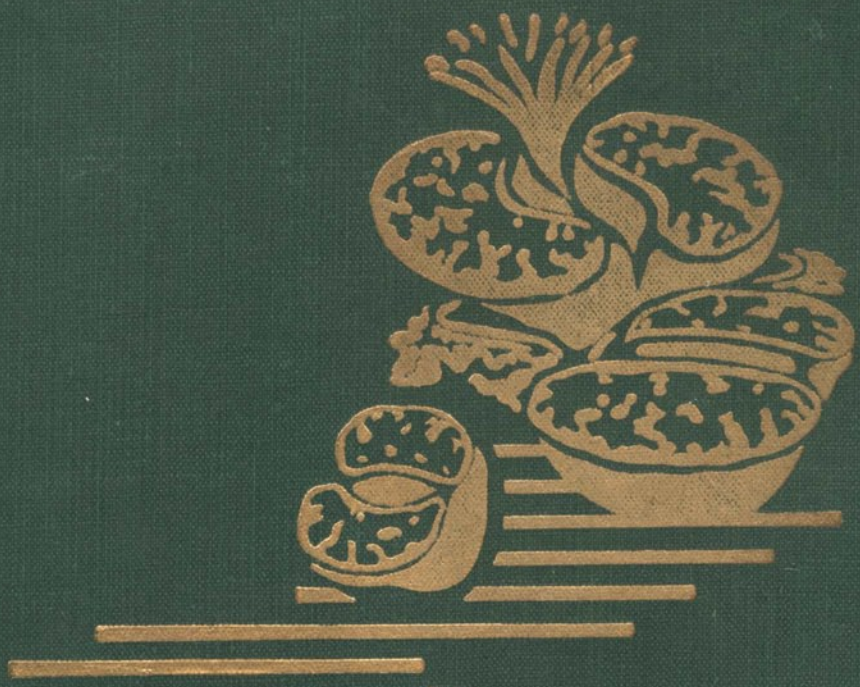
LITHOPS



By

G. C. NEL.

LITHOPS

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LITHOPS

Plantae succulantae, rarissimae, in terra obscuratae, e famailia Aizoaceae, ex Africa australi

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PREFACE

A Monograph on any genus should really be undertaken only if a complete record of all its characteristics is available, but unfortunately there is very often a very great gulf between the ideal and reality. In this particular case, if anyone attempted to wait until all the facts about the genus were known, it would take very many years to write a full account, and it is extremely doubtful if any one individual could collect all the relevant material in his short life. The genus Lithops grows to a large extent in inaccessible parts of the country and then, even if one knew its habitat one is not always sure of finding the plant on account of the prolonged droughts prevailing at times in these parts. Very often one can only find the plant after good rains have fallen, and these rains are few and far between. *L. brevis* is a species growing on a hillock near Viool's Drift, Orange River. At the request of the author, Mr. P. van Heerden, Principal of the High School, Springbok, set out to find the plant. He had with him the coloured boy who was present when the plant was originally discovered. Mr. van Heerden and the boy visited the hillock, but at that time there was a severe drought on. In spite of their combined diligent search, the plant could not he found. Some years afterwards, after a copious rain, Mr. van Heerden was good enough to visit the same locality, and he was successful in finding the plant. The coloured plate and the photograph are of these plants.

Very often the plants are found but die before they have flowered or fruited. The records are thus incomplete, and one is thus forced to use the meagre records at one's disposal. It has not been possible to obtain flowers of all the species despite the fact that over 12 years have been spent in collecting and studying the genus. The present account is an attempt to place on record such facts as are known, and it must be left to posterity to complete it.

That the genus is a fascinating one need hardly be emphasised, but to indicate its attraction for the lover of plants, a letter from Dr. J. Lückhoff, a well-known specialist of Cape Town, himself an indefatigable collector and keen observer, is reproduced here. Dr. Lückhoff writes

> "For me there is something very attractive in *Lithops*. Its adaptation is very peculiar and where it grows is so attractive, that a search for *Lithops* is always enveloped in an atmosphere of adventure—a search as it were for treasures, which require experience and a spirit of enterprise. Treasures of loveliness. Then, the many species are wonderful, since the difference between them is and cannot be great." (*The original is in the Afrikaans version.*)

This volume would never have seen the light of day if it had not been for the support the author had received from various quarters. First and foremost, I must express my warmest thanks to the curators of "Het Jan Marais Nationale Fonds" for the generous financial aid they have given me not only in contributing to the cost of preparing the coloured drawings but also towards the publication of this book. My especial thanks are due to the Hon. Minister of Education, who on the recommendation of the Research Grant Board, has contributed very substantially towards the cost of publication. Needless to say, I appreciate the support of the Research Grant Board in this matter.

I wish to express my very hearty acknowledgment for the help of the following:

Mr. Ernst Rusch, Lichtenstein, Windhoek, for valuable information and live material.

Herr Wilhelm Triebner, Windhoek, has placed his unique knowledge of the flora of South-West Africa and material at my disposal. His information about the distribution and habitats of the species was very valuable.

Mnr. Roux, Keimoes, for detailed accounts of the species growing in his neighbourhood.

Dr. Henrici, Fauresmith, for information about and a photo of *L. salicola*.

Herr Eberlanz, Lüderitzbucht for the loan of photos and collecting rare material in his vicinity.

Mr. Minnaar, Vryburg, for information about *L. Aucampiae*.

Mr. P. van Heerden for collecting rare species from Namaqualand.

Herr and Frau Goltze, Urikos, Maltahöhe, for a photo and material of the rare species, *L. Urikosensis*.

Mr. M. Otzen for material.

Dr. A. L. Geyer for valuable information and live material.

Mr. W. Giess for preparing drawings.

To Mrs. Evelyn Krämer, Knysna, I owe the deepest sense of gratitude for the trouble and I might say love with which she attempted to place on record the elusive colours and forms of these beautiful plants and also for the way she responded to my wishes. The beautiful coloured drawings are reproductions of her art.

I also wish to take this opportunity of expressing my thanks to the University of Stellenbosch for financial aid and for publishing this volume.

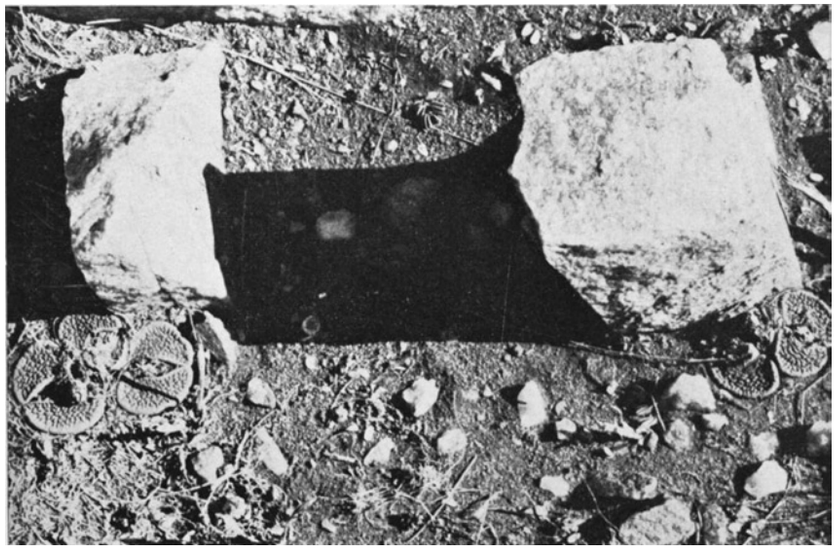
June, 1946. G. C. NEL.

INTRODUCTION

THE name *Lithops* is derived from the Greek word lithos, a stone, and ops, a face. The name was given to these plants by N. E. Brown in 1922 "on account of their resemblance in colour and appearance to the stones and pebbles they grow among," to quote his own words. This genus belongs to the *Aizoaceae*, a family exceedingly well represented by a great variety of plants in the drier parts of South Africa and South-West Africa. All the plants commonly called "vygies" in South Africa were formerly grouped together in one genus *Mesembryanthemum*. Mainly due to the researches of N. E. Brown in England and G. Schwantes in Germany, this genus has now been split up into approximately 140 different genera, one of which is our genus *Lithops*.

Burchell in his travels (1821) describes in the following words the discovery of a plant which proved about a century later to be the first *Lithops*; "On picking up from the stoney ground, what was supposed a curiously shaped pebble, it proved to be a plant, and an additional new species to the numerous tribe of the Mesembryanthemum but in colour and appearance bore the closest resemblance to the stones between which it was growing." He made a drawing and from that drawing Haworth described the plant,

FIGURE 1 · LITHOPS TURBINIFORMIS (HAW.) N.E. BR.
In habitat. Prieska, June. 1936



which he named *Mesembryanthemum turbiniforme*, as follows; *Planta acaulis, obconica, superne truncate obscuro punctata*. The plant was subsequently renamed *Lithops turbiniformis* by N. E. Brown. This discovery was made by Burchell on September 14th, 1811, at Zand Vlei, in the Prieska district (Fig. 1). More than a hundred years elapsed before this plant was rediscovered by Pole Evans in more or less the same locality as that in which it was found by Burchell. The next species to be described was named *Mesembryanthemum pseudotruncatellum* by Berger in 1908. This plant was found in Damaraland, Great Namaqualand, and as we now know, in the vicinity of Windhoek. In 1912 Mr. Leslie discovered near Vereeniging a plant, named by N. E. Brown *Mesembryanthemum Lesliei* after its discoverer. These early discoveries show that the genus has a very wide distribution, as Windhoek and Vereeniging lie far apart and they are both about 500 miles from Prieska.

During the period 1920–1933, large numbers of species were discovered both in the Union of South Africa and in South-West Africa.

Kurt Dinter, the indefatigable collector, deserves to be mentioned, for it is largely due to his enterprise that our knowledge of this genus has been so appreciably increased. It must be borne in mind that he undertook his collecting tours by oxcart and under very arduous conditions, as the majority of the South West species occur in the most arid and uninhabited parts of that dry country. One requires a knowledge of the country to know where to look for species of *Lithops*, as these plants are perhaps the most difficult of all to find in the field and a fairly sharp eye and one might almost say intuition are needed to find them. In the dry condition one walks on these plants without seeing them.

Each individual plant consists of more or less contiguous leaves on a short stem. The whole diameter of the plant varies from about 0·5 to 5 cm., the latter being an extreme case, as these plants are usually about 1–2 cm. in diameter. In some plants, the two leaves are separated by a very narrow fissure and in others the lobes, at least in the old stage, stand firmly apart from one another (*L. divergens, L. Comptonii, L. Helmuti*).

STEM

As mentioned above, each individual plant consists of two more or less contiguous leaves on a short stem, the cross-section of which is circular. The length of the internode is about the same as the thickness of the leaf, and is named the insertion zone. The stem is therefore not free, but only becomes so after the succulent leaves have shrunk and perished. The remains of the old leaves are dry and papery, and they protect the young leaves in their early, stages of development.

In the young stage the plant does not branch at the growing point of the stem, i.e. at the base of the fissure, but a new pair of leaves is formed

which enclose between them the new growing point. These leaves are protected by the original cotelydonary leaves. The leaves are opposite and they alternate with the old leaves which, after the new leaves are developed, die and disappear. In this manner the growing point produces annually a pair of leaves, which are decussate to the previous ones and to those that follow.

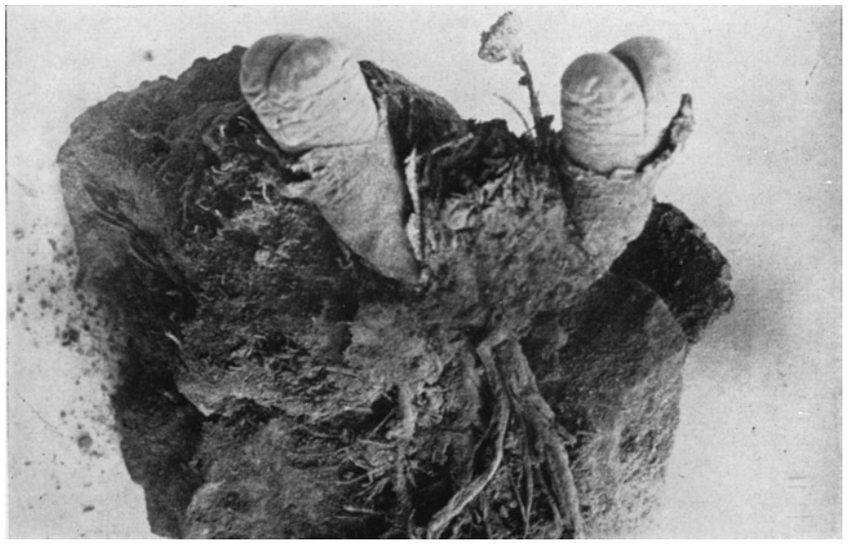
The plant flowers at a later stage and the flower is formed terminally. On both sides of the terminal flower a new leaf pair is formed.

LEAF

The two leaves together form an inverted cone, the base of which is exposed to the atmosphere and the apex is embedded in the soil. The base of this conical structure we can call the top, and the sides the mantle. For purposes of classification it is the base which is of paramount importance. The mantle, which is almost impervious to water, is in immediate contact with the soil and thus very little light reaches it. Immediately within the mantle is a thin layer of green tissue—chlorenchyma or food-making tissue of the plant. The central tissue of the inverted cone is transparent and serves for water-storage, and the shape of the cone varies within certain limits according to the degree of turgidity of the plant. Fig. 2 gives an idea of the general structure of the plant as a whole. The sinking of the plants in the soil is a protection against desiccation.

The top of each of the two leaves, which together form the conical

FIGURE 2 · LITHOPS WEBERI NEL.



structure referred to above, is more or less circular or semilunar in shape and its surface varies from apparently opaque to transparent.

Walter (4) determined the amount of moisture taken up and lost by *Lithops salicola*. He found that in one case a large plant (weighing 11.50 gm.) lost per diem when fully exposed to the sun scarcely 0·1 gm. in weight. Another plant (weighing 4·395 gm.) lost in 15 days scarcely 0·2 gm. Walter also determined the amount of water taken up by the roots of these plants. By placing a plant so that the roots were immersed in water, he found that a plant weighing 23·95 gm. had taken up 3·3 gm. of water in 15 days. By making a small cut at the base of the plant and putting it in water, this plant had absorbed 7 gm, of water in 24 hours. It thus appears that the whole surface of the plant, including the root system, is practically impervious to water. Walter also found that a plant gained scarcely 0·1 gm. per day when fully submerged in water. Absorption of water takes place apparently through the newly developed roots and not through the old roots.

This protection against the loss of water is of very great advantage, because most of the species of this genus grow in the most arid parts of the country, where the relative humidity of the atmosphere is very low, and consequently plants would lose all their moisture if not protected against such loss. Apart from the low humidity content, these areas very frequently have rainless periods of 12–20 months or even longer.

