 2. S. Burmannii Sweet. $\frac{1}{2}$ nat. size.

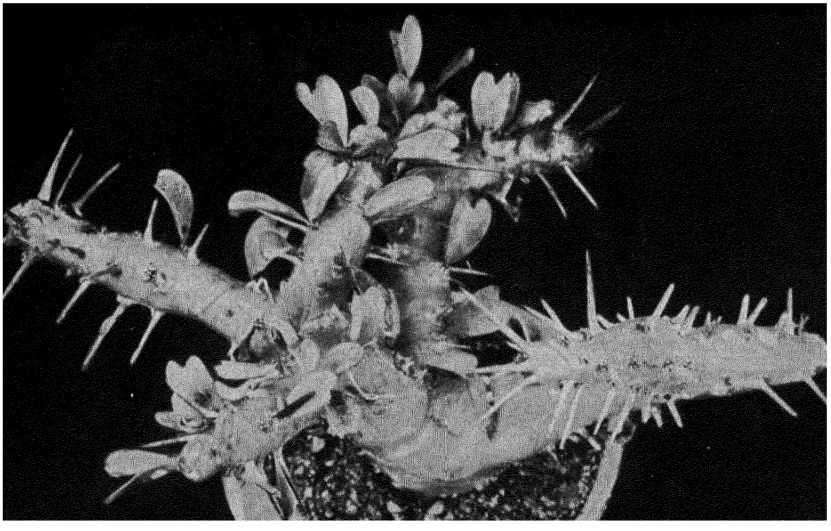


FIG. 257. Sarcocaulon rigidum Schinz. (Photo, R. Graessner.) *c.* $\frac{3}{4}$ nat. size.

$1\frac{1}{8}$–2 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. thick, grey-brown; $\frac{5}{8}$ in. long, thin, pointed thorns at the bases of the leaves; L. $\frac{1}{5}$ in. long, oval, 2-lobed, narrowed into a short stalk; F. dull pink, $\frac{5}{8}$ in. ϕ.

Sarc. rigidum Schinz (fig. 257), S.W. Africa. Low shrubs; branches $\pm$ horizontal, about as thick and as long as a finger, round, surrounded by a

resinous sheath; L. *c.* $\frac{1}{3}$ in. long, 2-lobed, green; F. pink. (This species is, on account of the resinous covering, used by the natives of S.W. Africa as firewood and called "Bushman's torch.")

Sarcophagophilus Dtr.

Family: ASCLEPIADACEAE.

Sarcophagophilus Winklerianus Dtr. (fig. 258). Occurrence: Great Namaqualand (S.W. Africa). Plants with many shoots, forming clumps; shoots grey-green, 3–4 in. high, *c.* $1\frac{1}{2}$ in. thick, closely covered with numerous hard, fleshy, laterally compressed, $\frac{1}{2}$–$\frac{5}{8}$ in. long, horizontal thorns arranged in about six spiral rows, at the end of these thorns $\frac{1}{5}$–$\frac{1}{4}$-in. long, hard grey tips; F. probably small. Cultivation as for *Trichocaulon*, warm and not too damp; dislikes excess moisture and easily rots off. Propagation from seed. Even the seedlings should be kept only moderately moist. Cuttings must be well dried before rooting. (Possibly identical with *Caralluma namaquanum* Welw.)



FIG. 258.—Sarcophagophilus Winklerianus Dtr. (Photo, R. Graessner.) $\frac{1}{2}$ nat. size.

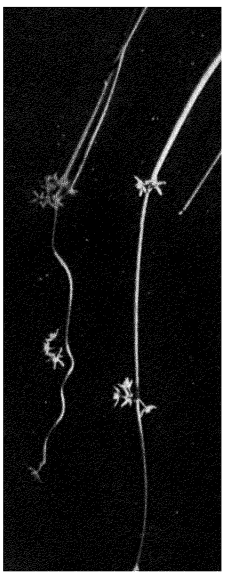


FIG. 259.—Sarcostemma viminale R. Br. (Photo, R. Kriechbaum.)

Sarcostemma R. Br.

Family: ASCLEPIADACEAE.

Occurrence: Tropical and Sub-tropical Asia, Africa and Australia.

Sarcostemma viminale R. Br. (fig. 259) (*Euphorbia viminalis* L.). Sub-shrub; branches erect or hanging, cylindrical, $\frac{1}{6}$–$\frac{1}{5}$ in. thick, jointed, forked, with triangular leaf scales on the joints, pale grey-green, often brownish,

milky; F. several in short-stalked umbels, *c.* $\frac{3}{8}$ in. ϕ, white. Useful for clothing the walls of the succulent house. In most gardens these plants are taken for *Euphorbia pendula.* (See remarks under *Euphorbia pendula*)

Sedum L.

Family: CRASSULACEAE.

Occurrence: Northern temperate and cool regions, Mexico.

○, ○ plants and sub-shrubs. Stems woody or fleshy, prostrate and often forming tufts or erect. L. opposite or in whorls, flat or cylindrical, edge entire or notched. F. usually in terminal false umbels or bunch, white, red, yellow or blue.

Most of the *Sedums* are hardy with us, and suitable for the rock garden or a dry wall. A few are useful as pot plants in a room, but must be kept cool in winter. Other species are not hardy, and are easily grown plants for a room and especially recommended for growing in quantity. In summer should be in an open frame or out of doors, in winter in a light, cool cold house, not over 50° F., fairly dry. Propagation easy from seed in spring, the plants pricked out in frames or in pots sunk in a hot bed. Propagation easy by cuttings or division, and sometimes possible from leaf cuttings, which root easily in sand.

S. acre L., Europe, N. Asia, N. Africa Hardy plant.

S. Adolphii Hamet, Mexico. Sub-shrub; branches ascending, curved, fleshy, L. alternate, the upper ones more crowded, $1\frac{3}{8}$ in. long, $\frac{5}{8}$ in wide, $\frac{1}{4}$ in. thick, lanceolate, blunt tipped, fleshy, yellowish-green with reddish edges; F. white, March–April

S. Aizoon L., Eastern Asia. Hardy plant

S. Alberti Praeg. = *S. gracile* C. A. Mey

S. album L. (*S. Clusianum* Guss., *S. micranthum* Bast., *S. teretifolium* Lam.), Europe, N. Africa, Asia Minor Hardy plant.

S. aleurodes Bitter = *S. bellum* Rose

S. allantoides Rose (fig. 260), Mexico. Sub-shrub, up to 16 in. high, branches erect, loosely leaved; L. horizontal, curved outwards, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, almost cylindrical, bluntly rounded, frosted with whitish-grey; F. greenish-white, June–July.

S. Anacampseros L. (*S. rotundifolium* Lam.), Pyrenees. Hardy plant.

S. bellum Rose (*S. aleurodes* Bitter, *S. farinosum* Rose), Durango (N. America). Tufted plant; branches short, leaves almost in rosettes, L. spreading, spatulate, rounded above, $\frac{3}{4}$–$1\frac{3}{8}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, pale green, mealy white; flower stalk 4–6 in. long, false umbels flat, loose, with numerous white F., January–February. Strikingly beautiful species! Plant for room or cold house.

S. boloniense Loisl. = *S. mite* Gil.

S. coeruleum Vahl. (*S. cyaneum* Desf.), Western Mediterranean Region. ☉.

S. chrysanthum R. Hamet = *Rosularia pallida* Stapf.

S. chrysanthum R. Hamet **v. Aizoon** = *Rosularia Aizoon* Bgr.

S. Clusianum Guss. = *S. album* L.

S. compactum Rose, Oaxaca (N. America). Tufted, low plant; L. obovate, blunt, $\frac{1}{8}$ in. long, in short or slightly elongated rosettes, green; F. small, white.

S. compressum Rose, Mexico. Up to 8 in. high, forked, sub-shrub; L. in loose rosettes, 1 in. long, $1\frac{1}{2}$ in. broad, oblanceolate, blunt and short tipped, fleshy, grey-green, edges often horny; F. golden yellow. Free flowering.

S. Cotyledon Jacq. = *Echeveria Cotyledon* Nels et Macb.

S. dendroideum Moc. et Sasse, Mexico. Sub-shrub, up to 2 ft. high, intricately branched; L. at the ends of the branches in rosettes, alternate, $1\frac{3}{4}$ in. long, $\frac{3}{4}$ in. wide, roundish spatulate, narrowed and cylindrical, fleshy, the edge with white wax, later reddish; L. yellow, in summer.

S. edule Nutt. = *Echeveria edulis* Bgr.

S. elegans Lej. = *S. rupestris* L.

S. Ewersii Ledeb., Altai Mountains. Hardy plant.

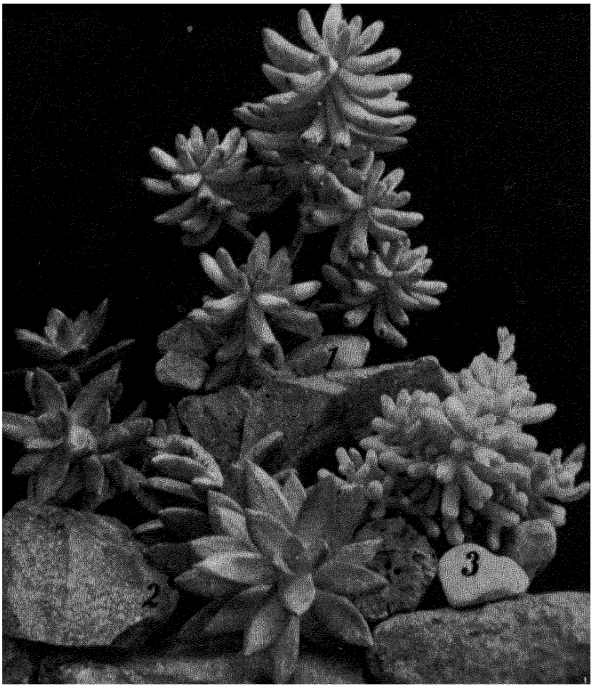


FIG. 260.—1. Sedum pachyphyllum Rose. 2. S. Nussbaumeri Bitter. 3. S. allantoides Rose.

S. Fabaria Koch (*S. Telephium Fabaria* Schinz et Keller), Central Europe. Hardy plant.

S. Fabaria Lem., hort. = *S. spectabile* Boreau.

S. farinosum Lowe, Madeira. Low shrub or small sub-shrub with ± spreading or prostrate thin branches, interlaced; L. crowded in 4–6 rows, awl-shaped, blunt, $\frac{1}{3}$–$\frac{5}{8}$ in. long, flattened somewhat on both sides, bare, green, the whole plant slightly farinose; inflorescence with 2–3 or more forked branches; F. sessile, white.