Green plants, as is well known, are dependent on light for the manufacture of their food. In this genus the plant is buried in the soil and if the exposed top surface were green the light could not penetrate very deeply into the tissues and thus the greening of the underlying cells would be prevented. If the chlorophyll were confined to the top surface of the leaf this would be the same as a reduction in leaf surface, and consequently the amount of solar energy available for the manufacture of the food would be very small indeed. This difficulty could be overcome by increasing the top surface, but that would be attended with the additional dangers of desiccation and heating of the body of the plant, especially as these plants are embedded in a soil which is also exposed to the full rays of the sun. In species of *Lithops* an interesting way out of this difficulty has been found. The chlorophyll containing cells line the inner surface of the mantle and thus lie for the most part below the soil level, and all the light which reaches them must come from above through the window like top (Fig. 3). In some species the top surface is transparent (*L. optica, L. olivacea, L. marmorata*), in others there are a number of miniature windows (*L. fulviceps*), *i.e.* small transparent areas with opaque tissue between, while in other species (*L. Meyeri*) the top surface, though opaque, yet allows sufficient light to pass through. Schanderl (2) has found that in the case of *Fenestraria rhopalophylla*, where the window resembles that of *L. optica* and *L. olivacea*, 90–91·5 per cent. of the incident light passes through, and at a depth of 17, mm. only diffuse light is found. In other words the transparent window lets through a very considerable quantity of light.

In the ease of *Lithops terricolor*, which is an example of the second type, he found the following figures;

white light	35·8%	red—infra red	44%
yellow to red	42·0%	blue green	24%

Lithops kunjasensis, one with an apparent opaque top;

white light	48%	red—infra red	55%
yellow to red	44%	blue green	24%

The opaqueness of the upper surface may be due to the formation of anthocyan in the cellsap, the deposition of calcium oxalate in the cell walls, and the accumulation of calcium concretions which are themselves coloured red. These calcium concretions disappear when dilute hydrochloric acid is added and the cell contents are then nearly transparent. With the alteration in the cell and in the cell wall, the intensity is reduced and only diffuse light reaches the interior. The whole structure of the leaf resembles a mine shaft, in which the interior is lit up by the light entering the mouth of the shaft. In the case of the leaf the light illuminates the transparent and colourless interior and thus reaches the chlorophyll lining the sides of the mantle. The intensity of the light has also been correspondingly reduced. The plant is then able to carry out the manufacture of its food under fairly favourable circumstances, although embedded in the soil. This adaptation enables these plants to live under the very unfavourable conditions prevalent in their habitat.

Dinter measured the temperature of a species of *Lithops* at Lichtenstein near Windhoek. S.W.A. and found it to be 56·2° C., whereas the surrounding stony ground was about 10° hotter. These plants have to endure the above temperature in summer, but in winter the temperature sinks to between 8 and 10 degrees below zero on the Centigrade scale. In addition to these extremes of temperature they have to endure a cloudless sky and long periods of drought.

The top of the leaves is either flat (*L. olivacea, L. Lesliei*), convex (*L. Ruschiorum*), or obliquely convex (*L. Meyeri, L. divergens*). The degree of flatness or convexity is in itself very variable and depends on the amount of water available at any particular phase in the life of the plant. In their natural habitat most species, with the exception of those belonging to the oblique-convex group, have a more or less flat top. After a soaking rain the top is more or less convex. Plants have, however, been seen in their natural habitat with a slightly concave appearance. This latter state coincides more or less with the period of rest after or during a long drought, and at this time the plants are contracted and sunk into the ground and below its level. In this stage these plants are very difficult to find, since they are then often more or less hidden under a thin covering of dust or sand and are consequently partly invisible. The colour of the plant is very similar to that of the sand or soil covering it. In the oblique-convex group the leaf very often tapers to a rounded point.

If these plants are grown throughout the year in places of relatively high humidity, as for example in Europe, Western Cape or near the sea, they tend to elongate and appear above the surface of the soil, and thus assume an appearance quite unlike their usual form and shape. One has then to be very careful in making use of the convexity or otherwise of these plants in determining the species, as the changed environment may have caused them to become very much more convex and swollen.

The top is either smooth or shows various degrees of rugosity. The two extreme cases are *L. turbiniformis* and *L. verruculosa*, where the whole top is covered with a large number of interconnected convolutions, breaking the surface up into numerous ridges and depressions. Plants like *L. olivacea* have a smooth surface. *L. salicola*, on the other hand, though usually possessing a smooth surface, may show in addition various degrees of rugosity. To give an adequate idea of all the various modifications of the top it would be necessary to describe each species afresh and the reader is therefore referred to the description of the individual species, the various photographs, and the coloured plates.

The colour of the top also varies very considerably and no description, however detailed, can give any clear and definite idea of the appearance of these weird and interesting plants. Human language is far too poor to describe adequately these delicate colours. Not only one leaf of a pair differs from its immediate neighbour but leaves taken at random from plants of the same species growing on one spot show a very great degree of variation.

FIGURE 4 · DR. H. W. DE BOER
'n Lithops-liefhebber aan die werk An enthusiastic Lithops collector at work.

L. salicola occurs at two places approximately ten miles apart, and there are thousands of these plants growing in each area. If the top had to be made the criterion of the validity of a species, one would be able to describe 10 to 12 different types. On closer examination gradations may be found between such extreme types as, for example, transparent and opaque or semi-transparent types, showing how they gradually merge into one another. It appears that the tint and nature of the soil have an important influence on the colouration of the top.

In determining a species the importance of colour cannot he underestimated, but it seems that undue weight has been given by some authors to this factor. Not only does one find great variation in the intensity and degree of the colouration in the full-grown plant, but young plants differ so markedly in their appearance from the same plants at a later stage as to appear to be distinct species. Those with red markings tend to lose them, or the intensity of the red colour may become so different as the leaf grows older that it is difficult to believe that the plants are specifically identical. Frequently the dark green spots or dark blue-green miniature windows lose their semi-transparency, the area being replaced by black or darker coloured dots. These changes take place in the leaf and are due to the old leaf dying off and consequently to the formation of new decomposition substances, which normally do not occur in the plant. (Fig 4.)

If one attempted to describe all these changes and variations the reader would be little the wiser. He would furthermore find it difficult to form a mental picture of the real colour of the top surface. It is instructive to read what Dinter wrote years ago, when there were only 22 species known; "Würde ich alle 22 Arten in gleichwertigen lebenden Stücken in einer Reihe einem nicht gar zu krassen Laien vorlegen, so würde er alle 22 Arten als wirklich unterscheidbar auseinanderzuhalten verstehen. Lege ich ihm aber die entsprechenden erstklassigen Photographien der 22 vor, so wird er nur etwa die reichliche Hälfte derselben als verschiedene Arten erkennen, während er versucht sein wird, den Rest auf die von ihm wirklich erkannten als mit diesen identisch zu verteilen. Liest er aber nur die 22 beschreibenden Texte, ohne die dazu gehörigen Bilder gleichzeitig zu sehen, so wird er es in der ganz sicheren Erkennung der Arten wahrscheinlich auf nur vier (*L. Ruschiorum, optica, Dinteri, Vallis-Mariae*) bringen, etwa 4 weitere wird er mit einem verbleibenden Rest von Zweifel bestimmen und etwa 15 wird er gar nicht bestimmen können."

Colour, after all, is a very subjective perception, and there are such great differences in the estimation of colour by different persons that it is extremely difficult to describe the colours found in the genus *Lithops*, so as to give an adequate idea of the top surface. An attempt was made by the author to determine the colour by means of colour charts, but it was given up, as one day he would arrive at a certain colour only to find in the same plant a totally different one the next day. Dinter had exactly the same ex-

perience, namely that, although one can determine the general nature of the colour, such as yellow for example, there are so many shades of this colour that when one wants to describe a specific shade the difficulty starts. The top surface is often not uniform in colour as for example in *L. pseudotruncatella*. Furthermore small areas of the upper surface often differ from one another, as in *L. karasmontana*, thus while the description may be true for one part of the top it is not correct for a part a few millimetres away.

As the leaves become older, the differences of the various parts become accentuated. When plants are removed from their natural habitat and grown in Europe and in the moister parts of South Africa the top tends to lose its brilliance. The plant also under such conditions protrudes above the ground, becomes more concave, and assumes a greener tint than material fresh from the field.

A representative of this genus which thrives in a part of the country (Bethlehem, Pretoria) with a fairly heavy rainfall is *L. Lesliei*. *L. terricolor* though occasionally found near Port Elizabeth, which has a fairly regular and heavy rainfall, is characteristic of the driest parts of the Cape Province (Ceres, Karroo, Laingsburg) with about two inches per year.

There is sometimes a marked difference between the colouration of the depressions and the ridges of the rugose species such as *L. karasmontana*, *L. gracilidelineata*. The network, which is sometimes a prominent feature of the top surface, also shows a great deal of variation, not only in the way it anastomises but also in its colouration. An extreme case is that of *L. pseudotruncatella* and *L. verruculosa*. The case of *L. Vallis-Mariae* should also be mentioned. In thus particular plant, the surface which appears uniform to the naked eve consists in reality of a large number of ridges with vermiform convolutions, giving the idea of sintered limestone.

In determining a species of *Lithops* a careful and close study must be made of the markings, especially those on the depressions. *L. Erniana* has a darkly coloured depression, but at the end of this depression one notices short brown lines with a buff border. These lines stand at right angles to the main depression. Red dots or short lines mark the intersection of the slight depressions of *L. chrysocephala*.

Species with red dots or warts fall into two distinct groups: (i) those like *L. Dinteri*, *L. Dorotheae* and *L. insularis*, where the red dots are embedded in the tissue and are level with it, and (ii) *L. Inae*, where the red shiny dots stand up above the surface of the leaf. In the first group the cell walls are coloured red, whereas in *L. Inae* the cell cavities contain the liquid anthocyan.

WINDOW

As already pointed out the top surface of the leaf is apparently opaque, although it lets light through as can be easily proved by cutting the top off,

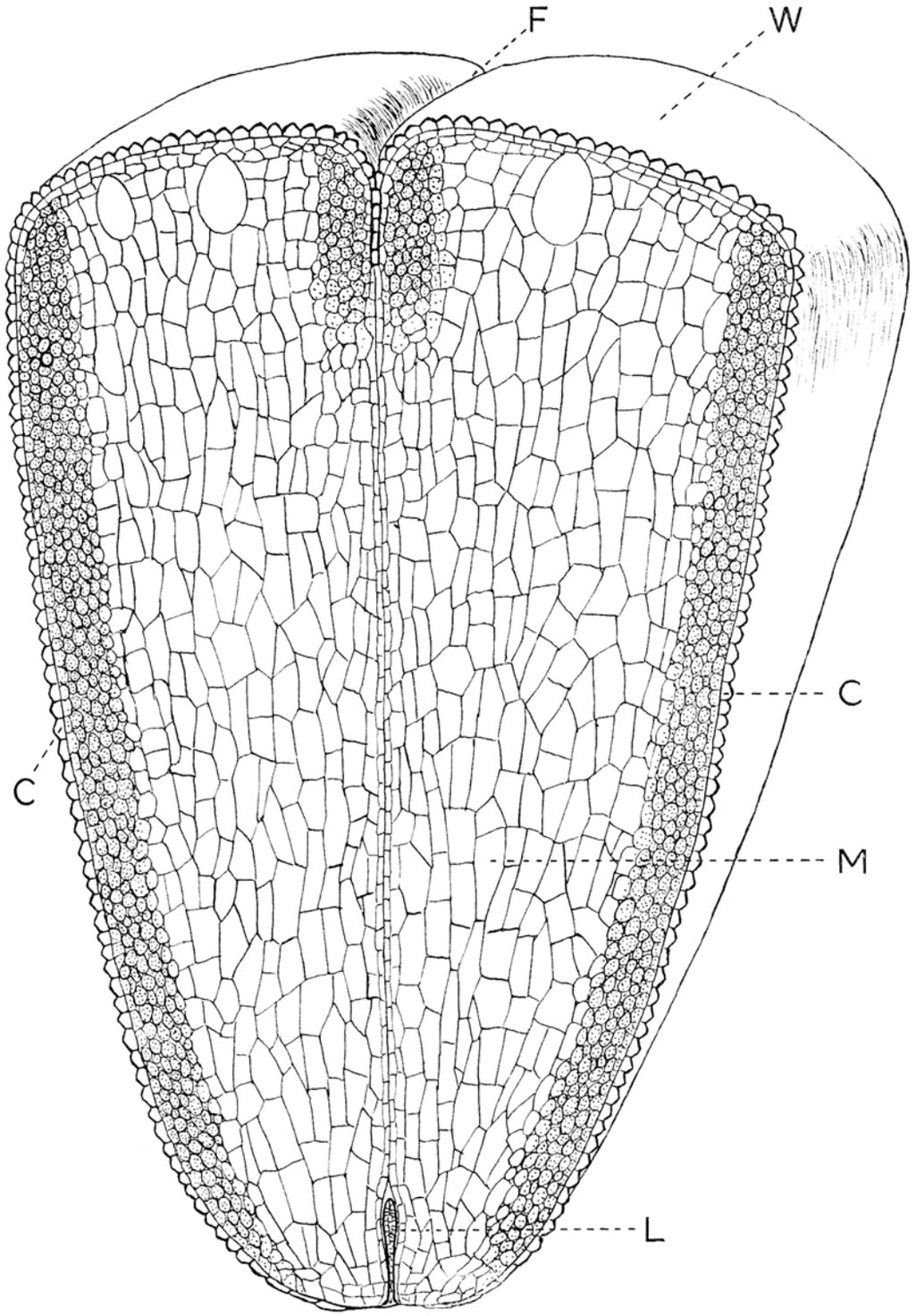


FIG. 3 · LONGITUDINAL SECTION THROUGH PLANT BODY OF LITHOPS.

C, epidermis with underlying chlorenchyma (dotted); L, Bud (young growth of following year); M, Tissue of colourless (transparent) cells; W, Window or upper face; F, Fissure.

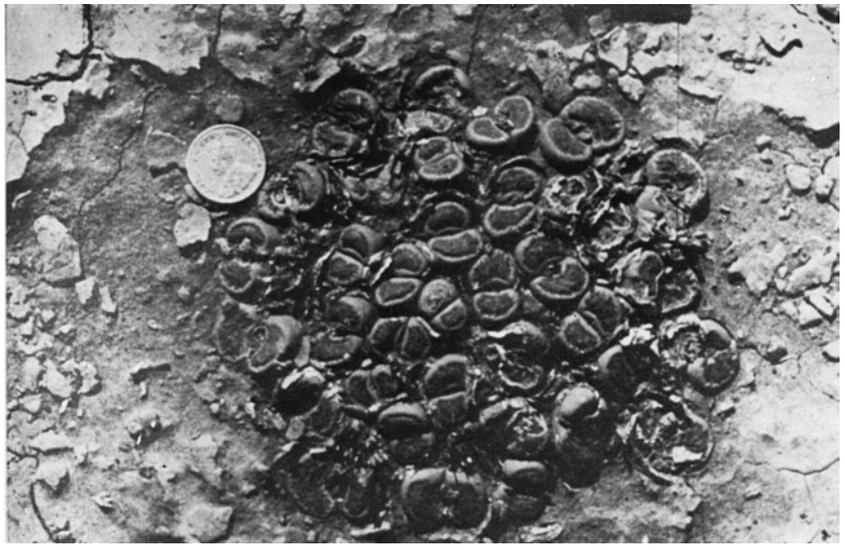


FIGURE 5 · LITHOPS SALICOLA L. BOL.
In situ. in habitat. Lückhoff

which contains the window and then holding it up so that light falls through the window, or the window is quite transparent since very little of the incident light is cut off. The window is green or variously coloured. *L. optica var. rubra* is in a class by itself for the top surface of this plant is of a uniform reddish-purple colour. This plant occurs amongst the ordinary *L. optica*, which possesses a fairly transparent greenish window. Unfortunately no seed has been available so further study of this peculiar and interesting variety has not been possible.

As regards the nature of the window four types can be distinguished:— (i) *turbiniformis-group*, where the window is apparently opaque as it lets through very little light (*L. turbiniformis, L. Ruschiorum, L. gracilidelineata*), (ii) *fulviceps-group*, where the greater part of the window is apparently opaque, but embedded in this opaque covering a number of prominent, transparent papillae (miniature windows) are observed (*L. fulviceps*), (iii) *olivacea-group*, where the main body of the window is quite transparent (*L. olivacea, L. optica, L. salicola*), (iv) *pseudotruncatella-group*, where the window possesses an opaque or semi-opaque covering which is perforated by a large number of round, pellucid spots (miniature windows) sunk into the tissue and level with it. It will be noted that in both the *fulviceps* and *pseudotruncatella* types miniature windows are present, but in the first-named these dots are convex and stand out above the level of the leaf, when the latter is turgid, while in the *pseudotruncatella* type the miniature windows are flush with the surface. In some eases, *L. Schwantesii*, for example, these pellucid dots are of a bluish-green colour.

It would appear that the top surface of the leaf has developed along two definite and different directions and the question arises which is the original one. The opaque window, as found in *L. Ruschiorum* and *L. turbiniformis* seems to be the more primitive and the development of the miniature windows is probably of later date. The efficiency of the latter type of window has already been commented on.

The opaque surface has, it appears, been pierced at certain specific points by the development of these transparent areas or dots. In the latter ease the further development has proceeded along two lines which appear independent but which on closer examination are clearly connected with one another. It is quite conceivable that at certain points in the history of the genus the opaque nature of the upper surface gradually decreased until certain definite areas allowed a little light to pass through more easily than elsewhere in the surface. The gradual increase in both size and transparency of these areas is then just a question of time. As a later development these pellucid dots rose above the level of the surface and in that case an incident ray of light striking this papilla at any angle less than 90° would be refracted by the raised body so as to enter the leaf. This papilla would then act as kind of convex lens. A ray of light towards the late afternoon, for example, falling almost parallel with the top surface or window of such a plant as *L. pseudo-truncatella* would not reach the interior of the body, but in the case of *L. fulviceps*, if the leaf is turgid, it would be so refracted as to illuminate the interior of the leaf.

Once these pellucid dots or miniature windows were formed on the upper surface the development of the transparent window followed in due course. It can be readily observed that these pellucid dots in *L. terricolor* become larger and eventually interconnected. The result of the gradual increase in size of the transparent area would be the formation of a large, unbroken window.

The development of the window in plants like *L. bella, L. Aucampiae, L. Otzeniana* has apparently proceeded along somewhat different lines, in this particular group no pellucid dots were formed, but the opaque covering gradually became less transparent. At certain specific places transparent lines or areas were formed and these by becoming interconnected eventually produced large open windows. In some cases opaque parts remained as islands in the transparent area. An examination of the window of *L. Franciscii* and *L. Lesliei, L. Venteri* shows that in these cases the semi-opaque covering of the window is being gradually perforated. Small circular areas are free and expose the underlying transparent window.

Size of Plant. The diameter of the leaves furnishes no valuable criterion for systematic purposes as it changes according to the amount of water at the disposal of the plant.

FIGURE 6 · LITHOPS SALICOLA L. BOL.
In habitat. Lückhoff

MARGIN

One can consider the top surface of the two leaves as a circle, the fissure between the two leaves as the diameter. That part of the margin adjoining the fissure is usually more or less straight and can be called the inner margin. The semi-circular part of the margin can be conveniently described as the outer margin. In quite a number of species (*L. Ruschiorum, L. gracilidelineata, L. turbiniformis*) the whole top surface is undifferentiated, as it is of a uniform colour and the texture is such that no distinct margin is visible. In many other species, especially those with a large open window, there is a distinct border to these windows. The margin is as a rule of no great systematic value, although in certain cases the margin is a specific feature of the plant and enables one to identify the species. The following species have a distinct and characteristic margin; (i) *L. optica*, in this species the outer and inner margins meet at the two extremities of the fissure and here a characteristic transparent triangle with the apex pointing downwards has been developed: (ii) the margin of *L. Otzeniana* is laciniated, the outer consisting of 10–12 laciniae, whereas that part of the inner margin along the fissure is only 4–6 laciniated. The individual laciniae are either irregular, triangular, somewhat oblong, obtuse or acute. They are 2–3 mm. in length and about as broad as long. The margin of *L. Otzeniana* is typical of this species and the reader is referred to the photographs. Some of the photographs were taken of this plant in its natural habitat: (iii) the margin of *L. Erniana* has already been noted and the reader is referred to the description of this species and to the coloured drawing: (iv) that of *L. Aucampiae* shows a minute reddish

colouration: (v) *L. Fulleri* also has dark coloured parts in the margin, which are more pronounced than those of *L. Aucampiae*.

As a rule the margins show various degrees of indentation, although in some species, as for example in *L. olivacea*, the inner margin is straight and without markings. In many cases the margins develop laciniae and these are sometimes fairly large and may approximate to teeth. These laciniae project into the window and parts or the whole of the laciniae become separated from the main body, thereby forming islands of various shapes and sizes in the window.

In some species (*L. Dinteri*) there is a narrow band (1-2 mm. wide) of a colour different from that of the rest of the top. In *L. Dinteri* this hand is huff-coloured and runs right round the window, whereas the rest of the top surface is orange-yellow.

GEOGRAPHICAL DISTRIBUTION

In examining the distribution of the genus *Lithops* in the southern half of Africa, one is struck by the following interesting facts:—

(1) The genus reaches on the western side of South Africa its most northern point at Franzfontein, near Outjo, S.W.A., latitude 20° S. (*L. gracilidelineata*), whereas on the eastern side of this subcontinent it only gets as far as Pretoria, latitude 25° 45′ S. (*L. Lesliei*).

L. terricolor is the only species which has migrated furthest south. It is very interesting to note that this species has so far been recorded at various places (Karroo Poort, Ceres, Laingsburg, Steytlerville, Springbok Flats, near Port Elizabeth), all of which, although the two extreme points (Ceres and Port Elizabeth) are hundreds of miles apart, yet lie approximately just a little south of latitude 33° S. Evidently there is some factor which has prevented the species reaching the sea or getting nearer to the sea.

Pretoria, longitude 28° 12′ E., and Bethlehem, 28° 16′ E., are the two most easterly points the genus has reached in its march eastwards. Bethlehem is so far the most easterly habitat so far recorded of the occurrence of this genus. Here again one has the peculiar phenomenon that a single species (*L. Lesliei*) has reached a certain longitude and evidently has not been able to spread further eastwards than this line.

As regards its distribution towards the west of South Africa, the genus has actually reached the seashore in some cases; for example, *L. optica* is found in close proximity to the sea at Lüderitzbucht, *L. Herrei* near the sea at Alexander Bay, *L. Nelii* not far from Cape Cross.

From the above it is apparent that this genus is confined to an area bounded on the north by latitude 20 and in the south by latitude 33. On the east its extreme boundary is longitude 28, whereas its western limit is the sea.

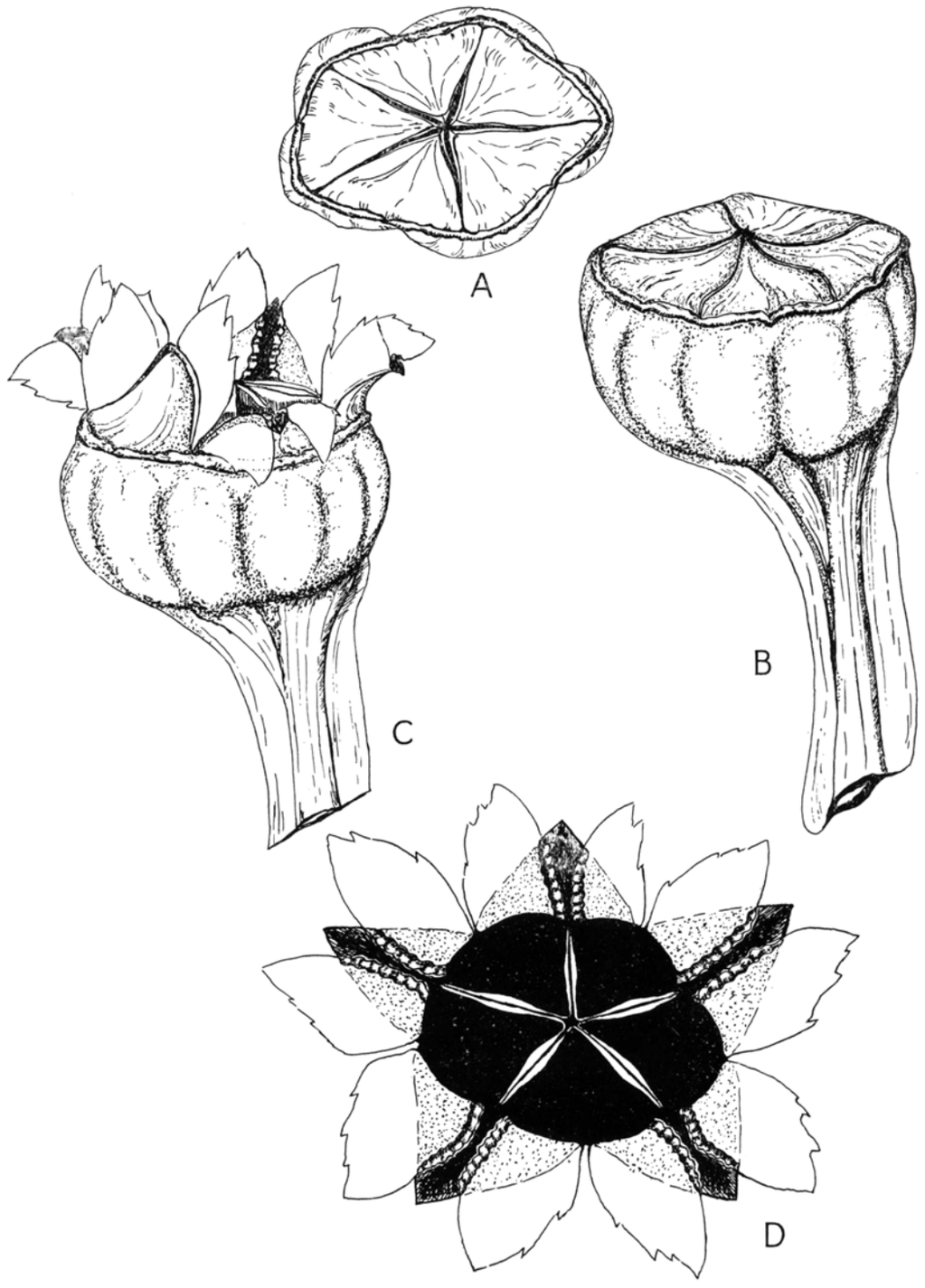


FIG. 12 · DRAWINGS TO ILLUSTRATE VARIOUS STAGES IN THE OPENING OF THE CAPSULE OF LITHOPS VENTERI NEL. A, capsule seen from above; B, capsule from side; C, capsule opening; D, later stage of C.

As will be described later, its main centre of distribution lies on the western side of southern Africa. In the whole central part of this area, usually called the Kalahari, these plants have up to the present not been found, though *L. pseudotruncatella* has advanced to the borders of the Kalahari at Gobabis, S.W.A., *L. Aucampiae* has got as far as Postmasburg from the south, and *L. Aucampiae* as far as Vryburg. The genus reached its most southern point in the Springbok Flats (*L. terricolor*) near Port Elizabeth.

While the genus as a whole has a very wide distribution certain species appear to he confined to small areas. It is probably too early to dogmatise about this, for *Lithops* species grow in the most arid and inaccessible parts of this subcontinent. Even after prolonged and systematic search by trained collectors it is likely to take many years before all is known about the distribution of the genus. Thus far the discovery of new species and of new habitats of known species has often been a mere matter of chance, for except after recent rains many species are exceedingly difficult to find.

(2) A remarkable feature of the distribution of this genus is that it has evidently found within the water basin of the Orange River and its many tributaries ideal conditions for its development. The genus occurs in the basin of the Vaal River and along the basin of the Mossop as far as Windhoek, as well as along the basin of the Fish River which flows southwards through South-West Africa. About three-quarters of the species are found within the water basin of the Orange River and its tributaries. The area from Upington to the mouth on both sides of the river can be considered as the main centre of development of the genus. *L. salicola* is found near Lückhoff, O.F.S.,

FIGURE 7 . LITHOPS SALICOLA L. BOL.

within 13 miles of the Orange River. A very interesting feature is that those species with blood-red markings are mainly confined to the northern Bank. *L. Dorotheae* and *L. Inae* are the only ones so far as is known, which have crossed on to the southern side of the Orange River. These two species have, however, kept fairly close to the river itself and are not found far away from it.

In considering the distribution of *L. Lesliei* we find that it has apparently spread itself along the basin of the Vaal River from Vereeniging through Klerksdorp and Venterstad as far as Warrenton, while one of its outposts is found near Bethlehem on a tributary of the Vaal River. This species also grows near Senekal and at Verkeerde Vlei, O.F.S. The two last-named places are also within the area drained by the Vaal River.

L. pseudotruncatella has a very wide area of distribution and is found everywhere on the higher plains of the Khomas plateau near Windhoek and its eastern extensions, and also in the Eros mountains, S.W.A., and their extensions. This area is more than 5000 square miles. Situated in the middle of the southern boundary is the Rusch Peak, which is 2420 metres high. On this peak *L. pseudotruncatella* also occurs. Dinter described this as an independent species, *L. alpina Dtr.*, although it is quite obviously a dwarf form of *L. pseudotruncatella*. The Khomas and Eros mountain plateaux are broken up by the Windhoek plain. The latter is about 1600 metres above sea level, whereas the former are 1800–2000 metres high. In the Windhoek plain no species of *Lithops* are found. *L. pseudotruncatella* is here more or less confined to heights above 1800 metres.

This species also occurs on the south-western slopes of the Khomas plateau as far as Friedenthal in the West, and even reaches the Namib border. Towards the south it has been found at a height of about 1400 metres. *L. pseudotruncatella* also occurs in the eastern extensions of the Khomas plateau. At Kranzneus on the southern extension of the Auas mountains, this species is frequent at heights of 1750 metres.

Towards the east *L. pseudotruncatella* has followed the south-eastern extensions of the Khomas plateau, Klein Windhoek. Furthermore, it extends eastwards from Klein Windhoek to Onde Karemba, Seeis, and from there to Witvlei up to Heather Bell on the Black and White Nossop, 15 miles east of Gobabis. Its most northern point in South-West Africa is in the Waterberg Mountains. The total area covered by this species is very great as it is more or less distributed in all directions from the main centre, the Khomas plateau. *L. pseudotruncatella* has not only a very wide horizontal distribution, but it is one of the few species which has settled at a height of 2420 metres on the Rusch mountains near Lichtenstein. It is found on the Khomas plateau at an altitude of approximately 2000 metres, and penetrates as far as Witvlei near Gobabis. It has been found in the basin of the Nossop, which flows southwards, and later joins the Orange River. Its most northern outpost is the Waterberg near Otjiwarongo.