S. farinosum Rose = *S. bellum* Rose.

S. glaucum Lam. = *S. dasyphyllum* L.

S. glaucum W. et Kit. = *S. hispanicum* L.

S. gracile C. A. Mey. (*S. Albertii* Praeg.), Caucasus. Hardy plant.

S. hispanicum L. (*S. glaucum* W. et Kit., *S. sexfidum* M. B.), Southern and South-eastern Alps to Asia Minor. ☉—☉.

S. humifusum Rose, Mexico. Plants forming clumps; stems at first spherical, finally catkin-like, up to 1 in. long; L. flat, obovate, closely imbricate, $\frac{1}{12}$–$\frac{1}{8}$ in. long, pale green, later reddish, edges and tips ciliate; flower stalk short, with one yellow flower.

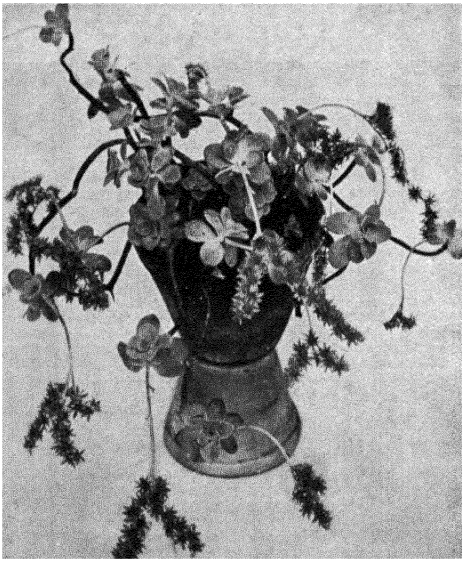


FIG. 261. Sedum Palmeri S. Wats. (Photo, K. Josefsky.)

S. kamtschaticum Fisch. et Mey., Kamchatka. Hardy plant.

S. laxiflorum DC. = *Monanthes laxiflora* Bolle.

S. maximum Suter (*S. Telephium maximum* L.), Europe, Caucasus. Hardy plant.

S. micranthum Bast. = *S. album* L.

S. mite Gil. (*S. sexangulare* auct., *S. boloniense* Loisl.), Europe. Hardy plant.

S. Nussbaumeri Bitter (fig. 260), Mexico. Like *S. Adolphii*; L. up to $1\frac{1}{2}$ in. and more, lanceolate.

S. oppositifolium Sims. = *S. spurium* M. B.

S. oregonum Nutt. (*S. obtusatum* hort. (not A. Gray!)). Hardy plant. Western N. America.

S. pachyphyllum Rose (fig. 260), Mexico. Sub-shrub erect; L. close, arranged in five ± distinct spirals, $1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. thick, cylindrical, bluntly rounded, pale grey-green usually with reddish tips; F. pale yellow, April.

S. Palmeri S. Wats. (fig. 261), Mexico. Low shrub; L. in loose rosettes, 1 in. long, $\frac{5}{8}$ in. wide, spatulate with round tips, glaucous; F. orange yellow, in spring.

S. pilosum M. B. (*S. Regelii* hort., *Umbilicus pubescens* Ledeb.), Caucasus, Asia Minor. ☉. Hardy.

S. populifolium Pallas., Siberia. Hardy plant.

S. portulacoides hort. = *S. spurium* M. B.

S. prealtum DC., Mexico. Sub-shrub, up to 2 ft. high, freely branched; L. alternate, 2–3 in. long, $\frac{5}{8}$–$\frac{3}{4}$ in. wide, lanceolate-spatulate, acute, pale green; F. pale yellow, May–June. Plant for the cold house.

S. pruinatum Lk. = *S. rupestra* L.

S. Pseudo-Fabaria Fenzl. = *S. spectabile* Boreau.

S. reflexum L., Europe. Hardy plant.

S. Regelii hort. = *S. pilosum* M. B.

S. rhodanthum A. Gray (*Clementsia rhodantha* Rose), Western N. America. Hardy plant.

S. Rhodiola DC. = *S. roseum* Scop.

S. roseum Scop. (*Rhodiola odorata* Lam., *Rh. rosea* L., *S. Rhodiola* DC.), Europe, N. Asia, N. America. Hardy plant.

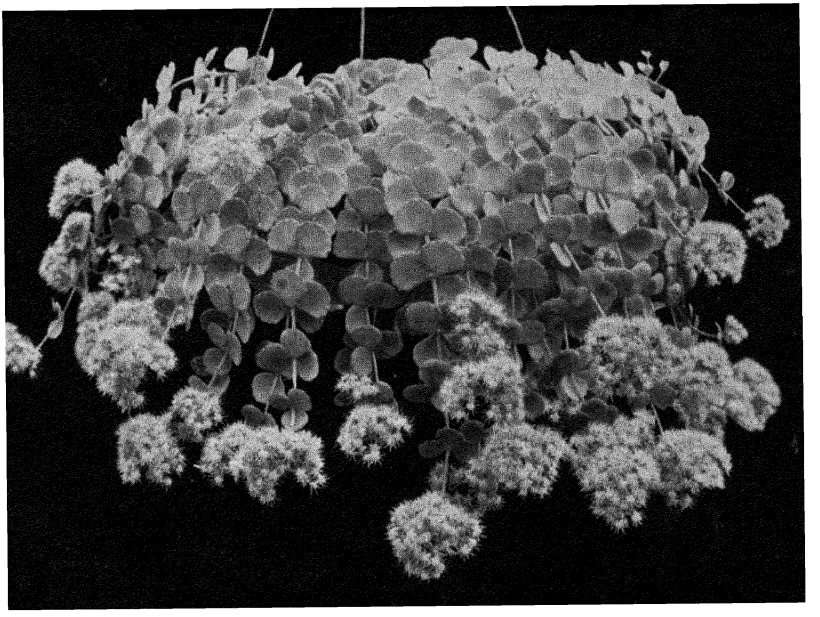


FIG. 262.—Sedum Sieboldii Sweet. (From V.P.B.)

S. rotundifolium Lam. = *S. Anacampseros* L.

S. rubens L. (*Aithales rubens* Webb. et Berth., *Procrassula rubens* Jord. et Fourr.), Western Europe, Canary Islands. ☉.

S. rupestre L. (*S. elegans* Lej., *S. pruinatum* Lk.), Western Europe. Hardy plant.

S. sedoides R. Hamet = *Sempervivella alba* Stapf.

S. Semenowii Mast. (*Umbilicus Semenowii* Rgl. et Herder), Turkestan. Hardy plant.

S. sempervivoides Fisch. (*S. sempervivum* Ledeb.), Caucasus, Asia Minor. Hardy plant. ☉.

S. sexangulare auct. = *S. mite* Gil.

S. sexfidum M. B. = *S. hispanicum* L.

S. Sieboldii Sweet (fig. 262), Japan. Hardy plant. Stem solitary prostrate or hanging, thin, red; L. wedge-shaped below, almost round above

somewhat notched, dentate, $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, smooth, glaucous, often with a red edge, coppery red in autumn; F. pink.

S. spectabile Boreau (*Anacampseros spectabile* Jord., *S. Fabaria* Lem., hort., *S. Pseudo-Fabaria* Fenzl., *S. spectabile* Henders.), Japan, Central China. Hardy plant, 12–20 in. high; L. up to 3 in. long, up to 2 in. wide, opposite or in whorls, at the base wedge-shaped with entire edge, oval above and crenate, bare, bluish-white; F. pink, large, August. Beautiful species, also useful as a pot plant. Propagation by leaf cuttings.



FIG. 263.—Sedum Stahlii Solms. (Photo, K. Josefsky).

S. spectabile Boreau **v. foliis variegatis** hort. L. marbled yellow and white.

S. spurium M. B. (*S. oppositifolium* Sims., *S. portulacoides* hort., *S. stoloniferum* hort.), Caucasus. Hardy plant.

S. Stahlii Solms. (fig. 263), Mexico. Intricately branched, low sub-shrub; branches spreading, forming clumps; L. opposite, oval, up to $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad, dark green to brown, breaking off easily; F. yellow, August–September. Easily grown. The L. which fall off readily root without difficulty.

S. stoloniferum hort. = *S. spurium* M. B.

S. teretifolium Lam. = *S. album* L.

S. Telephium Fabaria Schinz et Keller = *S. Fabaria* Koch.

S. Telephium maximum L. = *S. maximum* Suter.

S. Treleasei Rose, Mexico. Sub-shrub with thick succulent branches. L. alternate, closer towards the tips of the branches, spreading and curved upwards, $1\frac{1}{8}$ in. long, $\frac{5}{8}$ in. wide, reversed elliptical, blunt, upper side flat, back thickened, $\frac{3}{8}$ in. thick, with a blue-grey coating; F. pale yellow, April.

S. Weinbergii Bgr. (*Byrnesia Weinbergii* Rose, *Echeveria arizonica* hort., *Graptopetalum Weinbergii* Walther), Mexico. Succulent plant; L. in loose rosettes on thick stems, 2–3 in. long, $\frac{3}{4}$–$1\frac{1}{8}$ in. wide, reversed elliptical, with short blunt tip, upper side flat, back thickened and keeled, whitish-grey; F. white, April–May. L. falling and rooting easily. Easily grown and especially suitable for room cultivation.

Sempervivella Stapf.

Family: CRASSULACEAE.

Sempervivella alba Stapf. (*Sedum sedoides* R. Hamet, *Sempervivum album* Edgew.). Occurrence: Himalaya. Plants forming cushions, forming thin runners; L. in rosettes of $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ, elliptical, bluntly rounded above, $\frac{5}{8}$ in. long and wide, flat, finely hairy, pale green; F. 6–8, on short stalks, $\frac{1}{2}$–$\frac{5}{8}$ in.

ϕ, white or red, in summer May be planted out of doors in summer in a half-shady place, in winter needs a cool house.

Sempervivum L.

Family: CRASSULACEAE.

Occurrence: Mountains of Central and Southern Europe, Caucasus to N. Russia.

Forming clumps or cushions, low plants, forming many offsets or dividing. L. in close rosettes, spirally arranged, sessile, obovate, lanceolate or acute, fleshy, green, reddish or bluish. F. terminal, in erect, many-flowered inflorescences, white, greenish, yellow, pink or purple, in summer. The rosettes die after flowering or fruiting. Hardy, suitable for planting in the rock garden or a dry wall. The plants like very porous soil and are then easy to manage. Also useful for growing in a room in pans, but in summer should be near an open window or on a balcony. Propagation easy by division of old cushions or by rooting individual rosettes. Since the species cross very freely, propagation by seed is not advisable.