FIGURE 8 . LITHOPS GRACILIDELINEATA DTR.
A photo taken near Pforte. S.W.A., but plant cannot be bond.

The distribution of *L. terricolor* is also extremely interesting. This species has spread itself more or less evenly over the Beaufort West continental plain, which lies mainly between the Nuweveld and Swartberg range. It is found near Karroo Poort, Ceres, at Laingsburg and Prince Albert, and reaches its most northerly point near Beaufort West. From Prince Albert it follows the foot of the Swartberg mountains and spreads in a southerly direction to appear near Willowmore, and Miller station, finally reaching a point in the Springbok Vlakte just east of the Cockscomb at a height of 2000 feet. It seems to have been stopped on its southward course by an extension of the Onteniqua mountains. This is one of the few species occurring in the Cape Province which has evidently escaped from the water basin of the Orange River, and it stands in a class by itself. The distance from Karroo Poort, Ceres, to the Springbok Vlakte is approximately 300–350 miles. One fact emerges from this that so far this species has kept to the southern part of the Beaufort plain and has not spread to the centre.

L. gracilidelineata is another species which is found over a distance of approximately 200 miles. It appears near Pforte (Swakopmund), again near the Brandberg, reaching its most northerly limit at Franzfontein, near Outjo.

With the exception of a few South-West African species most of the species of this genus do not overlap in their distribution, in the large area in which *L. Lesliei, L. terricolor* and *L. pseudotruncatella* respectively are found, no other species occur. *L. divergens* is the only species found in the area of approximately 1500 square mile., known as the Knersvlakte, Van Rhynsdorp,

and as soon as one gets on the Loeriesfontein plateau *L. Otzeniana* appears. As already mentioned *L. pseudotruncatella* is found on the Rusch mountains. Another species, *L. Schwantesii*, grows at a height of 2210 metres in the Tiras mountains, South-West Africa.

L. Nelii has also a fairly large wide distribution, but its various habitats are more or less of the same nature, and are confined to a region where rain seldom falls. It is found on the narrow strip, 3–35 miles broad, running parallel with the coast from Cape Cross to the mouth of the Ugab River. This species of *Lithops* differs from *L. Ruschiorum*, to which it is closely related, in that it is only found in brackish soil covered with loose quartz pebbles, whereas *L. Ruschiorum*, together with *Crassula mesembrianthemopsis* and *Anacampseros quinaria*, is found on red quartzite hillocks. The roots of this species, *L. Nelii*, are placed horizontally, whereas those of other *Lithops* species are vertical. As these plants grow in a very arid part of the country, where rain seldom falls, the roots must be situated as near as possible to the surface of the soil to be able to absorb whatever moisture reaches the soil in the form of dew or mist. It appears that these plants live to a great age. Clumps have been found to which no less than 150 remains of dry bodies were attached. If one assumes that on account of the heavy mist prevailing on this part of the coast, a new body was formed every year, then such a plant would be about 150 years old. Most probably the plants are much older, since it often happens that in certain years no growth whatsoever will take place.

A word should be said about the occurrence of *L. salicola*. This plant grows near Lückhoff, O.F.S. and as far as is known in three different localities, two of which are somewhat similar. Dr. Henrici of Fauresmith was good enough to supply the following details about one of the two localities "*L. salicola* grows, wherever I have seen it, on the edge of brak pans, not in their middle, that is to say, at a place where the brak is not yet too concentrated. These pans are probably a few days under water after heavy showers. On these occasions the plants are covered with mud and even by the trained eye of a botanist cannot be discovered for weeks. Later on the surface mass of this mud breaks to pieces, generally in hexagonal pieces (Fig. 5), the edges curve away from the soil, and in the fissures first the plants call be seen. Still later the whole surface crust breaks to pieces and you can again find the plants. I think that something similar happens to *L. Aucampiae* or sub-species I found long ago in the alluvial ground of Bechuanaland. I visited the other day a new habitat of *L. salicola*, about a fortnight after rain, and we had trouble to see a few plants, although the owner told me that there were many, and we were five people to look for them." So far Dr. Henrici. I personally visited the latter habitat at the beginning of the rainy season (November, 1942), and there were thousands of these plants in the pan. You could not put your foot down without treading on fairly large clumps, some of which contained 10-20 bodies, and yet Dr. Henrici had difficulty in seeing any of them after a rain (Figs. 6 and 7). The pan itself is quite exposed

to the prevailing winds, and being fairly level it was quite apparent that the wind would drive some water over the plants growing just on the edge of the water. With a little more water in the pan or just after a rain the plants would be entirely inundated. In winter the pan is usually dry. It should not be inferred from the above that *L. salicola* is confined to these pans. Another habitat has been found at the foot of a koppie not far from Lückhoff, where the ground slopes somewhat steeply and consists of limestone. This habitat is thus much drier than those described above and yet there were large numbers of *L. salicola* to be found there.

MIMICRY

A great deal has been written about mimicry in general, and special reference has been made in this connection to certain *Aizoaceae*, namely *Didymaotus lapidiformis, Lithops, Titanopsis, Pleiospilos*, etc. I wish here to confine myself to the genus *Lithops*. It has been pointed out that in dry weather these plants are embedded in the soil to such an extent that only a very small part of the plant is exposed. This, however, is only true within certain limits, because if the clumps contain 5–15 bodies, then they are raised above the level of the soil. Whether these clumps are sunk into the soil or raised above its level depends entirely on the amount of moisture in the soil. In the dry season the plants are shrivelled, lightly covered with sand or dust and sunk into the soil, whereas after a good rain they are swollen and raised above the

FIGURE 9 . LITHOPS OPTICA VAR. RUBRA.
Showing old and new leaves

soil level and are then more easily seen. In the dry state the novice may walk over them without seeing them. Sometimes they are found embedded in fine limestone or amongst fine quartz pebbles and then they are not easily found. I once made a photograph of *L. gracilidelineata* near Pforte, South West Africa, with a very good and large camera. The plant was growing among quartz pebbles and in the field of vision was a chameleon. This chameleon was used as a kind of landmark and yet when the negative was developed (Fig. 8) I have failed to find the plant, although the print has been examined times without number.

The author has seen a considerable number of *Lithops* in the field and very rarely has one been seen that has been eaten by animals or even shows traces of having been nibbled at. The mimicry protagonists will maintain that that just proves their case, but one fails to see against what animals these plants protect themselves. Protection against undue transpiration is most likely the reason for the sinking of the bodies of these plants into the soil. In any case these plants occur very often singly and would not form adequate nourishment for any animal, how ever small. Frequently one finds *Lithops* species hidden under bushes or aloes (*L. Bromfieldii*). *L. Lesliei*, on the other hand, grows in grassy places and in the summer and in winter is often entirely covered by grass to such an extent that the clump is not visible. The same applies to *L. Aucampiae*. Marloth in his "Stone Plants" refers to *Didymaotus lapidiformis* as being a good example of the extent to which these plants resemble their surroundings. My own experience is that once one has seen a specimen of *Didymaotus* in the field, it can be recognised at a distance of 16 yards, and that is a fairly big distance when it is remembered that the plant itself is only about an inch or two in diameter and not more than half an inch in height above the soil level. Even *Lithops* species are not always difficult to find as is sometimes stated. It all depends on the stage of growth of the plant, whether rain has fallen recently or not and whether the observer has a trained eye. In time of drought the upper surfaces of these plants are level with the dry and dusty soil and frequently covered with a thin layer of dust or very loose soil particles of the same colour as the plant, so that they are then extremely difficult to find.

The question why these plants resemble their surroundings both in form and in colour has not been answered, and it is extremely doubtful whether it will ever be answered. It is, of course, quite easy, as has been done by some, to mount the Pegasus of phantasy and then postulate invisible or mysterious rays emanating from the soil and then influencing the plant to such an extent as to resemble it, but then one would be saying farewell to science and entering the domain of speculation not based on experiment. Why, for example *L. Lesliei* is rust-brown in the reddish soil from ironstone and *L. gracilidelineata* is whitish amongst the white quartz pebbles is a problem which still baffles us. As far as I am concerned, I prefer to say with du Bois Raymond "ignorabimus."

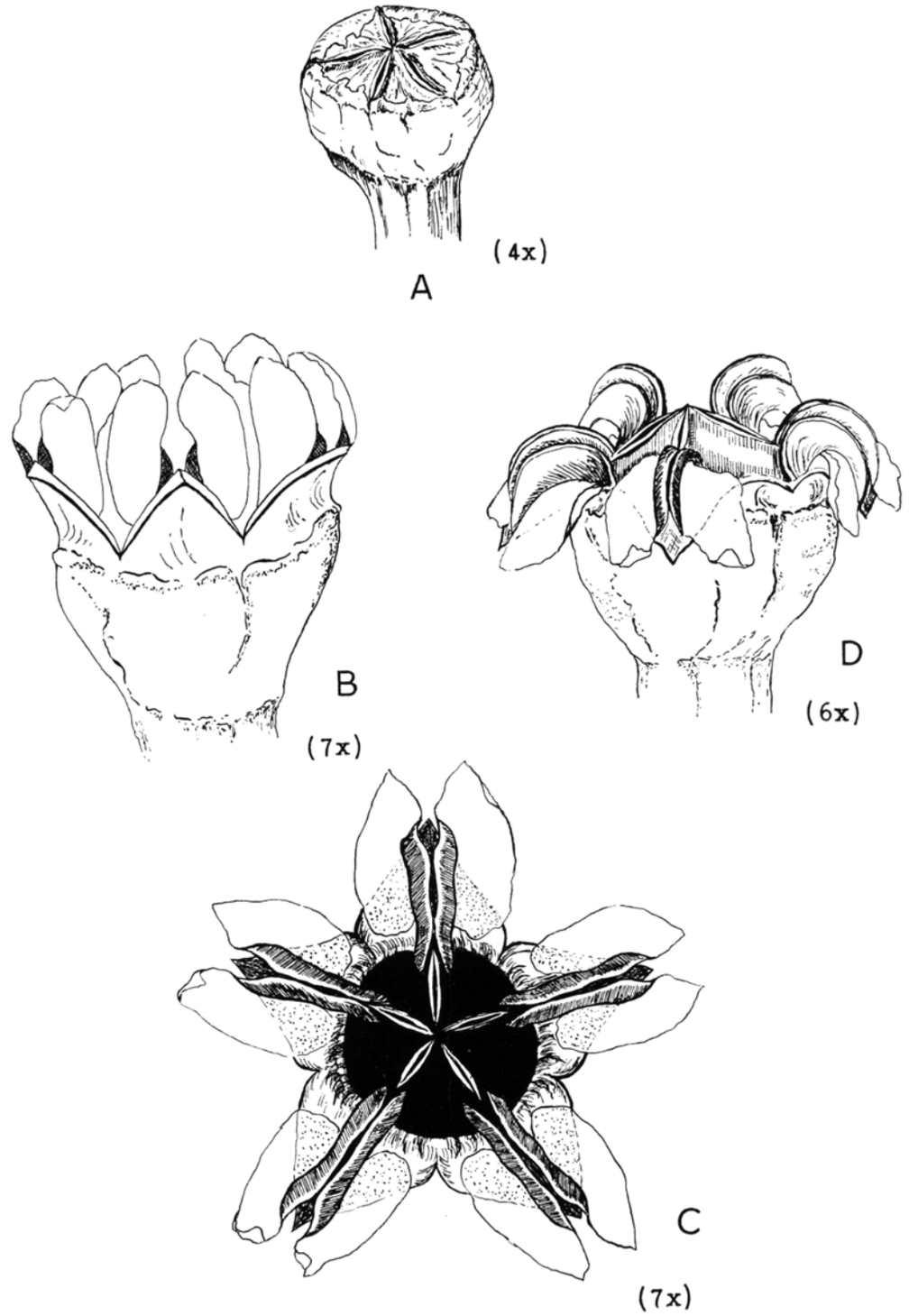


FIG. 13 . CAPSULE OF LITHOPS OPTICA (MARL.) N.E. BR. A, closed; B, in process of opening; C, later stage of B; D, fully opened, showing recurved wings and keel.

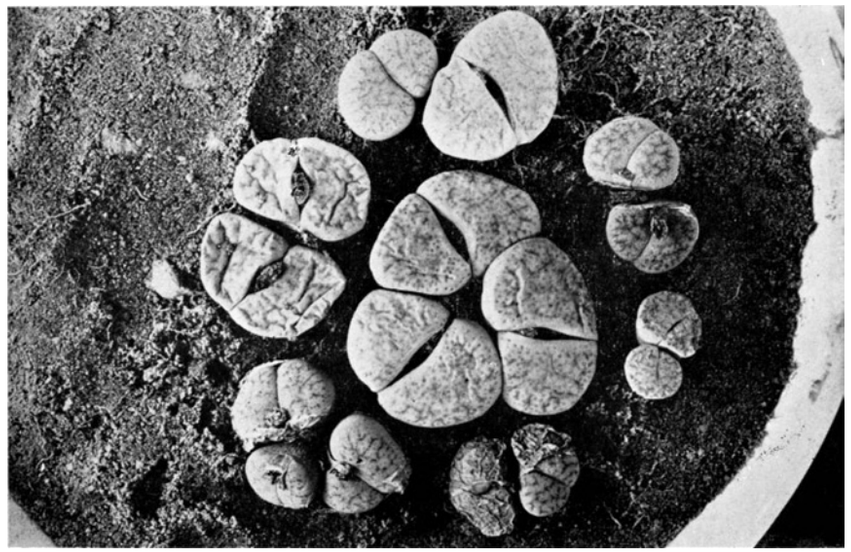


FIG. 10 . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

PROBLEM OF DETERMINING SPECIES OF THE GENUS

The delimitation of species in this genus is complicated by the fact that the flowers of the various species show such little variation that they cannot he used to any extent for purposes of classification. It is true that the colour of the flower might be used, but whether this is a sufficient or safe character to go by I am not prepared to say. It is well-known that flower colour frequently, depends on the kind of soil in which the plant grows. *L. Helmuti* is a very distinct species. As has already been stated it has a yellow flower and yet a white-flowered form has been recorded. Is one justified in creating a new species on this evidence alone? Another objection to the use of flower colour in the delimitation of species is that these plants are usually found in the vegetative condition and it sometimes takes years before they flower. I have therefore discarded the flower as a systematic character and have preferred to use the upper surface of the leaf for purposes of classification. I do not want for a moment to say that the character chosen is absolutely satisfactory, but what character is ? After all, our whole conception of species is a subjective one. Some have a narrow idea of species and others prefer to draw a wider ring to include many different plants in a single species. It sill be noticed that I have not mentioned—or at least only casually—the size of the plants. So far as I can judge there is only one species, *L. Nelii* which is characterised by its small size. The size of a succulent depends to a great extent on the amount of water available. If the water supply is low the plants are shrivelled and small, whereas after a rain these same plants are larger, and one would hardly believe them to be the same wilted plants seen

a few weeks ago. I have seen the collection of an enthusiast, who believed in feeding his plants with water. When viewing these plants from a distance I would not have taken them for a *Lithops*, but would have thought that they were *Pleiospilos Bolusii*, so abnormally large were they. It stands to reason that under such circumstances size can be no guide whatsoever in determining species in this genus.