S. agriostaphys O Kuntze = *Monanthes laxiflora* Bolle.

S. Aizoon Christ = *Greenovia Aizoon* Bolle

S. album Edgew = *Sempervivella alba* Stapf

S. annuum Chr Sm = *Aichryson dichotomum* W B.

S. arachnoideum L , Europe. Rosettes $\frac{1}{4}$–1 in. ϕ, slightly convex above, with very fine hairs spun like a cobweb between the tips; L. linguiforme acute, brownish-green, F. carmine. Likes a very dry position

S. arachnoideum L. **v. glabrescens** Willk (*S. Doellianum* Schnittsp et Lehm.), the Alps. Rosettes rather larger and looser; L spreading, with little "cobweb"

S. arachnoideum L. **v. tomentosum** Schnittsp. et Lehm. (fig. 264), the Alps Rosettes flat, almost closed and with a thick white web

S. arboreum W. et B = *Aeonium arboreum* W. et B.

S. arenarium Koch (*S. Kochii* Facch.), Eastern Alps. Rosettes spherical, $\frac{5}{8}$–$1\frac{1}{8}$ in. ϕ Forming many runners with small spherical rosettes; L. lanceolate, acute, $\frac{1}{8}$–$\frac{1}{6}$ in. wide, pale green, the tip brown, bare, the edge ciliate; F pale yellow.

S. armenum Boiss. = *S. globuliferum* Koch.

S. aureum C. Sm = *Greenovia aurea* W B

S. balsamiferum W. et B. = *Aeonium balsamiferum* W. et B.

S. barbatum Chr. Sm. = *Aeonium strepsicladum* W. et B

S. Borisii Degen et Urum , Bulgaria. Rosettes spherical, almost closed, $\frac{3}{4}$–$1\frac{1}{8}$ in. ϕ; L. elliptical-lanceolate, grey-green, both sides very hairy, with a bunch of hairs at the tip, F pale yellow

S. Burchardii Praeg. = *Aeonium Burchardii* Praeg

S. caespitosum C. Sm. = *Aeonium caespitosum* W. et B.

S. calcareum Jord. (*S. californicum* hort., *S. tectorum* L. *v. pyrenaicum* Voss.). Rosettes $1\frac{1}{2}$–$2\frac{1}{2}$ in. ϕ; L. $1\frac{1}{8}$ in. long, $\frac{3}{8}$ in. wide, linear, short tipped, pale grey-green, with brown tips, the edges white and ciliate; F. pale pink.

S. californicum hort. = *S. calcareum* Jord.

S. calyciforme Haw. = *Greenovia aurea* W. B.

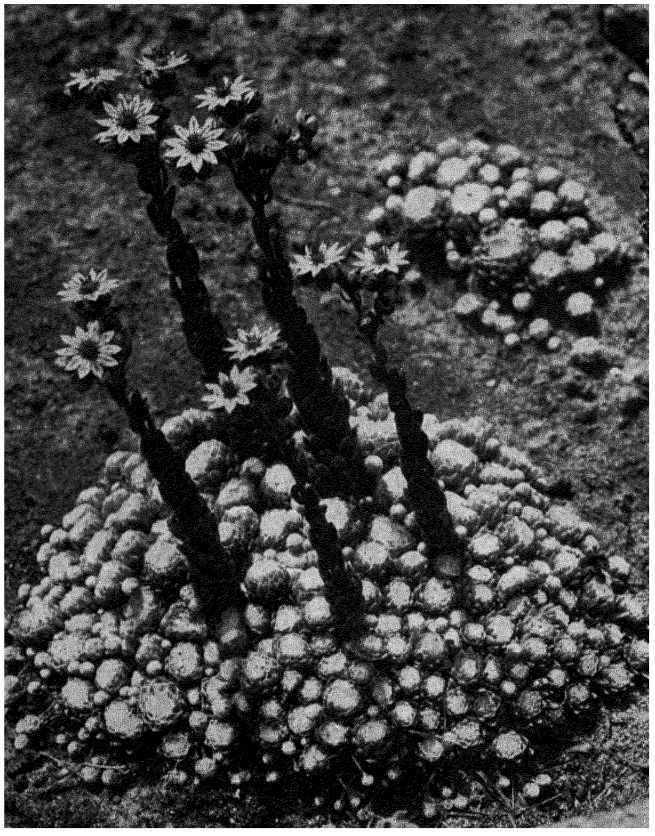


FIG. 264.—Sempervivum arachnoideum L. v. tomentosum Schnittsp. et Lehm. (From V.P.B.)

S. canariense Webb. = *Aeonium canariense* Webb.

S. ciliatum Sims. = *Aeonium caespitosum* W. et B.

S. ciliatum Willd. = *Aeonium ciliatum* W. et B.

S. cuneatum W. et B. = *Aeonium cuneatum* Webb.

S. decorum Christ. = *Aeonium decorum* W. et B.

S. dichotomum DC. = *Aichryson dichotomum* W. B.

S. Doellianum Schnittsp. et Lehm. = *S. arachnoideum* L. *v. glabrescens* Willk.

S. domesticum Praeg. = *Aeonium domesticum* Praeg.

S. Funckii F. Braun. Probably a hybrid. Rosettes $\frac{5}{8}$–2 in. ϕ; L.

obovate, acute above, grass green, rather hairy below, with a bunch of hairs at the tip, edges with long white hairs, F pink, large

S. globiferum Koch (*S armenum* Boiss), Asia Minor, Caucasus. Rosettes open, L clavate, short tipped, with long cilia, grey-green, hairy on both sides, F yellow

S. globiferum Rchb = *S. soboliferum* Sims.

S. globiferum Wulfen = *S Wulfenii* Hoppe

S. gracile Christ = *Greenovia gracilis* Bolle.

S. Goochiae Webb = *Aeonium Goochiae* Webb. et Berth

S. Haworthii S D = *Aeonium Haworthii* W. et B

S. Heuffelii Schott (*S patens* Gris et Schenk, *S Reginae-Amaliae* hort), Balkans. Rosettes $2\frac{1}{2}$–5 in ϕ, dividing in the middle; L 2-$2\frac{1}{2}$ in. long, $\frac{5}{8}$ in wide, oblanceolate, with a spiny tip, hairy on both sides, edge densely ciliate, F yellowish-white

S. hierrense Murr. = *Aeonium hierrense* Murr

S. hirtum Wim et Grab. = *S soboliferum* Sims.

S. holochrysum Christ = *Aeonium holochrysum* W. et B.

S. Kochii Facch = *S arenarium* Koch.

S. Lindleyi W. et B = *Aeonium Lindleyi* W et B

S. lineare Haw = *Aeonium strepsicladum* W et B

S. Monanthes Ait = *Monanthes polyphylla* Haw.

S. montanum L, Europe Rosettes spherical or open, $\frac{3}{4}$–$1\frac{1}{2}$ in. ϕ; L. lanceolate, short tipped, green, very hairy and ciliate; F violet, also whitish.

S. nobile Praeg et Burch = *Aeonium nobile* Praeg et Burch.

S. patens Gris et Schenk = *S Heuffelii* Schott

S. percaneum Murr = *Aeonium percaneum* Murr

S. pygmaeum C Sm = *Aeonium tortuosum* Bgr.

S. radicescens Lowe = *Aeonium tortuosum* Bgr.

S. Reginae-Amaliae hort = *S Heuffelii* Schott.

S. Saundersii Christ. = *Aeonium Saundersii* Bolle.

S. sedifolium Christ = *Aeonium sedifolium* Webb

S. Smithii Sims = *Aeonium Smithii* W. et B.

S. soboliferum Sims. (*S globiferum* Rchb, *S. hirtum* Wim. et Grab), Northern and Eastern Europe, Asia. Rosettes 1–$1\frac{1}{2}$ in ϕ, somewhat wide spread; L. oblanceolate, acute above, pale green, the tip brown. Runners with small spherical rosettes produced between the leaves; F. pale yellow.

S. spathulatum Hornem. = *Aeonium strepsicladum* W. et B.

S. strepsicladum W. et B = *Aeonium strepsicladum* W. et B.

S. tabulaeforme Haw. = *Aeonium tabulaeforme* W. et B.

S. tectorum L, Europe Rosettes medium sized; L. broader above, with red-brown tip, edge finely ciliate, grass green, in winter reddish; F. pink.

S. tectorum L. **v. glaucum** Ten Rosettes 4 in ϕ, grey-green.

S. tectorum L **v. rubescens** Voss. L. pinkish-violet at the base.

S. tectorum L **v. violascens** Voss. L. violet, above more blue-green, with brown tips.

S. tectorum L. **v. pyrenaicum** Voss. = *S. calcareum* Jord.
S. tortuosum DC. = *Aeonium tortuosum* Bgr.
S. tortuosum Link = *Aeonium Lindleyi* W. et B.
S. undulatum W. et B. = *Aeonium undulatum* Webb.
S. urbicum C. Sm. = *Aeonium strepsicladum* W. et B.
S. villosum Ldl. = *Aeonium strepsicladum* W. et B.
S. viscosum Webb. = *Aeonium Lindleyi* W. et B.
S. Wulfenii Hoppe (*S. globiferum* Wulfen), the Alps. Rosettes wide spread, $1\frac{1}{2}$–3 in. ϕ; L. elliptical to spatulate, shortly tapering above, bare, edge not very ciliate; F. yellow.
S. Youngianum Bourg. = *Aeonium undulatum* Webb.

Besides those named above, there are a large number of beautiful species and numerous hybrids, natural and artificial, worthy of cultivation.

Senecio L.

Family: COMPOSITAE.
Occurrence: Cape Province, S.W. Africa.

Closely allied to *Kleinia*, succulent plants, often with a tuberous root stock; L. roundish or flat, spatulate or somewhat cylindrical, linear or even reduced to scales. F. yellow, not very large.

Treatment and cultivation as for *Kleinia*.



FIG. 265.—Senecio fulgens Nich. $\frac{2}{3}$ nat. size.

Sen. adenocalyx Dtr., Great Namaqualand (S.W. Africa). Forming tufts; branches creeping, rooting, cylindrical, herbaceous, green, not much branched; L. erect, *c.* $\frac{3}{8}$ in. apart, $\frac{5}{8}$–1 in. long, *c.* $\frac{1}{5}$ in. thick, cylindrical, with a small spiny tip, dark green, with brownish-violet longitudinal lines; F. on *c.* 2-in. long stalks, whitish.