Dinter and Tischer have attempted to form no less than four species out of *L. pseudotruncatella*. Dinter has even gone so far as to weigh the seeds of *L. pseudotruncatella*, and his species *L. alpina* is based partly on the weight of the seeds. He found that the individual seeds of the latter weighed 0·118 mg. and those of the former 0·226 mg. The length of the seed of *L. alpina* he found to be 0·9 mm. and that of *L. pseudotruncatella* 1·1 mm. He evidently forgot that the weight of a seed is a very fluctuating quantity and that if one had to adopt such criteria there would be no end to the species of this genus. I have had quite a number of specimens of Dinter's *L. alpina* sent to me and have found that this smaller variant of *L. pseudotruncatella* is not confined to one particular spot on the Rusch mountain, but that it also grows elsewhere. Tischer on the other hand has described a new species *L. Mundtii*, solely because the plants so named were much larger than is usual in *L. pseudotruncatella*.

Three plants were sent to me under the name *L. Mundtii*, each of which was made up of two bodies. The actual measurements were as follows:—

(A)	3·5 × 2·6 cm.	3·3 × 2·3 cm.
(B)	2·8 × 2 „	2·3 × 1·7 „
(C)	2·8 × 2·2 „	2·4 × 1·7 „

A consignment of 193 plants (only 157 could be used) of *L. pseudotruncatella* was sent to me from the same locality near Windhoek. These were divided according to the size, *i.e.* diameter of body, into the following groups:

0·5–0·7 cm.	10	plants
0·7–0·9 „	23	„
1·0–1·1 „	58	„
1·2–1·3 „	57	„
1·3–1·5 „	6	„
1·5–1·7 „	3	„

The plants were collected during July, that is in the resting stage. During the summer or rainy season they would be slightly larger. The reader is referred to Fig. 10 which represents a cluster of these plants, one from each of the above groups. It illustrates quite clearly that one cannot use size to determine a *Lithops* species.

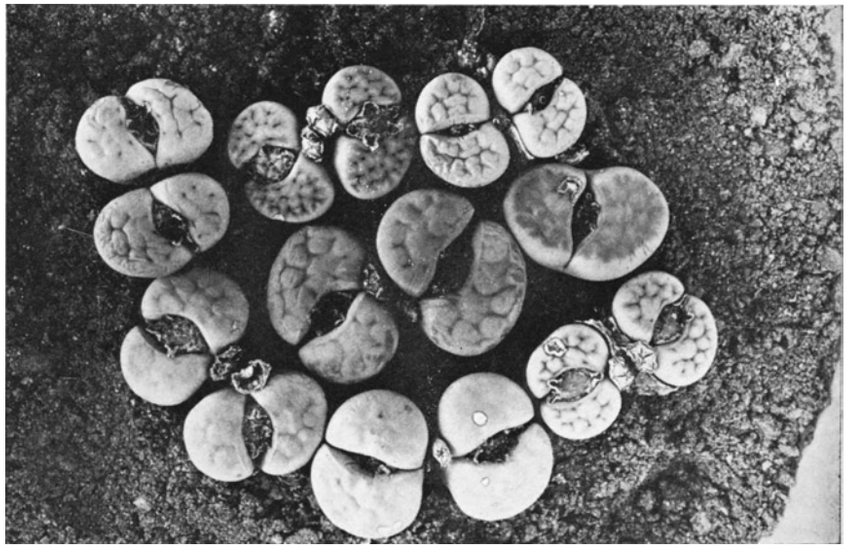
Samples of *L. pseudotruncatella* were sent from Heather Bell, near the Schwarzen Nossop (Gobabis), some of which had a diameter of 5 cm. It must not be forgotten, however, that these plants grow in sandy soil and that this would account for their abnormal size. For the size varies according to the locality in which the plant grows and the time of the year in which it is

collected. Dinter's *L. alpina*, on the other hand, grows at a height of 2420 metres, and in a rock ledge, thus its small size would appear to be the result of its habitat.

In the past authors have frequently made the mistake of describing a new species from one specimen only or from very meagre material. *L. terricolor* has a very wide distribution, and an attempt has been made to form a species *L. Peersii*, which is supposed to differ from the typical *L. terricolor* in certain respects. I had a consignment of about 400 plants from one and the same place sent to me, and it was evident that one could divide these plants into as many species as there were gradations in the colour of the top surface An examination of the colour plates of this species will make clear what is meant. A study of various specimens of *L. terricolor* in the field has borne out my contention that there is only one species, somewhat variable, and if an attempt were made to split this up into several species it would be exceedingly difficult if not impossible to find for these constant distinguishing characters.

Dinter has attempted to create a new species *L. summitata*, which is supposed to differ from *L. karasmontana* in certain respects. If one accepts Dinter's method of delimiting species of this genus then one might just as well give up any attempt to classify or name plants belonging to it. In his own photograph, published in Moellers Deutsche Gaertner Zeitung Nr. 27 (1927) p. 102, it is quite evident that he has two kinds of plants on the same plate both of which he called *L. summitata*. The one on the extreme left has very decided darker colouration in the depressions than the others.

FIGURE 11 . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.
Showing the degree of variation in size and texture of upper surface



He goes on to say that *L. summitata* is "hellgrau-blau am Kegelteil" and *L. karasmontana* "taubengrau-blau." This assumes that there is a definite colour called taubengrau-blau. It is clear that these fine differences in colour cannot possibly be used to distinguish species. Dr. Geyer, who had collected *L. karasmontana* and the so-called *L. summitata*, was asked by me to divide his fresh material into as many groups as he could, based on the difference in colour of the top surface. He found seven groups all more or less connected with one another (Fig. 11). If one mixed them and were asked to pick the members of the various groups, a different grouping would result in which the groups would not contain the same plants as before. Dinter asserts that the weight of the seed of *L. summitata* is 0·072 mg. and that of *L. karasmontana* is 0·064 mg. That is driving the art of distinguishing species to a very fine point indeed. To my mind there is only one species *L. karasmontana*, and I have come to this conclusion after examining plants from each of two localities in which *L. karasmontana* and *L. summitata* were found.

KEY FOR DETERMINING THE SPECIES

Only a few words are necessary concerning the key submitted here. As has already been stated the flower is of no help in the delimitation of species in the genus. One is therefore reluctantly compelled to use the nature and colour of the upper surface of the leaves for purposes of classification, although it is realised that the key based on one organ and that the leaf can never be entirely satisfactory.

The genus can conveniently be divided into two sections; (I) *Afenestratae* and (II) *Fenestratae*.

The first group consists of all those species in which the upper surface appears to be opaque though in reality it lets enough light through for the plants to thrive. The species of this group, with the exception of *L. Meyeri, L. turbiniformis, L. divergens, L. verruculosa* and *L. Van Zylii*, are all found north of the Orange River and are inhabitants of South-West Africa. With the exception of *L. divergens* they all grow in the neighbourhood of the Orange Riser itself.

The second group *Fenestratae* includes those species in which the upper surface is either entirely transparent or is perforated by transparent pellucid area. The key will unfortunately not enable one to determine satisfactorily certain species and in that case use should be made of the photographs and coloured plates. In the case of some species the differences are quite obvious, if the plants are placed alongside one another, but it is very difficult if not impossible to describe these differences in words.

Ernst Rusch, an enthusiastic collector of succulents in South-West Africa, found on examining seedlings of *Lithops*, that he could divide them into two distinct groups, viz.; (A) the fissure is localised in the form of a small aperture in the centre of the two leaves, and (B) the fissure separates the

two leaves entirely. Dinter extended this rule to a more general one that all seedlings with a circular opening (*Schlitzkeimlinge*, Group A) were those of species with white flowers, whereas the seedlings with a fissure separating the two leaves (*Spaltkeimlinge*, Group B) belonged to plants with yellow flowers. Unfortunately Dinter and Rusch only examined about 28 then known species and these mainly from South-West Africa. The 28 species enumerated by Dinter must be considerably reduced in number, as there are a number of synonyms amongst them. Whether this rule can he upheld for all species is a question which the future must decide.

Dinter states that the correct time to determine whether the plant or seedling belongs to one or other of the above groups is from the three weeks old stage until just before the cotyledonary leaves (first leaves) dry up.

Dinter gives a list of the following plants whose seedlings Rusch and himself had examined;

Group A (yellow flowers, seedling with circular opening)

L. Comptonii	*L. kuibisensis*	*L. Ruschiorum*
L. Dinteri	*L. kunjasensis*	*L. Schwantesii*
L. fulviceps	*L. olivacea*	*L. urikosensis*
L. Franciscii	*L. pseudotruncatella*	*L. Vallis-Mariae*
L. gracilidelineata		

Group B (white flowers and fissure)

L. bella	*L. Eberlanzii*	*L. Fulleri*
L. karasmontana	*L. optica.*	

This list is a modification of the one given by Dinter. The synonyms have been omitted.

DESCRIPTION OF GENUS

Body single or forming clumps of 2–20, embedded in the soil, usually 2–6 cm. in diameter, turbinate: top surface plain, convex, oblique-convex or obconical: top surface forming large transparent areas often reduced to minute impressed lines or dots, sometimes only transparent miniature windows raised or embedded in the body: window sometimes with few or many islands or covered with an opaque covering perforated by circular openings: window very often bordered by a narrow buff band: top surface plain or rugose, with or without darker coloured impressed lines, with or without red to dark-red lines or dots embedded in the body or raised above the surface: sometimes warts between the elevations, sometimes with dendritic markings: window with or without a laciniated or denticulated margin, margin sometimes absent or inner margin straight, or with a triangular clear part at junctions of two margins: colour of top surface white-creamy white, grey-white, yellowish-white, yellowish, green, green-white, pink, reddish to purplish (Figs. 12 and 13).

Flower single produced between the pair of leaves in the fissure: calyx not membranous, usually 4–7 lobed, slightly exerted above the leaves, no tube above the ovary: corolla with many petals, yellow, white, white with a tinge of orange, 1–4 seriate, linear, obtuse, rotund or with a notch at the apex: stamens many, erect in a column, lower part of filament sometimes papillate: ovary inferior 4–7 locular, placentas on outer walls or floor of loculi: ovules many: style short or almost absent, stigmas 4–7, filiform: capsule 4–7 locular with 4–7 valves, valves with one stout central expanding keel, split at the apex, wings membranous: seeds minute with a nipple at one end, round or rotund, smooth or rugulose, coloured dark brown or partly dark brown and opaque or one part transparent.

VOORWOORD

Die oningewyde wat deur die Karoo en die Suidelike dele van Suidwes-Afrika reis en dan die veld deur die venster van 'n spoorwegwa of motorkar beskou, sal 'n indruk kry van verlatenheid en dorheid. Die plante wat hy sien is onaantreklik, en die veld skyn uit groot kaal kolle met hier en daar 'n droewige bossie te bestaan. Vir die plantkundige, egter, is juis die kaal kolle dikwels die plekke wat hy die eerste besoek, want hier is soms plante te vinde wat nie net uiters interessant is nie, maar waarin hy juis belangstel.

Aan die skrywer is 'n plek, bekend, omtrent 'n 100 tree van die hoofpad en in die onmiddellike omgewing van 'n dorp, waar daar 'n taamlike groot kolonie *Lithops* woon en die kolonie is maar aan min mense bekend. Onder die enkele bossies, tussen die splete van die klipriwwe en op die kaal kolle, is daar vir die plantkundige die juweeltjies. Die geslag *Lithops*, wat die tema van hierdie boek vorm is één van daardie juweeltjies.

Laat ons sien wat die gemoedstemming is van iemand wat wel nie 'n beroepsplantkundige is nie, maar wat self 'n planteliefhebber is en al baie in die veld na *Lithops* gesoek het. Ek haal aan uit 'n brief van hom: „Daar is vir my iets baie aantrekliks in *Lithops*. Die aanpassing is so eienaardig en waar hulle groei so aanlokkend, dat 'n soektog vir *Lithops* vir my altyd iets is met die atmosfeer van 'n avontuur—'n soektog as 't ware na skatte, wat ervaring en ondernemingsgees nodig het. Skatte van lieflikheid. Dan, die vele soorte is verbasend, aangesien die verskil in vorm en grootte tussen hulle nie groot is nie of kan wees nie." Die skrywer van hierdie brief is dr. J. Lückhoff, 'n hoogstaande spesialis in Kaapstad.

Die monografiese bewerking van 'n geslag behoort eintlik eers onderneem te word as al die gegewens oor die geslag beskikbaar is. Soos dit maar te dikwels gaan, is die kloof tussen die ideaal en die werklikheid maar baie breed. In hierdie spesifieke geval is dit nog des te meer waar, want hierdie geslag bewoon dele van ons land wat nie net ver van die beskawing af lê Die, maar wat ook moeilik toeganklik is. As iemand hom dit dus ten doel stel om al die nodige informasie vir die monografie eers in hande te kry, dan sou daar nie net baie jare verstryk nie, maar dit is hoogs twyfelagtig of dit moontlik sou wees om alles bymekaar te kry in die loop van die kort menslike lewe. Al weet die versamelaar waar die plant groei, is hy nie altyd seker dat hy die plant daar sal vind nie, want as daar 'n droogte heers is die plante moeilik om te sien en soms glad nie te sien nie. Om hierdie punt te verduidelik mag ek net verwys na *L. brevis*. Hierdie plant is jare gelede op 'n sekere plek naby Vioolsdrif, Oranjerivier, ontdek. Mnr. P. van Heerden, Prinsipaal, Hoër Skool, Springbok, het op my versoek onderneem om die plant te gaan

soek. Dit is hom geluk om die kleurling, wat destyds teenwoordig was toe *L. brevis* die eerste keer gevind is, op te spoor. Hy is toe met die kleurling na die betrokke koppie en alhoewel hulle die koppie kruis en dwars deursoek het, kon hulle *L. brevis* nie vind nie. Dit was toe bitter droog. 'n Jaar of wat later, nadat dit in die omgewing goed gereën het, is mnr. Van Fleerden weer daarheen en op die koppie het hulle hierdie keer die plant gevind. Die kleurplaat en die portret is van plante wat hy destyds aan my gestuur het.

Selfs al het 'n mens die plante, dan gebeur dit dikwels dat hulle doodgaan, voordat hulle geblom of saad gevorm het. Die gevolg is dus dat die monografie op onvolledige gegewens moet berus. Hierdie bewerking, hoewel die skrywer al by die twaalf jaar besig is om die geslag te versamel en te bestudeer, bly nog onvolledig. Die volledige verslag moet dus aan die toekoms oorgelaat word.

Hierdie boek sou nooit verskyn het nie, as dit nie was vir die hulp wat die skrywer van verskillende persone ontvang het nie. Ek wil hier my opregte dank en waardering uitspreek aan die Kuratore van Het Jan Marais Nationale Fonds. Die Kuratore het my gulhartig finansiële ondersteuning verleen, nie net by die maak van die gekleurde tekeninge nie maar ook deur die beskikbaarstelling van 'n aansienlike bedrag vir die publikasie van die boek. Hulle het hier wesentlik bygedra tot die bevordering van die kennis van die plante van ons land. Aan die Edelagbare Minister van Onderwys wat op aanbeveling van die Navorsingsraad 'n aansienlike som toegesê het vir die uitgee van die boek, my hartlikste dank. Aan die Navorsingsraad wens ek ook my dank uit te spreek vir sy hulp.

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Mnr. W. Giess, vir die maak van tekeninge.