Sen. Anteuphorbium Hook. f. = *Kleinia Anteuphorbium* DC.

Sen. fulgens Nich. (fig. 265), East Africa. Stem erect, fleshy, about 8 in. high, $\frac{3}{8}$–$\frac{5}{8}$ in. thick, swollen at the base, *c.* 2 in. ϕ, grey skinned, little branched; L. spirally arranged, ovate-spatulate, narrowed into the petiole, short tipped, with a small spine at the apex, 3–4 in. long, $1\frac{1}{8}$ in. broad, upper side concave and distinctly grooved, the middle vein very prominent on the back, edge entire, fleshy, smooth, bluish-green, with a white coating, purple-edged; F. terminal, in December.

Sen. Gunninsii Bak. = *Kleinia pendula* DC.

Sen. Haworthii Hook. = *Kleinia tomentosa* Haw.

Sen. Herreianus Dtr. appears to be identical with *Kleinia gomphophylla* Dtr.

Sen. junceus Harv. (*Brachyrhynchos junceus* Less.). Bush up to 3 ft. high; branches erect, only $\frac{1}{8}$–$\frac{1}{5}$ in. thick, round, green or grey-green, with paler stripes; L. lacking or reduced to small triangular scales; F. yellow.

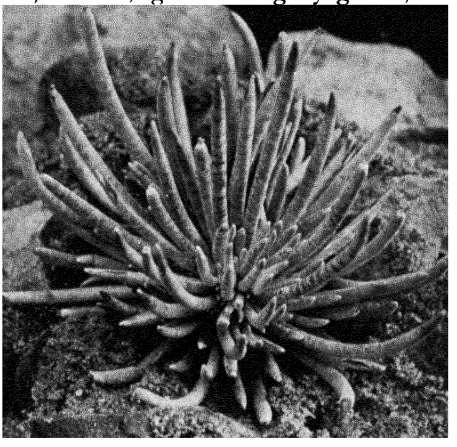


FIG. 266.—Senecio scaposus DC. (Photo, K. Josefsky.)

Sen. Klinghardtianus Dtr. (*Othonna pusilla* Dtr.), Great Namaqualand, coastal deserts. Forming clumps, making runners, from a thick, fleshy, root stock; stems up to ten in number, *c.* $1\frac{1}{8}$ in. high, $\frac{3}{8}$ in. thick; L. crowded into a head, 8–11, boat-shaped, $\frac{5}{8}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, with blunt tip, with bluish coating, the leaves often shorter and more berry-shaped; L. upper side with broad dark green transparent lines, and besides these, with 4–5 fine dark lines; a bunch of short white hairs in the leaf axils; F. about 15, solitary, pale purple.

Sen. longifolius L. Freely branched plant; branches *c.* $\frac{1}{8}$ in. thick, round, smooth, green or reddish; L. numerous, up to 4 in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. wide, narrowly linear, very soft, hanging, green.

Sen. longipes Bak. = *Kleinia Grantii* Hook. f.

Sen. odorus Sch. Bip. = *Kleinia odora* DC.

Sen. oxyriaefolius DC. Thin-stemmed plant with tuberous root stock, creeping, tufted; L. heart-shaped, irregularly notched, *c.* $1\frac{1}{8}$ in. long, *c.* $1\frac{1}{2}$ in. broad, pale green, fleshy.

Sen. paucifolius DC., S. Africa. Very thin-stemmed bush, loosely leaved; L. fleshy, almost sessile, oval, $1\frac{3}{4}$ in. long, $1\frac{3}{8}$ in. wide, pale green, with bluish waxy coating and three prominent veins, the edge often reddish and with a few small teeth.

Sen. pendulus Sch. Bip. = *Kleinia pendula* DC.

Sen. phonolithicus Dtr., Great Namaqualand. Very succulent, erect bush, up to 30 in. high, branches ascending, with a brownish-green skin, up to $\frac{3}{8}$ in. thick at the ends, bearing leaves throughout their length; L. spreading, slightly sickle-shaped, *c.* $3\frac{1}{4}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. thick, narrowing to the apex, ending in a point, glaucous, bare, with about thirteen dark longitudinal lines; inflorescence terminal, $3\frac{1}{4}$–4 in. high, *c.* $3\frac{1}{4}$ in. wide, with many golden yellow F. in winter. Beautiful, stately species!

Sen. pteroneura Hook. f. = *Kleina Anteuphorbium* DC.

Sen. pyramidatus DC. Sub-shrub; stem erect, fleshy, with many leaves; L. erect, rounded, $3\frac{1}{4}$–$4\frac{3}{4}$ in. long, up to $\frac{3}{8}$ in. thick, with a short, blunt point, almost smooth and grey, or the whole plant felted; F. *c.* 2 in. ϕ, golden yellow, on long leafless stems in clusters.

Sen. quinquangulatus Sch. Bip. = *Kleinia cana* DC.

Sen. succulentus Sch. Bip. = *Kleinia repens* Haw.

Sen. scaposus DC. (fig. 266), Eastern Cape Province. Low shrub, usually stemless; L. very numerous, in a rosette, slightly curved, 2–3 in. long, $\frac{1}{8}$–$\frac{1}{6}$ in. thick, cylindrical or flattened somewhat, blunt above and often not widened, the young L. especially covered with white felt; F. 5–6 on a long stalk, yellow. Keep dry in winter.

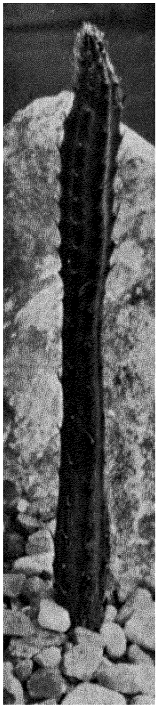


FIG. 267. — Senecio stapeliiformis Phillips. ½ nat. size.

Sen. stapeliiformis Phillips (fig. 267), Eastern Cape Province. Stems erect, branched from the base, the young shoots often penetrating the soil at first; stems 8 in. long and longer, $\frac{3}{8}$–$\frac{3}{4}$ in. ϕ, 5–7-angled, the edges ± distinctly sinuous, with prominent leaf cushions regularly arranged, each bearing a ± thorny leaflet $\frac{1}{5}$ in. long, dark green, the sides between the angles greyer, with a short dark green streak running upwards from the base of the leaf; F. on 2–$2\frac{1}{2}$-in. long stalks, yellow. In the resting period, in summer, keep very dry, and should only have a little water in the growing period. Grow in pans, in porous, loamy soil.

Sen. tropaeolifolius MacOwen, S. Africa. Thin-stemmed shrub with tuberous root stock; leaves not close; L. heart-shaped or irregularly rounded, irregularly notched, with reddish teeth *c.* 1 in. large, fleshy, pale green.

Sen. usambariensis, East Africa. Little branched bush; branches *c.* $\frac{1}{5}$ in. thick, smooth, green, leaves open, on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, somewhat heart-shaped, irregularly lobed, here and there with minute teeth, $1\frac{1}{8}$–$1\frac{1}{2}$ in. long and wide, fleshy, pale green.

Sen. vestita Bgr. Similar to *S. scaposus*. L. stouter, rather flatter and widened above and spatulate. Very beautiful species!

Sesamothamnus Welw.

Family: PEDALINACEAE.

Sesamothamnus benguellensis Welw., Tropical Africa. Stem swollen, 2 ft. ϕ and more, not projecting far above the ground, with 4–5 thick branches with ascending, thorny twigs 3–5 ft. high; L. oval, narrowed into the petiole, 4–6 in. long, $3\frac{1}{4}$–$4\frac{3}{4}$ in. wide, bluish; F. at the ends of the branches, 3–7 together, $2\frac{1}{2}$ in. ϕ, whitish-pink. Remarkable, rare plant. Cultivation as for *Pachypodium*.

Stapelia L.

Family: ASCLEPIADACEAE.

Occurrence: S. and S.W. Africa, a few species in Tropical Africa, and East Indies.

Plants with fleshy ascending or erect stems, branching from the base and forming clumps, 4-angled, the angles coarsely toothed and with leaves often dying off and soon falling, bare or with soft hairs, green or reddish. F. solitary, two together or even more, long stalked, large, usually at the base of young stems, rarely at the ends of the shoots, evil smelling, lasting several days, in June and July. Corolla rotate or broadly bell-shaped, divided half-way up or more into five parts and with spreading or recurved ± triangular or acute lobes, rather fleshy, variously coloured, often marked with purple, ± striped or wrinkled, bare or hairy, with a thick fleshy ring on the true corolla, pistil and stamens in the centre. Fruits long, tapering. The flowers usually have a horrible smell of carrion and therefore attract blow-flies, which assist fertilisation.

Easily grown, especially suitable for growing in a room; recommended for growing in quantity. Should be wintered in a light greenhouse or window not over 55° F., fairly dry, but the plants should not shrivel. In summer they need an airy greenhouse or frame, during the growing period keep very moist and warm; during this period they may be sprayed on hot days. Later the watering should be gradually reduced, so that the plants do not rot. On very hot days, shade lightly. Propagation easy from cuttings which in the spring may be cut in quantity from the old plants. The cuttings must be well dried before being struck. They root quickly in peat with $\frac{2}{3}$ coarse, washed sand in a closed atmosphere. The *Stapelias* need rich, porous soil and good drainage in the pot, since they much dislike stagnant water. Compost: $\frac{2}{9}$ old cow manure, $\frac{4}{9}$ old leaf mould or turves, $\frac{1}{9}$ old mellow loam, $\frac{2}{9}$ coarse, sharp sand; broken brick, small pieces of charcoal and mortar rubble may be added. *Stapelias* should be repotted every year, when the oldest shoots should be removed and used as cuttings. Propagation is very easy from seed, which germinate in a few days. Sow in sandy peat. Germination is rapid in a closed atmosphere, when the young plants should be pricked out and hardened off, otherwise they rot easily. The *Stapelias* cross easily with each other. The plants found in gardens are often not true species, and are difficult to identify. In the space of the following list it is not possible to include all the species and varieties. Those interested should therefore refer to the important work by Alwin Berger, *Stapelien und Kleinien*, as well as the new book *The Stapeliae*, by Alain White and Boyd L. Sloane, Pasadena, California, 1933, 1934.

St. albo-castanea Marl. (*St. Caroli-Schmidtii* Dtr.), Karasbergen. Forming clumps; stems 1½–3 in. long, ascending, producing new shoots at the base on the outer side and so creeping forward, 4-angled, with large, upstanding, ⅓-in. long teeth, tinged with reddish-brown; inflorescence at the base of the stems; F. 1⅛ in. ϕ, lobes ⅖–½ in. long, with the base about ⅕ in. wide; outside rough and papillose, green with red dots, base yellowish-white, with large roundish dots, edges of the lobes with ⅛–⅙-in. long, blackish-red, clavate hairs.