Dr. C. S. Grobbelaar, Stellenbosch, vir die nasien van die Afrikaanse teks.

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Ten slotte, my opregte dank aan die Universiteit van Stellenbosch vir geldelike ondersteuning en die bereidwilligheid om hierdie werk onder sy naam uit te gee.

G. C. NEL.

Junie, 1946.

INLEIDING

DIE naam *Lithops* kom van die twee Griekse woorde lithos 'n klipsteen, en ops, aangesig. N. E. Brown het in 1922 hierdie plante *Lithops* genoem, omdat hulle, soos hy dit self gestel het, in vorm en in kleur in ooreenstemming is met die gesteentes en ronde klippies waartussen hulle groei. Die genus behoort tot die *Aizoaceae*, 'n familie wat in die droeëre streke van Suid-Afrika en Suidwes-Afrika goed verteenwoordig word deur 'n groot verskeidenheid van plante. Die gewasse wat in Suid-Afrika algemeen bekend is as „Vygies", was vroeër almal saamgevat in een enkele genus, nl. die genus *Mesembryanthemum*. Dis veral aan die ondersoekings van N. E. Brown in Engeland en G. Schwantes in Duitsland te wyte dat hierdie genus tans in naastenby 140 verskillende genera opgesplits is; een daarvan is die onderhawige genus *Lithops*, populêr bekend as beesklou, toontjies.

Burchell het in sy reisbeskrywings (1821) die ontdekking van 'n plant wat 'n een later geblyk het die eerste *Lithops* te wees as volg beskryf: „Met die opneem uit die klipperige grond van, wat na vermoeding 'n eienaardige afgeronde klippie was, het dit geblyk dat dit 'n plant is, en daarby 'n nuwe soort en 'n toevoeging tot die getalsterke genus *Mesembryanthemum*; maar wat sy kleur en voorkoms betref was hy wesentlik in ooreenkoms met dié van die klippe waartussen hy gegroei het." Hy het 'n tekening daarvan gemaak, en op grond van daardie tekening het Haworth die plant *Mesembryanthemum turbiniforme* genoem, en as volg beskryf: *Planta acaulis, obconica, superne truncata obscura punctata*. Die naam was later deur N. E. Brown tot *Lithops turbiniformis* verander. Hierdie plant was deur Burchell ontdek op die 14de September, 1811, te Zandvlei in die distrik Prieska (Fig. 1). Meer as honderd jaar het verbygegaan voordat hy weer ontdek was deur Pole Evans op min of meer dieselfde plek waar Burchell dit gevind het. Die tweede en volgende soort wat beskryf is, het Berger in 1908 *Mesembryanthemum pseudotruncatellum* genoem. Hierdie soort is in Damaraland, Groot Namakwaland, ontdek, in die omgewing soos ons nou weet, van Windhoek. In 1912 het Mnr. Leslie 'n plant naby Vereeniging ontdek wat deur N. E. Brown na die ontdekker daarvan, *Mesembryanthemum Lesliei*, genoem is. Hierdie vroeë ontdekkings bewys dat die genus 'n baie wye verspreiding het—trouens Windhoek en Vereeniging lê baie ver van mekaar, en albei is ongeveer 500 myl van Prieska af.

Gedurende die tydperk 1920–1933 is 'n groot aantal soorte in die Unie van Suid-Afrika sowel as in Suidwes-Afrika ontdek.

Kurt Dinter, die onvermoeide versamelaar, verdien hier vermelding want dit is vernaamlik aan sy ywer te danke dat ons kennis van hierdie genus so aanmerklik toegeneem het. Onthou moet word dat hy sy versamel-

togte met kar en osse en onder veeleisende toestande gemaak het, aangesien die meerderheid van die Suidwes-Afrika-soorte in die allerdroogste dele van daardie dor landstreke voorkom. As iemand na *Lithops*-soorte soek, dan is 'n kennis van die land noodsaaklik, want van alle plante is hulle miskien die moeilikste om op die veld uit te ken. In die droë toestand sal 'n mens al lopende op hulle trap sonder om hulle raak te sien.

Elke individuele plant (3) bestaan uit min of meer dig teen mekaar sluitende blare op 'n kort stammetjie. Die totale deursnee van 'n plant varieer van naastenby 0·5 tot 5 cm. Laasgenoemde maat geld alleen vir uiterste gevalle. By sommige is die twee blare deur 'n smal spleet van mekaar geskei, by andere staan die twee lobbe, ten minste by gevorderde leeftyd, stewig weerskante toe uit en raak mekaar nie (*L. divergens, L. Comptonii, L. Helmuti*).

STAM

Soos reeds vermeld bestaan iedere plant uit twee of meer teenmekaar sluitende blare op 'n kort stammetjie waarvan die deursnee rond is. Die lengte van 'n internodium, die sogenoemde aanhegtingsone, is ongeveer gelyk aan die dikte van die blaar. Die stam is dus nie vry nie; hy kom alleen vry na die sappige blare verkrompel en dood gegaan het. Die oorblyfsels van die ou blare is droog en papieragtig en hulle beskerm die jong blare gedurende die vroeë groeistadia.

In die jeugstadium vertak die stam nie by sy groeipunt, d.w.s. aan die basis van die spleet, nie, maar 'n nuwe paar blare word gevorm, waartussen die groeipunt ingesluit lê. Hierdie blare word deur die oorspronklike saadlobbe beskerm. Die blare is teenstandig en afwisselend met die ou blare en sit op die stam net teenoor die ou blare, wat wegdroog en verdwyn na die nuwes ontwikkel bet. Op hierdie wyse bring die groeipunt jaarliks 'n paar blare voort wat kruisstandig is tot die vorige en dié wat sal volg.

Die blom wat op later stadium uitkom, word eindstandig gevorm, en weerskante daarvan kom 'n paar nuwe blare tot ontwikkeling.

DIE BLAAR

Die twee blare tesame liet die vorm van 'n ge-ïnverteerde keel waarvan die basis aan die begin blootgestel is en die apeks in die grond ingebed lê. Ons kan die basis van hierdie keëlvormige struktuur die top en die sye die mantel noem. Vir die klassifikasie-doeleindes is die basis uiters belangrik. Die mantel is byna ondeurdringbaar vir water, en baie min lig bereik hom daar by direk in aanraking is met die grond. Net onder sy oppervlakte is 'n laag weefsels, die chlorenchyma of voedselvormende weefsel. Die sentraal geleë weefsel van die ge-ïnverteerde keel is deursigtig en dien vir die opberging van water; al na die graad van die turgiditeit is die keel ook binne sekere perke aan verandering van vorm onderworpe. Fig. 2 gee ons 'n idee van die

algemene hou van die plant as geheel. Deur die insinking in die grond word die plante teen uitdroging beskerm.

Die top van elkeen van die twee blare wat tesame die keëlvormige struktuur uitmaak, waarvan hierbo melding geinaak is, is min of meer rond of halfmaanvormig, en die oppervlakte kan ondeurskynend of onvolkome tot volkome deurskynend wees.

Walter (4) het die vogtigheid bepaal wat deur *Lithops salicola* opgeneem en afgegee word. Hy het gevind dat 'n groot plant 11·50 gram in gewig, ten volle blootgestel aan die son, nouliks 0·1 gram in 15 dae, en 'n ander van 4·395 gram in dieselfde tydperk 0·2 gram verloor het. Hy het ook die hoeveelheid water bepaal wat deur die wortels van hierdie plante opgeneem word. Deur 'n plant in water te plaas sodat net sy wortels bedek is, het hy gevind dat 'n plant van 23·95 gram in 15 dae 3·3 gram water opgeneem het. Deur 'n klein snytjie aan die basis van die plant te maak en dit weer in die water terug te plaas het hy gevind, dat hierdie plant 7 gram water vir 24 uur opneem. Dit blyk dus dat die hele plantoppervlakte, die wortelsisteem inkluis, feitlik ondeurdringbaar is vir water. Walter het ook kon vasstel dat 'n plant wat geheel en al onder water gedompel as, nouliks 0·1 gram per dag in gewig toegeneem het. Die opname van water het vermoedelik deur die pasontwikkelde en nie deur die ou wortels plaasgevind nie.

Hierdie beskerming teen die verlies van water is vir die plant uiters voordelig, want die meeste soorte van hierdie genus groei in die allerdroogste streke waar die relatiewe humiditeit van die atmosfeer baie laag is en onder dergelyke toestande sou hulle al hul vogtigheid kwytraak, was dit nie dat hulle teen waterverlies beskerm word nie. Afgesien van die lae vogtigheidsinhoud van die lug kom daar in hierdie streke dikwels ook reënlose periodes van 12–20 maande voor.

Dit is algemeen bekend dat groenplante afhanklik is van lig vir die opbou van hul voedsel. In hierdie genus lê die plant in die grond ingebed; as die blootgestelde oppervlakte groen is, dan sal die lig nie tot diep in die weefsel kan deurdring nie en die groenwording van die onderliggende selle sou dus verhoed word. As die chlorofiel beperk sou wees tot die blootgestelde boonste oppervlakte van die plant dan sal dit op 'n vermindering van blaaroppervlakte neerkom, en die energie wat die plant uit die sonstrale kry vir die opbou van plantevoedsel sal baie gering wees. Deur 'n vergroting van die boonste blaaroppervlakte sou hierdie moeilikheid uit die weg kon geruim word, maar dit sal die gevaar van uitdroging verhoog en die verwarming van die planteliggaam teweegbring, veral omdat hierdie plante ingebed sit in grond, wat aan die volle strale van die son blootgestel is. Op 'n baie interessante (vernuftige) wyse is, by species van *Lithops*, 'n uitweg uit hierdie moeilikheid gevind. Die chlorofielbevattende selle vorm 'n laag aan die binnekant van die mantel en lê dus grotendeels onder die grondoppervlakte; al die lig wat hulle bereik moet dus van ho, deur die top, die plant se „venster", kom (Fig. 3). By sommige soorte *L. optica, L. olivacea, L. marmorata* is die topoppervlakte deurskynend, by andere *L. fulviceps* het dit 'n voorkoms van 'n aantal miniatuur-venstertjies, klein deurskynende openinkies deur ondeurskynende weefsel van mekaar geskei; by andere *L. Meyeri* weer laat die ondeurskynende oppervlakte tog nog genoeg lig deur vir die behoefte van die plant. Schanderl het gevind dat in die geval van *Fenestraria rhopalophylla*, waar die vensters ooreenkom met dié van *L. optica* en *L. olivacea*, 90–91·5 persent van die invallende lig deurgelaat word, en dat op 'n diepte van 17 mm. slegs diffuse lig voorkom-met ander woorde die deurskynende venster laat 'n baie aansienlike hoeveelheid lig deur.

In verband met *Lithops terricolor* wat 'n voorbeeld is van die tweede tipe is Schanderl se bevindings as volg:

wit lig	35·8%	rooi-infra rooi	44%
geel tot rooi	42·0%	blou groen	24%

Lithops kunjasensis 'n plant met 'n oënskynlik ondeurskynende top:

wit lig	48%	rooi-infra rooi	55%
geel tot rooi	44%	blou groen	24%

Die ondeurskynendheid van die boonste oppervlakte moet vermoedelik toegeskryf word aan die vorming van anthocyan in die selsap, die afsetting van kalsiumoxalaat in die selwand en die ophoping van kalsiumkarbonaatsaampaksels wat self rooi gekleurd is. Hierdie stukke saamgepakte kalsiumkarbonaat verdwyn as verdunde soutsuur bygevoeg word, en die selinhoud word feitlik deurskyneud. Veranderings in die sel en selwand gaan gepaard met 'n afname in die intensiteit van die lig en dis slegs 'n diffuse lig wat na binnetoe deurdring. Hoewel deur die grond bedek, kan die plant nog sy eie voedsel vervaardig onder vrywel gunstige toestande. Op hierdie wyse ingerig, is hy in staat om sy bestaan te bestendig ten spyte van die heersende ongunstige toestande in sy woonplek.

Dinter het die temperatuur van 'n species van *Lithops* te Lichtenstein naby Windhoek, S.W. Afrika gemeet, en dit het op 56·2° C. te staan gekom, terwyl die temperatuur van die omliggende klipperige grond tien grade hoer was. In die somer het hulle bogemelde temperatuur te verduur, en in die winter daal die temperatuur weer van 8-10° onder die nulpunt van die Celsius skaal. Behalwe hierdie temperatuuruiterstes het hulle 'n wolklose hemel te dulde en moet lang periodes droogte deurstaan.

Die top van die blaar is plat (*L. olivacea, L. Lesliei*), konveks (*L. Ruschiorum*), of skuinskonveks (*L. Meyeri, L. divergens*). Die graad van platheid of konveksiteit is by die individuele plante baie veranderlik, dit is afhanklik van die hoeveelheid water wat op enige besondere fase van sy lewe vir hom beskikbaar is. In hulle natuurlike woonplek is die top van die meeste soorte min of meer plat, behalwe by diegene wat tot die skuinskonveks groep behoort. Na 'n deurdringende reën is die top min of meer konveks. Hier egter,

in hulle natuurlike woonplek, is plante ook al teengekom met ’n effens konkawe voorkoms. So’n vormverandering val min of meer saam met ’n rusperiode tydens of na ’n langdurige droogte, wanneer hulle bul ingekrimp en tot onder die oppervlakte teruggetrek bet. Wanneer hulle hierdie stadium bereik bet, dan is dit baie moeilik om hulle op te spoor, want hulle lê min of meer bedek onder, ’n dun laag stof en is dus maar ten dele sigbaar; nog meer, sy kleur kan noueliks onderskei word van dié van die lagie sand wat bom bedek.

Word bierdie plante dwarsdeur die jaar gekweek in plekke byvoorbeeld in Europa, Wes-Kaapland of naby die kus waar die relatiewe humiditeit boog is, dan is bul geneig om langer te word en bokant die oppervlakte uit te steek. Vorm en voorkoms is dan heeltemal anders as die gewone. In sulke gevalle moet ’n mens baie omsigtig te werk gaan, as jy die species van ’n plant wil bepaal op grond van die graad van sy konveksiteit of van enige ander kenmerke, want dit kan wees dat hulle onder ’n gewysigde omgewing baie uitgeswel en ronder geword bet.

Die top is gelyk of in mindere of meerdere mate gerimpeld. Die twee uiterste gevalle *L. turbiniformis* en *L. verruculosa*, waar die hele top sterk geplooid is, sodat die oppervlakte in talryke kronkelende aanmekaar verbonde bindings en groewe verval het. Plante soos *L. olivacea* het ’n gelyke oppervlakte. Aan die anderkant weer is *L. salicola*, waar die oppervlakte gewoonlik gelyk is maar ook in mindere of meerdere mate gerimpeld kan wees. Om ’n juiste beeld van al die verskillende wysings van die topoppervlakte aan die leser voor te skilder, sal dit nodig wees om ieder afsonderlike species opnuut te beskryf; derhalwe word by verwys na die beskrywing van die individuele soorte, na die verskillende fotos en gekleurde plate.

Die kleur van die top word ook gekenmerk deur ’n verskeidenheid kleurvariasies, en uit geen beskrywing, hoe gedetailleerd ook, kan iemand ’n helder en juiste begrip kry van die voorkoms van hierdie interessante en betowerende plante nie. Die taal van die mens is veel te arm om hierdie keurige kleurskakeringe na verdienste te beskryf.

Nie alleen verskil die een blaar van die newenstaande blaar in ’n paar nie, maar daar ook is ’n aansienlike mate van variasie tussen die blare wat sonder uitsoek geneem word van plante, wat tot dieselfde species behoort en in een en dieselfde kolletjie groei. *L. salicola* staan by die duisende op twee plekke wat nagenoeg tien myl van mekaar is, as die top naamlik die graad van sy platheid, konveksiteit of deurskynendheid, as maatstaf vir die geldigheid van die species sou moet dien, dan sou ons in staat wees om bier tien tot twaalf tipes te beskryf. By nader ondersoek blyk dit egter, dat daar tussen die twee uiterstes die deurskynendheid en die ondeurskynendheid, alle oorgangsvorme voorkom tot by die half deurskynendes—’n bewys van hoe die een trapsgewys in ’n ander oorloop. Oënskynlik oefen die tint en gesteldheid van die grond ’n belangrike invloed uit op die toekomstige kleur van die top.

Die belangrike rol wat kleur in die bepaling van ’n soort speel, moet nie onderskat word nie, maar dit skyn dat sommige outeurs ’n te groot waarde aan hierdie elenskap geheg het. Nie alleen vind ’n mens dat die kleurintensiteit van die volwasse plant varieer en dat hy minder of meer gekleurd kan wees nie, maar tussen die jong plant en dieselfde plant op ’n later stadium is daar so ’n aansienlike verskil in voorkoms, dat ’n mens hulle allig as aparte species kan beskou.

Die wat rooi vlekkies het, is geneig om die vlekkies te verloor, of die intensiteit van die rooi kleur mag so verander het, al na die blare ouer word, dat ’n mens beswaarlik kan aanneem dat die plante spesifiek identies is. Dikwels word die half-deurskynende, donkergroen gespikkelde plekkies, of die half-deurskynende, blougroen miniatuur-venstertjies vervang deur swart of donkerder kolletjies. Hierdie veranderings vind in die blaar plaas, en word teweeggeroep deur die wegkwyning van die blare en, as gevolg daarvan, die vorming van ontbindings-stowwe wat normaal in die plant nie voorkom nie.

As iemand ’n poging son maak om al hierdie veranderings en variasies op skrif te stel, dan sal die leser uit die beskrywings nie veel wyser word nie. Trouens hy sal bom beswaarlik ’n beeld kan voorskilder van die werklike kleur van die top.

Dit is leersaam in hierdie verband wat Dinter jare gelede geskryf bet toe daar nog maar net twee-en-twintig soorte beskryf was. „Würde ich alle 22 Arten in gleichwertigen lebenden Stücken in einer Reihe einem nicht gar zu krassen Laien vorlegen, so würde er alle 22 Arten als wirklich unterscheidbar auseinanderzuhalten verstehen. Lege ich ihm aber die entsprechenden erstklassigen Photographien der 22 vor, so wird er nur etwa die reichliche Haelfte derselben als verschiedene Arten erkennen, waehrend er versucht sein wird, den Rest auf die von ihm wirklich erkannten als mit diesen identisch zu verteilen. Liest er aber nur die 22 beschreibenden Texte, ohne die dazu gehörigen Bilder gleichzeitig an sehen, so wird er es in der ganz sicheren Erkennung der Arten wahrscheinlich auf nur vier (*L. Ruschiorum, optica, Dinteri, Vallis-Mariae*) bringen, etwa 4 weitere wird er mit einein verbleibenden Rest von Zweifel bestimmen und etwa 15 wird er gar nicht bestimmen können.”

Kleur is per slot van rekening ’n subjektiewe waarneming, en die bepaling van kleur deur verskillende persone is baie uiteenlopend, derhalwe is dit uiters moeilik om die kleure, wat in die genus *Lithops* voorkom so te beskryf dat ’n mens uit die beskrywing ’n natuurgetroue beeld kry van die kleur van die topoppervlakte. Skrywer hiervan bet ’n poging gemaak om die kleur deur middel van kleurkaarte te bepaal, maar by moes dit staak want die een dag son by op ’n sekere kleur besluit, slegs om die volgende dag ’n gans ander kleur in dieselfde plant te vind. Dinter het dieselfde ervaring gehad. Sy bevinding was dat ’n mens wel die algemene aard van die kleur, soos geel byvoorbeeld kan bepaal maar daar kom so baie skakerings van hierdie kleur

voor, dat jou moeilikhede begin wanneer jy 'n spesifieke skakering wil beskryf. Die topoppervlakte is dikwels soos by *L. pseudotruncatella*, nie eengalig gekleurd nie. Verder verskil klein deeltjies van die oppervlakte van mekaar soos by *L. karasmontana*. Terwyl die beskrywing dus in 'n deel van die topoppervlakte son geld, is dit ongeldig in 'n deel slegs 'n paar millimeters verder.

Al na die blare verouder, word die onderskeid tussen die verskillende dele ook duideliker. Wanneer plante uit hulle natuurlike woonplek verwyder word en in Europa en in die vogtige streke van Suid-Afrika gekweek word, dan is die top geneigd om sy glans te verloor. Onder dergelike toestande steek die plant ook bo die oppervlakte uit, word meer konveks en lyk effens groener as dié wat pas uit die veld kom.

'n Verteenwoordiger van die genus wat 'n deel van die land (Bethlehem, Pretoria) met 'n taamlike hoe reënval aard bewoon, is *L. Lesliei*. Hoewel *L. terricolor* af en toe naby Port Elizabeth gevind is, waar die reënval taamlik hoog en gereeld is, maar sy eintlike tuiste is die droogste dele van die Kaapprovinsie (Laingsburg) met 'n reënval van sowat twee duim per jaar.

Soms is daar by die gerimpelde soorte soos *L. karasmontana, L. gracilidelineata* 'n aanmerklike verskil tussen die kleur van die groewe en die windings (riffels). Hierdie netwerk wat soms 'n uitstaande kenmerk is van die topoppervlakte, kom ook al na die wyse waarop die riffels en groewe in mekaar loop en al na sy klein variasies, in 'n verskeidenheid van vorme voor. 'n Uiterste geval is *L. pseudotruncatella* en *L. verruculosa*. In hierdie verband moet ook *L. Vallis-Mariae* genoem word. By hierdie besondere plant is die oppervlakte vir die blote oog skynhaar uniform, maar in werklikheid bestaan dit uit 'n groot aantal wurmvormig heen-en-weer kronkelende riwwe, presies asof dit 'n stuk gebluste kalk is.

By die vasstelling van 'n species van *Lithops* moet die vlekkies veral die in die induikings, noukenrig bestudeer word. By *L. Erniana* is daar 'n donkerkleurige induiking, maar aan die end daarvan lê kort, bruin strepies met liggeel omranding. Hierdie strepies staan reghoekig tot die hoofinduiking. Rooi spikkels of kort strepies dui die oorkruisings aan tussen die ligte induikings van *L. chrysocephala*.

Die soorte met rooi spikkels of vratte kan in twee aparte groepe verdeel word: (i) soorte soos *L. Dinteri, L. Dorotheae en L. insularis*, waar die rooi spikkels waterpas met en in die weefsel lê, en (ii) soorte soos *L. Inae* waar die glansende rooi spikkels bokant die blaaroppervlakte uitsteek. In die eerste groep is die selwande rooi gekleurd, terwyl die selruimtes by *L. Inae* 'n vloeistof, anthocyan, bevat.

DIE VENSTER

Die topoppervlakte van die blaar is, soos reeds aangetoon, skynbaar ondeurskynend hoewel dit lig deurlaat, 'n feit wat maklik kan bewys word deur

die top wat die venster bevat, af te sny en teen die lig te hou, sodat lig deur die venster kan straal; die venster kan ook heeltemal deurskynend wees, daar baie min van die invallende lig teruggelion word. Die venster kan groen of verskillend gekleurd wees. *L. optica var. rubra* vorm 'n klas van sy eie, want by hom het die topoppervlakte 'n egalige rooiagtige pers kleur. Hierdie plant kom onder die gewone *L. optica* voor wat 'n taamlike deurskynende venster besit. Ongelukkig was sy saad nie verkrygbaar nie en dus onmoontlik om hierdie interessante variëteit verder te ondersoek.

Ten opsigte van die eienaardigheid van die venster kan daar vier venstertipes onderskei word (i) *turbiniformis*-groep, waar die venster oënskynlik ondeurskynend is daar dit baie min lig deurlaat (*L. turbiniformis, L. Ruschiorum, L. gracilidelineata*); (ii) die *fulviceps*-groep, waar die grootste deel van die venster oënskynlik ondeurskynend is, maar in die ondeurskynende bedeksel is 'n aantal uitstaande deurskynende papille (miniatuurvenstertjies) waarneembaar (*L. fulviceps*) (iii) die *olivacea*-groep, waar die vernaamste deel van die venster heeltemal deurskynend is (*L. olivacea, L. optica, L. salicola*; (iv) die *pseudotruncatella*-groep, waar die venster 'n ondeurskynende of halfdeurskynende bedeksel bet wat deurspek is met 'n groot aantal helder, ronde kolletjies (miniatuur-venster) wat waterpas met en in die weefsel ingebed lê. Dit blyk dus dat ronde kolletjies (miniatuur-vensters) by die *fulviceps*- en *pseudotruncatella*-tipes voorkom, maar by eersgenoemde is hierdie kolletjies konveks, en hulle staan ho die oppervlakte uit as die blaar uitgeswel is, by laasgenoemde is hulle gelyk (waterpas) met die oppervlakte. In sommige gevalle, soos by *L. Schwantesii* byvoorbeeld is hulle blonagtig-groen.

Denkbaar het die topoppervlakte van die blaar in twee definitiewe en verskillende rigtings ontwikkel. Die vraag is nou: wat was die oorspronklike toestand. Dis waarskynlik dat die ondeurskynende venster soos dit by *L. Ruschiorum* en *L. turbiniformis* aangetref word 'n primitiewe toestand daarstel, en dat die ontwikkeling van die miniatuur-venster van later datum is. Op die doeltreffendheid van laasgenoemde het ons alreeds gewys.

Met hulle ontwikkeling het die deurskynende vlekkies en kolletjies blykbaar die ondeurskynende oppervlakte op sekere bepaalde punte deurdring. Hulle verdere ontwikkeling het in twee rigtings gegaan: skynhaar is dit twee aparte rigtings; by nader ondersoek, egter, blyk dit dat hulle nou niet mekaar verbonde is. Dis heeltemal denkbaar dat die gehalte van die ondeurskynende oppervlakte langsamerhand so verander het dat dit op sekere punte geredelik 'n bietjie meer lig deurgelaat het as op andere dele daarvan. Die geleidelike toename in grootte en deurskynendheid van sulke vlekkies is dan net 'n kwessie van tyd. Op 'n latere ontwikkelingstadium het hierdie helder spikkels bokant die oppervlakte te lê gekom en 'n invallende ligstraal wat op die oppervlakte van so'n papil val, met 'n invalshoek van minder as 90°, sal so gebuig word, dat dit in die blaar indring. Hierdie papil is dan soos 'n konveks-lens. 'n Ligstraal laat in die agtermiddag, wat byna parallel op die oppervlakte

val van ’n plant soos bv. *L. pseudotruncatella*, sal dit die binneste deel van die plantliggaam nie bereik nie, maar by *L. fulviceps* sal hy die plant van binne verlig mits die blaar uitgeswel is.

As die helder spikkels of miniatuur-vensters eers eenmaal tot ontwikkeling gekom bet op die oppervlakte, dan sal mettertyd ook die deurskynende venster verskyn. ’n Mens kan sonder meer waarneem, hoe hierdie helder spikkels by *L. terricolor* al groter en groter word en eindelik onderling met mekaar verbind raak. Die gevolg van geleidelike toename in grootte van die deurskynende kolletjie of vlekkie sal uitloop op die vorming van ’n groot ononderbroke venster.

Die venster in plante soos *L. bella, L. Aucampiae, L. Otzeniana* het skynbaar op ’n effens ander wyse tot stand gekom. In hierdie besondere groep is helder spikkels nie gevorm nie, maar die ondeurskynende bedeksel liet langsamerhand deurskynend geword. Op sekere bepaalde plekke het deurskynende strepies of vlekkies ontstaan en deur hulle verbinding met mekaar het hulle eventueel groot vensters geword. In sommige gevalle het ondeurskynende dele soos eilandjies in die deurskynende plekke agtergebly. ’n Ondersoeking van die venster van *L. Franciscii, L. Lesliei* en *L. Venteri* bring aan die lig dat die half-deurskynende bedeksel van die venster in hierdie drie gevalle langsamerhand deurboor word. Klein ronde kolletjies het reeds vry geword en maak die onderliggende venster si baar.

Die Grootte van die Plante. Die deursnee van die blare verskaf ons nie ’n waardevolle maatstaf van taxonomiese doeleindes me want dit verander al na die hoeveelheid water wat die plant tot sy beskikking het.

DIE SOOM

Ons kan aanneem dat die topoppervlakte van die blare ’n sirkel vorm en die spleet tussen hulle, die deursnee. Die deel van die rand al langs die spleet is gewoonlik reguit en kan die binnerand of binnesoom genoem word, en die halfsirkelvormige deel kan geriefshalwe as die buiterand of buitesoom beskryf word. By heelparty plante (*L. Ruschiorum, L. gracilidelineata, L. turbiniformis*) is die hele topoppervlakte ongedifferensieerd, daar dit egaal gekleurd is en die tekstuur van so’n aard is dat ’n definitiewe rand nie kan onderskei word nie. Die venster van baie soorte en veral die groot oop venster van sommiges het ’n duidelike omranding. Die omranding is in die reel nie van groot taxonomiese waarde nie, hoewel dit ’n spesifieke kenmerk is van sekere plante, en ’n mens in staat stel om die soort te bepaal. By die volgende soorte kom ’n duidelike, eiesoortige rand voor: (i) *L. optica* kom die binnestreep en buiterand by die twee eindpunte van die spleet bymekaar, kenmerkend is die ontwikkeling by hierdie soort van ’n deurskynende driehoek met apeks na ondertoe gekeer; (ii) by *L. Otzeniana* is die rand deur inkerwings opgesplits in lobbetjies waarvan 10–12 in die buite en 4–6 in die binnerand voorkom: ’n lobbetjie kan onreëlmatig, driehoekig, effens langwerpig, stomp of skerp-

puntig wees. Hulle is 3 tot 4 millimeters lank en ongeveer net so breed. Die rand van *L. Otzeniana* is tipies van hierdie species, en die leser word na die betreffende portrette verwys, sommige waarvan geneem is van die plant in sy natuurlike woonplek; (iii) die raad van *L. Erniana* het ons alreeds leer ken, en die leser word verwys na die beskrywing en gekleurde tekeninge daarvan; (iv) die rand van *L. Aucampiae* is effens rooiagtig; (v) by *L. Fulleri* kom ook donker dele voor, maar hulle is meer opvallend as dié by *L. Aucampiae*.

In die reel is die rand in mindere of meerdere mate ingekerf, hoewel die binnerand by sommige soorte, by *L. olivacea* byvoorbeeld reguit en sonder kentekens is. In baie gevalle het die inkerwings in die rand gelei tot die vorming van lobbe; soms is hierdie lobbe taamlik groot en kom baie na aan tande. Die lobbe lê tot in die venster uitgestrek en het gedeeltelik of in die geheel van die liggaam van die plant geskei geraak, daardeur het hul soos eilandjies van verskillende vorms en grootte in die venster te lê gekom.