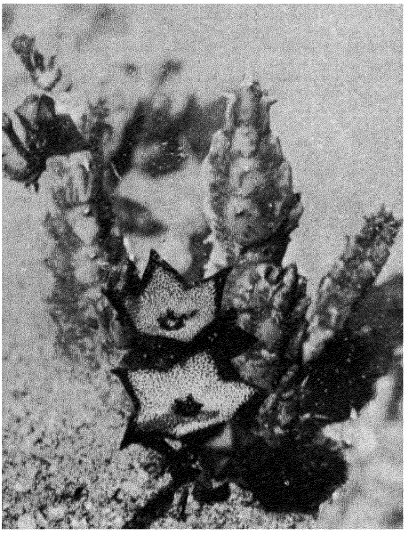


FIG. 268.—Stapelia Dinteri Bgr. (Photo, W. Triebner.)

St. articulata Mass. = *Pectinaria articulata* Haw.

St. barbata Mass. = *Huernia barbata* Haw.

St. bella Bgr. (cultivated form?). Stems erect, 6–8 in. high, ⅝ in. thick, little branched, angles with short, pointed, upstanding teeth, pale green, the tips somewhat reddish, minutely hairy; F. several, short stalked, 2 in. ϕ, fleshy, tube short, 5-lobed, pale, hairy, lobes triangular-ovate, recurved, with low cross-markings, brownish-red, edges with numerous, ¼–⅓-in. long, pale brown hairs.

St. Bergeriana Dtr., Central Namaqualand. Stems 3–4 in. long, ⅝–¾ in. thick, 4-angled, hairy; angles compressed, winged; inflorescence from the lower part of the stem; flower stalk ⅕ in. thick, 1½ in. long, spreading; corolla flat, rotate, split up more than half-way, *c.* 3 in. ϕ, lobes ovate, with elongated tips, lower side pale reddish-green, with five darker veins, upper side smooth, dull glossy, violet-brown, without markings, with ⅙-in. long, purple hairs at the edge.

St. bufonia Jacq. = *St. variegata* L. *v. bufonia* N. E. Br.

St. cactiformis Hook. = *Trichocaulon cactiforme* N. E. Br.

St. Caroli-Schmidtii Dtr. = *St. albo-castanea* Marl.

St. ciliata Thunb. = *Diplocyatha ciliata* N. E. Br.

St. Cooperi N. E. Br. = *Stapeliopsis Cooperi* N. E. Br.

St. crassa Donn. = *Heurnia reticulata* R. Br.

St. cylindrica hort. = *Echidnopsis cereiformis* Hook. f.

St. digitaliflora Pfersd. = *Tavaresia angolensis* Welw.

St. Dinteri Bgr. (fig. 268), S.W. Africa. Stems 3¼–4¾ in. high, ⅝ in. thick at the base, narrowing above, blunt, 4-angled; sides divided into oblong areas, dull grey-green, with brown markings and dotted; inflorescence from the lower part of the stems, 2½ in. long, ¼ in. thick; F. 1⅛ in. ϕ, round, lobes cleft

about $\frac{1}{5}$ in. deep, $\frac{2}{5}$ in. wide at the base, sides slightly curved outwards to the tip; lower side greyish-brown, dull glossy, with five distinct nerves on the lobes, upper side greenish-yellow, with close, fine, reddish-brown dots, the edges with a reddish-brown margin, which is $\frac{1}{8}$ in. wide in the notches, a few ciliate hairs in the notches.

St. elegans Mass. = *Duvalia elegans* Haw.

St. europaea Guss. = *Caralluma europaea* N. E. Br.

St. flavopurpurea Marl. Identical with *St. Fleckii* Bgr. et Schltr. Colour of the flower rather more purple.

St. Fleckii Bgr. et Schltr., Great Namaqualand. Stems 4 in. high, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, with soft hairs, angles with fine erect teeth; inflorescence from the grooves at the upper end, with 2–4 F.; F. on $\frac{3}{4}$-in. long stalks, $1\frac{3}{8}$–$1\frac{1}{2}$ in. ϕ, flat, divided almost to the base, lobes $\frac{5}{8}$ in. long, $1\frac{1}{2}$–2 in. wide, narrow lanceolate, tapering, with fine short hairs outside, inside warty, plain ochre coloured, with a ring of pale rose or white glandular hairs round the low corolla tube. Smelling of honey.

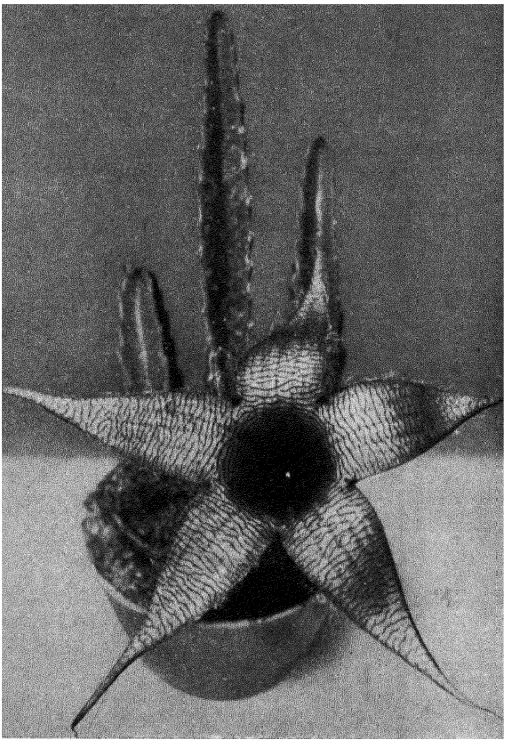


FIG. 269. Stapelia gigantea N. E. Br. (From V.P.B.)

St. Gettlefii Pott., Cape Province. Similar to *St. hirsuta*; F. on $2\frac{1}{2}$–$3\frac{1}{4}$-in. long stalks, $\frac{5}{8}$ in. ϕ, deeply 5-lobed, velvety outside, yellowish-green, purple in the centre inside, lobes yellow, with purple-red stripes and margins, with reddish-purple hairs.

St. gigantea N. E. Br. (fig. 269), South-eastern Cape Province. Stems ascending, stout, 6–8 in. high, over $1\frac{1}{8}$ in. thick, angles winged, teeth small, distant, pale green; F. 1–2, 1–$1\frac{3}{8}$ in. ϕ, flat, deeply cleft, lobes with elongated tips, pale yellow, with numerous thin, rather wavy, red stripes and scattered, reddish hairs, the edges with long white hairs. Likes rich soil!

St. Gordonii Mass. = *Hoodia Gordonii* Sweet.

St. grandiflora Mass. (*St. spectabilis* Haw.), Cape Province. Stems stout, club-shaped, 8–12 in. high, $1\frac{1}{8}$–$1\frac{1}{2}$ in. thick, teeth and leaflets distant and erect; F. 3–10, on $1\frac{1}{2}$–2-in. long stalks, $\frac{5}{8}$ in. ϕ, flat, deeply cleft, lobes lanceolate, with cross-wrinkles, tufted, with hairy edge, under side glaucous, upper side blackish-purple.

St. Gussoneana Jacq. = *Caralluma europaea* N. E. Br.

St. Hanburyana Rust et Bgr. Cultivated form Stems stout, up to 4 in. high, $\frac{2}{5}$–$\frac{5}{8}$ in thick, edges rounded, divided by sharp grooves, with upstanding stout teeth, bare, green or grey-green, F. 1–3, on 1$\frac{1}{2}$–2-in.-long stalks, 3 in. ϕ, lobes triangular-ovate, tapering, soon recurved, upper side with transverse wrinkles, with sunken longitudinal nerves, edges with small dark hairs, whitish-yellow, with round reddish-brown dots running into lines, the edges darker, the tips tinged with reddish-brown, ring saucer-shaped, $\frac{1}{5}$ in. high, 1 in. wide, rather pale whitish-yellow

St. Herrei Nel, Little Namaqualand Caespitose, stems erect, 3–4$\frac{3}{4}$ in. high, 4-angled, bare, greenish-brown, about twice as wide at the base as at the tip; L. very small; F. solitary, near the tip, on 1–1$\frac{1}{2}$-in. long stalks, ascending, buds 1$\frac{1}{8}$ in. long, F. when open 1$\frac{1}{8}$–1$\frac{1}{2}$ in. ϕ, bell-shaped, lobes acute-lanceolate, $\frac{5}{8}$ in. long, $\frac{3}{8}$–$\frac{5}{8}$ in. broad at the base, much wrinkled inside, wrinkles white, brownish-purple in between, the tube less wrinkled. Interesting new species!

St. hirsuta L. (*St. sororia* Lodd.), Cape Province Stems slender, erect, up to 8 in. high, $\frac{3}{8}$–$\frac{5}{8}$ in. wide, sides somewhat sunken, angles with small, erect, distant teeth, sooty green, with soft hairs; F 1–3, $\frac{3}{8}$–$\frac{1}{2}$ in ϕ, flat, divided deeper than half-way, edges and tips with brownish-red hairs, glaucous outside, inside pale yellow with blood-red wrinkly stripes

St. Hystrix Hook. f. = *Heurnia Hystrix* N E Br

St. Jacquiniana Roem et Schult = *Duvalia elegans* Haw

St. Juttae Dtr., S.W. Africa. Forming close clumps, stems 2–4$\frac{3}{4}$ in high, $\frac{3}{8}$–$\frac{3}{4}$ in. thick, narrowing above, 4-angled, with short hairs, inflorescence on the lower part of the stems numerous, stalk $\frac{3}{4}$ in long, $\frac{1}{5}$–$\frac{1}{4}$ in thick, with 8–10 F.; flower stalks 3–3$\frac{1}{4}$ in. long, radiating; F $\frac{1}{8}$ in ϕ, lobes about $\frac{1}{6}$ in. deep, brownish-black, upper side with coarse transverse wrinkles

St. marmorata Jacq. = *St. variegata* L *v marmorata* N. E Br

St. mutabilis Jacq, Cape Province Stems up to 6 in high, stout, with spreading teeth, grey-green, bare, F 5, on $\frac{1}{8}$-in long stalks, 3 in ϕ, lobes triangular-ovate, with close, purple-red cross-lines and dots, the tips brownish, the ring small, rather lighter

St. ocellata Jacq = *Heurnia ocellata* R et Sch.

St. pachyrrhiza Dtr., Great Namaqualand Forming cushions, with thick roots; stems 5–25, bluntly 4-angled, 1$\frac{1}{2}$–3 in. high, $\frac{5}{8}$ in thick, grey-green, with red markings or even ± red, F in bunches at the base of the young stems, on $\frac{3}{4}$–1-in. long stalks, 3 in. ϕ, lobes at the base 1 in. wide, $\frac{3}{4}$ in. long, with $\frac{1}{8}$-in. long hairs on the edges; F. brownish-red outside, red-striped inside on a yellow ground, or plain velvety black. Likes a lot of light!

St. pilifera L. = *Trichocaulon piliferum* N. E. Br

St. Portae-taurinae Dtr. et Bgr., S.W. Africa. Habit (without flowers) like *St. Juttae*; inflorescence from the lower part of the stems, with 10–15 F; flower stalks horizontal, 1–1$\frac{1}{2}$ in. long; F. 1–1$\frac{1}{8}$ in. ϕ, lobes $\frac{1}{5}$–$\frac{1}{4}$ in. deep, broad ovate, tapering, the edges curved under, back green, upper side dark yellowish-brown, with marked cross-ribs.

St. pulvinata Mass., Cape Province. Stems ascending, 4–8 in. high, dark green to brownish, with thick soft hairs, sides almost flat, teeth erect; F. solitary, on 2-in. long stalks, *c.* 4 in. ϕ, lobes triangular ovate, up to $1\frac{1}{2}$ in. long and wide, short tipped, reddish-brown, with yellow cross-markings, the tips smooth and shining, edges without hairs, with a thick cushion of reddish hairs in the middle of the corona to the middle of the lobes. Rare species!

St. radiata Jacq = *Duvalia elegans* Haw.

St. reclinata Mass = *Duvalia reclinata* Haw.

St. reticulata Mass. = *Heurnia reticulata* R. Br.

St. Ruschiana Dtr, Great Namaqualand. Forming clumps *c.* 8 in. across; stems 4–8 in long, bluntly 4-angled, green to reddish-brown; F. on 2-in. long stalks, at the base, middle or tips of the stems, wide bell-shaped, $1\frac{3}{8}$ in. ϕ, lobes $\frac{5}{8}$ in. long, $\frac{1}{4}$ in. wide at the base, green outside with red dots, lobes without markings outside, greenish-red, ground of the corolla deep red inside, covered with blackish-red clavate hairs for about $\frac{1}{5}$ in. upwards, then to the base of the lobes or over, a $\frac{1}{4}$-in wide, hairless, white, scarred zone with red dots, lobes scarred, red-brown.

St. Schinzii Bgr. et Schltr., S.W. Africa Stems with winged angles, $3\frac{1}{4}$ in high, $\frac{5}{8}$–$\frac{2}{3}$ in wide, teeth decurrent, fresh green, with soft hairs, F usually two on a $2\frac{1}{2}$-in. long stalk, $3\frac{1}{4}$–$8\frac{3}{4}$ in. ϕ, flat, deeply divided below the middle, lobes spreading, lanceolate, tapering gradually, blackish-brown, bare at the base, with fine transverse wrinkles, with purple hairs along the edges up to the tips.

St. sororia Lodd. = *St. hirsuta* L.

St. sororia Mass, Cape Province. Stems ascending, up to 12 in. high, over $1\frac{1}{8}$ in thick, 4–5-angled, teeth distant, dark green, F usually solitary, on *c.* 3-in long nodding stalks, $4\frac{3}{8}$–$4\frac{3}{4}$ in. ϕ, flat, split half-way down, lobes lanceolate-acute, blackish brown-red, with yellowish cross-markings, with dark rust-coloured hairs on the edges and throat.

St. spectabilis Haw. = *St. grandiflora* Mass.

St. Tapscottii Verdoorn = *Stapeliopsis Cooperi* N. E Br

St. tigrina Nel, Little Namaqualand. Forming clumps; stems bare, grey-green, purple above; *c.* 5 in. high, $\frac{5}{8}$ in. thick below, somewhat narrower above, 6-ribbed, grooves shallow, deeper towards the tip, angles rounded, teeth *c.* $\frac{5}{8}$ in. apart; F. on the upper and lower parts of the stems, 2–3, on $1\frac{3}{4}$-in. long stalks, $2\frac{1}{2}$ in. ϕ, wide bell-shaped, lobes $\frac{3}{4}$ in. long, bare outside, greenish-yellow, wrinkled inside, wrinkles greenish-yellow, the intervening areas brownish-purple, tube with large regular markings.

St. trifida Tod., Cape Province. Stems 2–3 in high, $\frac{1}{2}$–$\frac{5}{8}$ in. thick, with upstanding teeth, bare; F usually solitary, on $\frac{3}{4}$–$1\frac{1}{8}$-in. long stalks, 3–$3\frac{1}{4}$ in. ϕ, lobes lanceolate, about $\frac{7}{8}$ in. wide in the middle, with violet-red hairs on the edge, dull violet to purple, with numerous yellow lines, the tips without markings

St. variegata L. (*Orbea variegata* Haw.), Cape Province. Stems ascending, 2–4 in. high, angles blunt, with upstanding, pointed teeth, bare, green,

or slightly grey-green, often reddish; F. 1–5, 2–3¼ in. ϕ, flat, lobes triangular-ovate, acute, later somewhat recurved, outside smooth, bare, pale green, inside with transverse wrinkles, yellow, with dark brown markings, scattered or arranged in regular longitudinal lines; ring wide, curved under somewhat, almost circular or slightly pentagonal, with small markings and dots; flowering period to October. The colour of the flower is very variable. Below are some of the varieties:

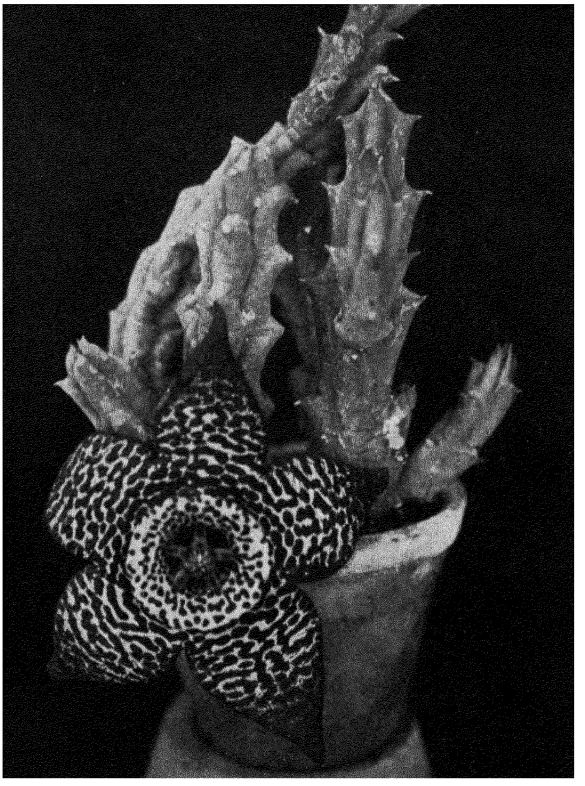


FIG. 270. Stapelia variegata L. v. bufonia N. E. Br. (Photo, K. Josefsky.)

St. variegata L. **v. asparagensis**. Stems low; lobes roundish ovate, acute, rounded, pale yellow, with dark reddish-brown markings, ring roundly pentagonal, with smaller markings.

St. variegata L. **v. bufonia** N. E. Br. (fig. 270) (*St. bufonia* Jacq., *Orbea bufonia* Haw.). Lobes sooty brown inside, with black markings and cross-stripes; smelling very strongly.

St. variegata L. **v. marmorata** N. E. Br. (*Orbea marmorata* Don, *St. marmorata* Jacq.). Stems grey-green, angles bluntish, with short, close teeth; F. 1½–2 in. ϕ, flat, lobes triangular ovate, bare, with cross-wrinkles, deep brown, with rather paler yellowish irregular markings and darker cross-lines.

St. venusta Mass. = *Heurnia venusta* R. Br.

Stapeliopsis Pillans

Family: ASCLEPIADACEAE.
Occurrence: Karroo, Little Namaqualand.
Plants related to *Stapelia*; cultivation as for these.

Stapeliopsis Cooperi N. E. Br. (*Stapelia Tapscottii* Verdoorn), Karroo. Stems erect, 1⅛–2 in. high, ⅓–⅖ in. thick, bluntly 4-angled, bare, with conical, pointed, ⅕–¼-in. long teeth on the angles, with two smaller teeth at the base,

green or grey-green, with red or dark green markings or striped; F. up to 10, on $2\frac{1}{2}$–5-in. long stalks, $1\frac{1}{8}$–$1\frac{1}{2}$ in. ϕ, flat, lobes radiating like a star, ovate or ovate-lanceolate, tapering, bare; smooth outside, bare, green, with reddish stripes, inside with pale purple warty scars, warts pale yellow, with fine reddish lines, edges somewhat recurved and with reddish hairs from the base to the middle; ring $\frac{1}{3}$ in. broad, rounded pentagonal, closely covered with warts and brightly coloured.

Stapeliopsis neronis Pillans, Namaqualand. Branching and so forming clumps; stems erect, finely papillose; corolla forming an almost closed spherical structure, about $\frac{2}{3}$ in. long, $\frac{1}{2}$ in. ϕ, the opening at the end very small, the free tips of the petals small and erect; F. purple inside, and with tooth-like warts which have purple hairs, the tips somewhat paler.

Stylophyllum densiflorum Rose = *Echeveria densiflora* Bgr.

Stylophyllum edule Br. et Rose = *Echeveria edulis* Bgr.

Synadenium Boiss.

Family: EUPHORBIACEAE.

Synadenium Grantii Hook. f. (fig. 271) (*Euphorbia Grantii* Oliv.). Occurrence: Tropical Africa. Erect growing, succulent shrubs with ascending, green, milky branches, very leafy; L. the size of a hand, ovate-spatulate, bluntish, leathery fleshy, fresh green, in winter ± deciduous; F. small, red, in autumn.

Treatment and cultivation as for the shrubby *Euphorbias*.

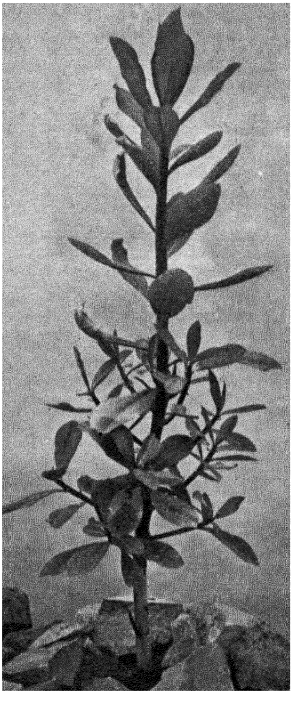


FIG. 271.—Synadenium Grantii Hook. f. (Photo, K. Josefsky.)

Talinum Anacampseros Willd. = *Anacampseros Telephiastrum* DC.

Tavaresia Welw.

Family: ASCLEPIADACEAE.

Occurrence: S.W. Africa, Angola, Karroo.

Succulent plants, allied to the *Stapelias*; stems branched from the base, cylindrical, 6–12-ribbed, the ribs divided by deep grooves, the angles toothed, teeth with three fine bristles, grey-green. F. several at the base of the young stems or branches, short stalked, large and conspicuous, bell- or funnel-shaped, in summer.

Cultivation difficult, in a light, warm greenhouse, in a dry position, not below 70° F.

Like a similar soil to *Stapelias*, but sandier. In summer give full sun, plenty of air and a moderate amount of moisture; do not water on dull days! Keep dry in winter; since during this period the shoots easily dry up it is as well to keep the plants growing slowly. Propagation by seed, which germinate very easily in spring. Grafting the *Tavaresia* on *Stapelias* is often useful, and can be recommended.

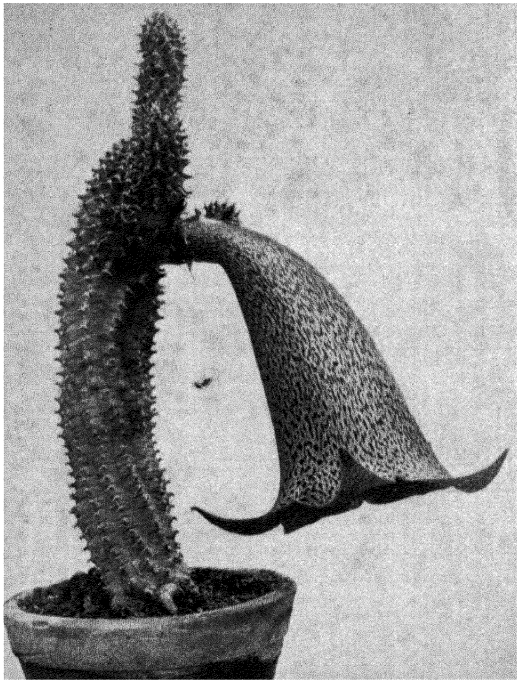


FIG. 272.—Tavaresia grandiflora Bgr. (From M.d.d.K.G.) (Photo, K. Gielsdorf.)

Tav. angolensis Welw. (*Decabelone elegans* Decne., *D. Sieberi* Pfersd., *Stapelia digitaliflora* Pfersd.), Angola. Rare in cultivation.

Tav. Barklyi N. E. Br. (*Decabelone Barklyi* Dyer), Karroo. Rare in cultivation.

Tav. grandiflora Bgr. (fig. 272) (*Decabelone angolensis* N. E. Br., *D. grandiflora* K. Schum.), S.W. Africa, Transvaal. Stems very numerous, 10–11-angled, angles with numerous teeth, which each carry three bristles, of which the central one points outwards, the side ones downwards; F. $3\frac{3}{4}$–$5\frac{1}{2}$ in. long, the lobes spreading, ending in *c.* a $\frac{1}{4}$-in.-long tip, both sides pale yellow, with reddish-brown stripes and dots, bare outside or minutely roughened, inside with numerous papillae, especially towards the base. A strikingly beautiful succulent.

Testudinaria Salisb.

Family: DIOSCOREACEAE.

Occurrence: S. Africa.

Climbing plants with hemispherical stem with hard, rugged bark. Stem becoming woody, climbing, with alternate, triangular heart-shaped leaves. Flowers small, in clusters; the plant is dioecious. The branches die during the dry period; the stems, which store water, can resist extreme drought often for years. Grow in a succulent house, light and fairly warm, in sandy, turfy soil. Keep fairly damp in the growing period, and quite dry in the resting period. Propagation from seed.

Test. elephantipus Salisb. (fig. 273) (*Dioscorea elephantipus* Spr.). Stem often over 20 in. across, the bark divided into fairly high protuberances, 6–7-angled at the base. Resting period in summer. Slow growing.

Test. silvatica Zeyh. (*Dioscorea montana* Eckl. et Zeyh.). Stem lower, protuberances wide and flat. Resting winter to May. Strong growing.

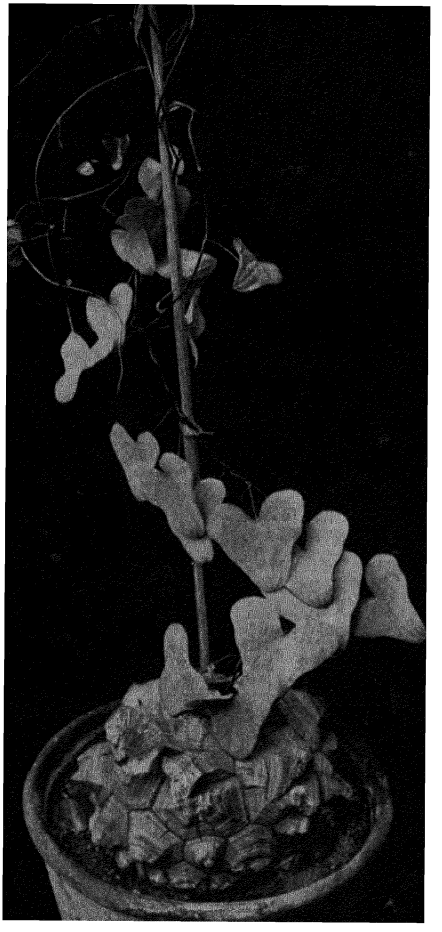


FIG. 273.—Testudinaria elephantipus Salisb. (From V.P.B.)

Tradescantia L.

Family: COMMELINACEAE.

Tradescantia navicularis Ortg. (fig. 274). Occurrence: N. Peru. Low, tufted plants, with creeping, short-jointed stems which root at the nodes; L. imbricate, in two rows, ovate, boat-shaped, ciliate, fleshy, grey-green; F. in small false umbels, inconspicuous, in summer, often in winter also. Easy plant for room or cold house. Propagation by cuttings.

Trichocaulon N. E. Br.

Family: ASCLEPIADACEAE.

Occurrence: S. and S.W. Africa.

Very succulent plants. Stems very fleshy, spherical or more cylindrical, simple or branched, closely covered with tubercles, which are arranged on numerous ribs or in spirals and often bear hairy or bristly tips. F. small, several, between the tubercles, towards the tops of the stems flat or saucer-shaped, deeply 5-cleft, lobes ovate, acute, variously coloured and marked, autumn to winter. Needs a light, warm greenhouse. Resting period January to June, when very little water is required. In summer full sun, plenty of air and moisture. It is advisable to plunge the pots in gravel and to keep this reasonably damp, so that no water touches the roots directly. The soil recommended for *Stapelias* is very suitable, but an equal quantity of coarse

gravel may be added. *Trichocaulons* may also be grown in pure, loamy sand and this is probably the best. (The method of seed-raising given for *Stapelia* should be followed here also.) Imported plants make new shoots readily, but they do not appear to live very long when imported. Cuttings are rather difficult, the cut surface must be very carefully dried.



FIG. 274. Tradescantia navicularis Orig. ¼ nat. size.

Tr. cactiforme N. E. Br. (fig. 275) (*Stapelia cactiformis* Hook.), Little Namaqualand. Stems obovate or almost cylindrical, up to 4 in. high, 2–2½ in. thick, closely tubercled, in the lower part the tubercles coalescing transversely and with minute scales, grey-green; F. ⅖–½ in. ϕ, yellow, with red markings.

Tr. columnare Nel, Little Namaqualand. Stems erect, unbranched, with 2–3 new shoots at the base, columnar or cylindrical to conical, ⅝–⅔ in. high, ¾–1 in. wide, 8-ribbed, grooves *c.* ⅜ in. wide, rather less above, ribs divided transversely, with small downcurved teeth; greenish-grey; F. from the grooves, 10–15 on the upper half of the stem, on 1/12–⅙-in. stalks, ⅙–⅓ in. ϕ, lobes ⅙ in. wide, 1/12 in. long, ovate-acute, finely dotted outside and with red markings, inside with white hairs, yellowish-green, with red dots. Interesting new species!

Tr. Delaetianum Dtr., Great Namaqualand. Stems 2–20, 4–8 in. high, 1½–2 in. thick, tubercles in numerous rows, with purple-brown, pointed, thin spines; F. wide bell-shaped, ½ in. ϕ, lower side brownish-red, inside brownish-yellow.

Tr. Dinteri Bgr. (fig. 275), S.W. Africa. Stems 1–6 together, 1½–2½ in. long, 1½ in. thick, blunt, pale grey below, dull green above, 4–6-angled, divided by deep grooves into little squares; F. 3–5 together, from the grooves in the upper part of the stem, on 1/25–1/12-in. long stalks, bell-shaped, ¼–⅓ in. ϕ, lobes recurved, with brown dots outside, smooth inside, paler at the base with reddish-brown marks and dots, which coalesce on the lobes.

Tr. Engleri Dtr., Southern Namaqualand. Stem 5–6½ in. long, 2–3 in. thick, columnar, branching freely at ground level, grey-green to green, hexagonal, irregularly divided into squares; inflorescence with 8–14 F. in the upper part of the stem; F. on ⅛-in. long stalks, ½–⅝ in. ϕ, wide bell-shaped, under side reddish-brown, inside minutely roughened, yellowish-green or cream coloured with round blackish-brown or reddish-brown dots.

Tr. grande N. E. Br., Cape Province. Stems 18–24 in. high, branched about 4 in. above the soil level, *c.* 2 in. thick, with *c.* 30 rows of tubercles, with $\frac{1}{5}$–$\frac{1}{4}$-in. long, bristly spines; F. $\frac{5}{8}$ in. ϕ, bell-shaped, greenish-yellow.

Tr. keetmanshoopensis Dtr., S.W. Africa. Stems 1–6, slender, cylindrical, up to 6 in. high, *c.* $1\frac{1}{2}$ in. thick, with rounded tubercles, violet-grey or yellowish-brown; F. up to 5 together, from the grooves of the upper part of the stems; F. on $\frac{3}{8}$-in. long stalks, bell-shaped to rotate, $\frac{3}{8}$–$\frac{5}{8}$ in. ϕ, lobes wide ovate, tapering; bare inside, whitish-grey or greenish-yellow, with reddish-brown markings.

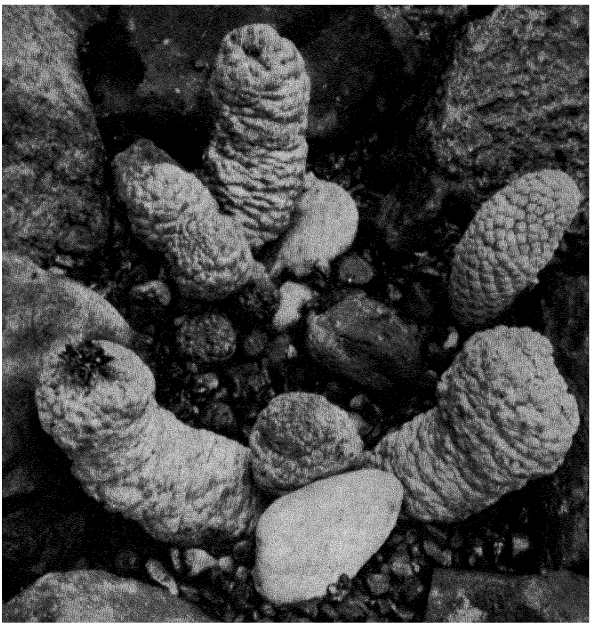


FIG. 275.—Trichocaulon cactiforme N. E. Br., above right; Tr. Dinteri Bgr. $\frac{1}{2}$ nat. size.

Tr. kubusanum Nel, Little Namaqualand. About $6\frac{1}{2}$ in. high, *c.* $1\frac{1}{2}$ in. wide, columnar, distinctly ribbed, ribs up to 16, transversely divided, the individual squares more prominent in the lower part, flatter above, the upper part of the stem with irregularly arranged, untoothed, bare tubercles; F. in the upper quarter, 10–12 between the tubercles, on $\frac{1}{12}$-in. long stalks, bud very flat, F. $\frac{3}{8}$ in. ϕ, lobes $\frac{1}{8}$ in. long, 1 in. broad at the base, inside greenish-white, papillose, brownish-red markings towards the centre, in the middle a raised ring *c.* $\frac{1}{6}$ in. ϕ.

Tr. officinale N. E. Br., Central Namaqualand. Stems 1–8, 8–16 in. high, $2\frac{1}{2}$–3 in. thick, glaucous, with 20–25 irregular ribs, with $\frac{3}{8}$-in. long, decurrent, pale brown, stiff, bristly spines, blackish-purple when young, the tips white; F. on $\frac{3}{8}$-in. long stalks, flat, rotate, $\frac{5}{8}$ in. ϕ, red-brown, minutely hairy inside, with a yellow ring at the base; the plants much resemble *Hoodia* in habit.

Tr. perlatum Dtr., Great Namaqualand. Stems several, up to 6 in. high, 2 in. thick, pale grey-green; F. on the top of the stem, in bunches of 2–4, almost sessile, $\frac{1}{8}$ in. ϕ, lower side yellowish-green, with purple markings, upper side closely covered with whitish, shining papillae.

Tr. piliferum N. E. Br. (*Stapelia pilifera* L., *Piaranthus piliferus* Sweet), Cape Province. Many stemmed when old; stems thick, cylindrical, up to 8 in. high, $1\frac{1}{2}$–2 in. thick, with numerous, vertical rows of tubercles, which

have $\frac{1}{8}$–$\frac{1}{5}$-in. long, soft, brown spines, glaucous; F. between the rows of tubercles, several, *c.* $\frac{2}{3}$ in. ϕ, bell- or funnel-shaped, pale yellowish-red outside, dark red-brown inside; evil smelling.

Tr. Pillansii N. E. Br., Cape Province. Stems 5–7 in. high, $1\frac{1}{8}$–2 in. thick, many-angled, angles small, tubercles ending in a $\frac{1}{6}$–$\frac{1}{5}$-in. long, stiff bristle; F. about $\frac{1}{3}$ in. ϕ, whitish-yellow.

Tr. pubiflorum Dtr., Great Namaqualand. Plants with several stems, *c.* 5 in. high, *c.* $1\frac{1}{2}$ in. thick, dark blue-green, with 14 irregular ribs $\frac{1}{4}$ in. broad at the base, with *c.* $\frac{1}{6}$-in. long bristles $\frac{1}{6}$ in. apart; inflorescence with 3–5 F. from the grooves between the tubercles; F. $\frac{1}{2}$ in. ϕ, flat saucer-shaped, lobes $\frac{1}{5}$ in. broad at the base, $\frac{1}{6}$ in. long, yellow inside, then a zone with red dots passing into the brownish-green, violet-edged lobes, minutely hairy inside, outside yellowish-green, lobes reddish-brown. Allied to *Tr. officinale*. Rare species!

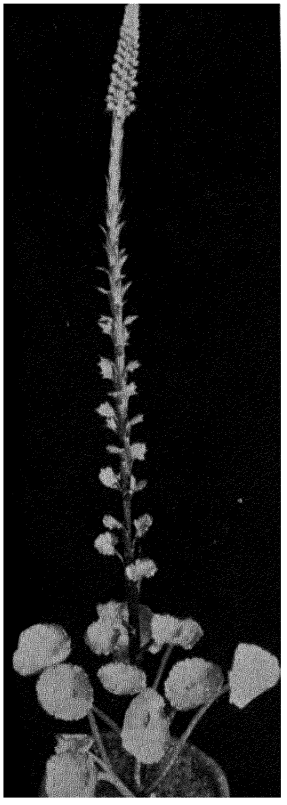


FIG. 276.—Umbilicus pendulinus DC. $\frac{1}{3}$ nat. size.

Tr. simile N. E. Br., Cape Province. Stems like *Tr. cactiforme*, almost ovate, $1\frac{3}{4}$ in. high, $1\frac{1}{2}$ in. thick, almost smooth, slightly wrinkled; F. at the tip, $\frac{1}{3}$ in. ϕ, deep red-brown.

Tr. sinus Lüderitzii Dtr., S.W. Africa. Stems up to $3\frac{1}{4}$ in. long, up to $1\frac{1}{2}$ in. thick, grey-green; flower stalk *c.* $\frac{3}{8}$-in. long; F. 4–6 from the grooves on the upper part of the stem; F. bell-shaped, lobes pointing upwards, bare, yellowish-green, with faint, narrow, reddish, concentric markings; F. inconspicuous, not opening much.

Umbilicus DC.

Family: CRASSULACEAE.

Occurrence: Mediterranean.

Low plants with tuberous roots, resting during the dry period. Stem solitary or with slender racemes of flowers. L. alternate, stalked, round to shield-shaped, sunken in the middle, green. F. greenish-white, in spring.

In summer may be planted out of doors in a sunny place, in winter in the cold house. After flowering, the plant dies down and should then be kept quite dry. Likes rich soil.

U. Aizoon Fenzl. = *Rosularia Aizoon* Bgr.

U. chrysantha Boiss. = *Rosularia pallida* Stapf.

U. horizontalis DC. (*Cotyledon horizontalis* Guss.). Similar to *U. pendulinus*, the flowers in horizontal, close clusters.

U. pallidus Schott. et Kotschy = *Rosularia pallida* Stapf.

U. pendulinus DC. (fig. 276) (*Cotyledon peltatum* Wendl., *Cot. pendulinus* Batt., *Cot. tuberosus* Hal., *Cot. Umbilicus* L. *v. tuberosus*). Tubers up to $1\frac{1}{8}$ in. across; L. at first arranged in rosettes, long stalked, circular, green, the whole plant with reddish streaks, becoming brownish-red in a light position; flower stem *c.* 8–16 in. high, erect, with several kidney-shaped, notched leaves.

U. Semenowii Rgl. et Herder = *Sedum Semenowii* Mast.

U. spinosus DC. = *Orostachys spinosus* Bgr.

U. pubescens Ledeb. = *Sedum pilosum* M. B.

Urbinia agavoides Rose = *Echeveria agavoides* Lem.

Urbinia Purpusii Rose = *Echeveria Purpusorum* Bgr.

Vitaceae (Family). Genera described: *Cissus*, *Vitis*.

Vitis quadrangularis Wall. = *Cissus quadrangularis* L.

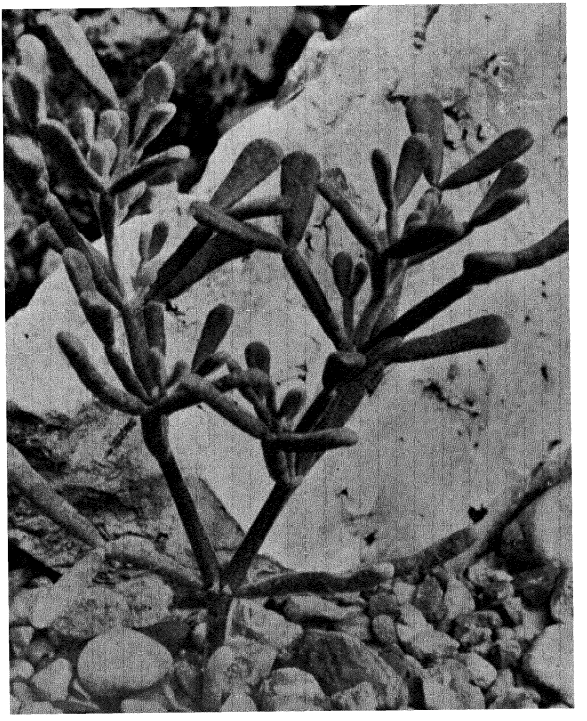


FIG. 277.—Zygophyllum Fontanesii W. B. $\frac{3}{4}$ nat. size.

Zygophyllum L.

Family: ZYGOPHYLLACEAE.

Zygophyllum Fontanesii W. B. (fig. 277), Canary Islands. Broad, bushy plant, about 16 in. high; branches numerous, spreading; L. usually in pairs, somewhat clavate, in cultivation up to $\frac{5}{8}$ in. long, $\frac{1}{5}$–$\frac{1}{4}$ in. wide above, $\frac{1}{12}$ in. thick, glaucous, golden yellow before they fall; F. in spring in large numbers, small, starry, pink; fruits egg-shaped, at first green, later yellow to orange.

Decorative plants. Propagation from seed in sandy soil. Grow in light, sandy soil, in small pots in a hot bed or temperate succulent house. Old plants should be put in deep pots. Resting period in winter. The seeds remain viable for about eight weeks.

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