In sommige soorte (*L. Dinteri*) is daar ’n smal strookie (l–2 mm. breed) wat anders gekleurd is as die res van die top. By *L. Dinteri* loop hierdie band heeltemal rondom die venster, en is lig-geelbruin terwyl die topoppervlakte oranje-geel gekleurd is.

GEOGRAFIESE VERSPREIDING

In ’n ondersoek gewy aan die verspreiding aan die genus *Lithops* trek die interessante feite soos in die volgende paragrawe uiteengesit dadelik die aandag:—

(1) Aan die Weskant van Suid-Afrika is Franzfontein (breedtegraad 20° Suid) naby Outjo, Suidwes-Afrika, die mees noordelike punt wat die genus *Lithops* (*Lithops gracilidelineata*) in sy verspreiding noordwaarts bereik het, terwyl hy aan die ooskant daarvan nie verder as Pretoria (breedtegraad 25° 45′ S.) gekom het nie (*L. Lesliei*).

L. terricolor is die enigste species wat die verste suidwaarts gemigreer het. Dis interessant om daarop te let dat hierdie soort uit verskeie plekke (Laingsburg, Steytlerville en Springbokvlakte naby Port Elizabeth) vermeld word-en hoewel Laingsburg en Port Elizabeth honderde myle van mekaar is, is dit almal plekke wat nagenoeg net suid lê van breedtegraad 33° S. Klaarblyklik is daar die een of ander faktor wat die verspreiding van die species aan of nader aan die see verhoed het.

Pretoria (lengtegraad 28° 12′ O.) en Bethlehem (lengtegraad 28° 16′ O.) is die twee mees oostelike geleë punte wat die genus in sy verspreiding ooswaarts bereik het. Dusver is Bethlehem die verste ooswaarts geleë woonplek van die genus, wat vermeld word. Hier weer staan ons voor die eienaardige verskynsel dat ’n enkele species (*L. Lesliei*) ’n sekere lengtegraad in sy verspreiding bereik het, en klaarblyklik nie in staat was om hom oor die grens verder ooswaarts te versprei nie. Met betrekking tot die verspreiding aan die

westekant van Suid-Afrika liet die genus in sommige gevalle inderdaad die seekus bereik: *L. optica* kont te Lüderitzbucht voor in die onmiddellike nabyheid van die see; *L. Herrei*, naby die see te Alexanderbaai, en *L. Nelii* nie ver van Kaap Cross, S.W.A., af nie.

Uit bogemelde is dit duidelik dat hierdie genus tot 'n oppervlakte beperk is, wat ten noorde deur breedtegraad 20° S. en ten suide deur breedtegraad 33° S. begrens word; die uiterste oosgrens is lengtegraad 28° O., en die wesgrens die see. Soos later sal beskryf word, lê die vernaamste verspreidingsentrum aan die weskant van Suidelike Afrika. In die hele sentrale gedeelte van hierdie gebied, die sogenoemde Kalahari, is hierdie plante tot nog toe nie aangetref nie, hoewel *L. pseudotruncatella* by Gobabis, Suidwes-Afrika tot aan die rand van die Kalahari, *L. Aucampiae* van die suide af tot in Postmasburg en *L. Lesliei* in die nabyheid van Vryburg voortgedring het. Die verste punt suidwaarts wat die genus bereik het, is die Springbokvlakte (*L. terricolor*) naby Port Elizabeth. Hoewel verspreiding van die genus oor die algemeen oor 'n wye gebied strek, is sekere soorte blykbaar tot 'n klein gebiedsoppervlakte beperk. Dis waarskynlik nog te vroeg out bieroor die een of ander stelling neer te lê, want *Lithops*-species groei in die allerdroogste en mees ontoeganklike dele van die Suid-Afrikaanse vasteland. In weerwil van langdurige en sistematiese soektogte deur geskoolde versamelaars sal dit waarskynlik nog baie jare duur, eerdat alles in verband niet die verspreiding van die genus bekend is. Dusver is nuwe soorte en 'n nuwe woonplek van reeds bekende soorte deur blote toeval ontdek, want dis baie moeilik om sommige soorte raak te sien, behalwe na 'n onlangse reën.

(2) 'n Merkwaardige verspreidingskenmerk van die genus is dat dit klaarblyklik binne die bekken van die Oranjerivier en sy vermenigvuldigde bylope ideale toestande vir sy ontwikkeling gevind het. Hy kont voor in die bekken van die Vaalrivier en langs dié van die Nossop tot by Windhoek, en ook langs die bekken van die Visrivier wat deur Suidwes-Afrika suidwaarts vloei. Ongeveer driekwart van die soorte kom voor in die bekken van die Oranjerivier en sy bylope. Die gebied van Upington af weerskante van die rivier tot by sy mond kan beskou word as die middelpunt van sy ontwikkeling. *L. salicola* kom in die omgewing van Lückhoff, O.V.S., voor, binne 13 myl van die Oranjerivier. 'n Baie interessante verskynsel is dat die rooi gevlekte of gespikkelde soorte hoofsaaklik tot die noord al beperk is. Soos bekend, is *L. Dorotheae* en *L. Inae* die enigste soorte wat na die suidekant toe oorgekom het. Hulle het egter taamlik dig by die rivier gebly en kom nie op plekke ver daarvandaan voor nie.

Word die verspreiding van *L. Lesliei* ondersoek, dan vind ons dat hy hom langs die bekken van die Vaalrivier van Vereeniging af, oor Klerksdorp en Venterstad tot by Warrenton uitgebrei het, terwyl die uitloper naby Bethlehem op 'n byloop van die Vaalrivier gevind word. Hierdie species kom ook naby Senekal en te Verkeerde Vlei, O.V.S. voor, twee plekke wat in die dreineringsgebied lê van die Vaalrivier.

L. pseudotruncatella het 'n taamlike uitgestrekte verspreidingsgebied en kom oral op die hoer gelee vlakland van die Khomas-plato naby Windhoek, sy duidelike uitloper en op die Erosgebergte, S.W.A., en sy uitlopers. Hierdie gebied beslaan 'n oppervlakte van meer as 5000 vk. myl. Op Rusch Peak 'n bergspits 2420 meters hoog, en in die middel van die Suidgrens gelee, kom *L. pseudotruncatella* ook voor. Dinter het dit as 'n apart soort *L. alpina Dtr.*, beskryf, maar dit is klaarblyklik 'n dwergvorm van *L. pseudotruncatella*. Die bergagtige Khomas- en Eros hoogland word deur die Windhoek-vlakte onderbreek. Laasgenoemde lê ongeveer 1600 meters, terwyl eersgenoemde van 1800–2000 meters ho die seespiël lê. In die Windhoek-vlakte kom geen species van *Lithops* voor me. *L. pseudotruncatella* is min of meer beperk tot hoogtes van meer as 1800 meters.

Hierdie soort word ook op die Suidelike van die Khomas-plato tot by Friedenthal in die Weste aangetref, en bereik selfs die Namibgrens. Suidwaarts is dit al ter hoogte van omtrent 1400 meters aangetref. *L. pseudotruncatella* kom ook voor op die oostelike uitlopers van die Khomas-plato. Te Kranzneus aan die suidelike uitloper van die Auas-berge is hy ook volop op 'n hoogte van 1750 meters.

L. pseudotruncatella het sy verspreidingsgebied al langs die suid-oostelike uitlopers van die Khomas-plato uitgebrei tot by Klein Windhoek, en van Klein Windhoek verder ooswaarts na Oude Karemba, Seeis, vandaar na Witvlei tot by Heather Bell aan die Swart en Wit Mossop, 15 myl van Gobabis. Die verste noordelik punt wat hy in Suidwes-Afrika bereik het, lê in die Waterberg-gebergtes. Sy woongebied beslaan 'n groot oppervlakte daar hy van die Khomas-plato die verspreidingsentrum, min of meer in alle rigtings verspreid geraak het. *L. pseudotruncatella* het nie alleen 'n uitgebreide horisontale verspreiding nie, maar dit is een van die weinige soorte wat hulle hoog (2420 meters) op die Rusch-gebergtes naby Lichtenstein gevestig het. Hy kom op die Khomas-plato voor op 'n hoogte van byna 2000 meters, en straal vandaar uit tot by Witvlei naby Gobabis. Hy is al in die bekken van die Nossop gevind, 'n rivier wat suidwaarts en later in die Oranjerivier vloei. Waterberg, naby Otjiwarongo, is die noordelike uithoek.

Die verspreiding van *L. terricolor* is uiters belangwekkend. Hierdie soort is min of meer eweredig versprei oor die kontinentale vlakte by Beaufort-Wes, hoofsaaklik tussen die Nuweveld en die Swartberge. Hy kom voor te Laingsburg en Prins Albert, en het noordwaarts nie verder gekom as tot in die nabyheid van Beaufort-Wes nie. Van Prince Albert af is sy verspreidingsgebied al langs die voet van die Swartberge en dan in 'n suidelike rigting na Willowmore en Millerstasie om eindelik 'n punt 2000 voet hoog te bereik in die Springbokvlakte net oos van die Hanekam. Dit skyn dat hy in sy uitbreiding suidwaarts gestuit geword is deur 'n uitloper van die Outenikwa-berge. Hierdie soort is een van die weinige in die Kaapprovinsie wat klaarblyklik insluiting in die dreineringsgebied van die Oranjerivier vrygespring het, en hy vorm 'n klas van sy eie. Van Laingsburg af na die Springbokvlakte is dit nagenoeg

300–350 myl. Een gevolgtrekking wat hieruit voort vloei is dat hierdie soort dusver aan die Suidkant van die Beaufort-Wes-vlakte gebly en nie na die sentrum toe deurgedring het nie.

L. gracilidelineata is 'n ander soort wat oor 'n afstand van 200 myl gevind word. Hy verskyn te Pforte (Swakopmund), dan weer naby die Brandberg en vandaar tot by Franzfontein naby Outjo, die verste punt noordwaarts wat hy bereik het.

Met dié uitsondering van 'n paar Suidwes-Afrikaanse soorte het die meeste species van hierdie genus mekaar nie in hulle verspreiding omvleuel nie. In die uitgebreide gebied waar *L. Lesliei* , *L. terricolor* en *L. pseudotruncatella* onderskeidelik voorkom, word geen ander soort aangetref nie. *L. divergens* is die enigste soort wat oor 'n oppervlakte van nagenoeg 500 vk. myl, in die sg. Knersvlakte (Van Rhynsdorp) gevind word; sodra 'n mens in die nabyheid van die Loeriesfontein-hoogland kom, maak *L. Otzeniana* sy verskyning. Soos reeds vermeld kom *L. pseudotruncatella* op die Rusch-gebergte voor. 'n Ander soort *L. Triebneri* groei in die Tiras-berge, Suidwes-Afrika, op 'n hoogte van 2210 meters.

L. Nelii het ook 'n vry uitgestrekte verspreiding, maar sy verskillende woonplekke is min of meer van dieselfde aard en is tot 'n gebied waar dit selde reën, beperk. Dit kom voor in 'n smal strook 3–35 myl breed, wat parallel loop met die kus vanaf Kaap Cross tot aan die mond van die Ugabrivier. Hierdie *Lithops*-soort is na verwant aan *L. Ruschiorum*, maar verskil van hom deurdat hy alleen in brakgrond met 'n bedeksel van los, ronde wit kwarts (vuursteen) klippies, terwyl *L. Ruschiorum* saam met *Crassula mesembryanthemopsis* en *Anacampseros quinaria* op rooi kwartsiet (vuursteen) randjies voorkom. Sy wortels kom horisontaal te lê, terwyl dié van *L. Ruschiorum* vertikaal loop. Aangesien *L. Nelii* in 'n baie dor deel van die land groei, 'n deel waar dit selde reën, moet die wortels so na moontlik aan die oppervlakte lê om alle vogtigheid hoe min ook al, wat die grond in die vorm van mis of don bereik, te kan absorbeer. Dit skyn dat hierdie plant 'n baie hoe ouderdom bereik. Klompe is al gevind waaraan die oorblyfsels van me minder as 150 droë plantliggame vassit nie. As 'n mens aanneem dat deur aanwas 'n nuwe plant elke jaar ontstaan het as gevolg van die heersende swaar mis oor hierdie deel van die kus, dan sou so'n plant ongeveer 150 jaar oud wees. Heel waarskynlik is die plante nog heelwat ouer, want dit gebeur dikwels dat daar gedurende sekere jare geen aanwas plaasgevind het nie.

Die woonplek van *L. salicola* verdien vermelding. Hierdie plant groei in die omgewing van Lückhoff, en sover bekend op drie verskillende plekke, twee waarvan min of meer eenders is. Dr. Henrici van Fauresmith het my goedgunstiglik die volgende besonderhede oor een van die plekke gegee: „*L. salicola* grows wherever I have seen it, on the edge of brak pans, not in their middle, that is to say, at a place where the brak is not yet too concentrated. These pans are probably a few days under water after heavy showers. On

these occasions the plants are covered with mud, and even by the trained eye of a botanist cannot be discovered for weeks. Later on, the surface mass of this mud breaks to pieces, generally in hexagonal pieces, the edges curve away from the soil, and in the fissures first the plants can be seen. Still later the whole surface crust breaks to pieces and you can again find the plants. I think that something similar happens to *L. Aucampiae* or sub-species, which I found long ago in the alluvial ground of Bechuanaland. I visited the other day a new habitat of *L. salicola*, about a fortnight after rain, and we had trouble to see a few plants, although the owner told me that there were many and we were five people to look for them." Tot sover Dr. Henrici. Ek het dieselfde plek persoonlik besoek aan die begin van die reëntyd (November 1942), en in die pan het die plant by die duisende gestaan. 'n Mens kon nergens jou voet neersit sonder om op een van die groot klompe te trap me, sommige waarvan uit 10–20 plantliggame bestaan het en tog kon Dr. Henrici nouliks enige daarvan raaksien na 'n reën. Die pan self lê heeltemal in die slag van die heersende winde, en deurdat hy taamlik gelyk is, is dit maklik te begryp dat die wind van die water oor die plante son dryf, wat op die waterrand staan. Reën dit dan 'n bietjie meer sal die pan heeltemal onder water wees. In die winter is hy gewoonlik droog. Uit bogemelde moet nie afgelei word dat *L. salicola* tot hierdie panne beperk is nie. 'n Ander woonplek nie ver van Lückhoff nie, is aan die voet van 'n koppie ontdek, waar die grond 'n taamlike steil opdraende vorm en uit kalkklip bestaan. Hierdie woonplek is dus baie droër as die hierbo beskryf, en tog was hier talle van *L. salicola* te sien.

MIMIEK

Heelwat is al geskryf oor mimiek oor die algemeen, en in hierdie verband is veral verwys na sekere *Aizoeceae*, nl. *Didymaotus lapidiformis, Lithops, Titanopsis*, ens. Ek wil my graag bepaal by die genus *Lithops*. Dis al daarop gewys dat hierdie plante in droë weer tot so'n mate in die grond ingebed lê, dat daar net 'n baie klein deeltjie bo die oppervlakte uitsteek. Dis egter alleen waar tot 'n sekere mate, want ingeval die planttrosse uit 5–15 plantliggame bestaan, dan kom hulle ho die grondoppervlakte te lê. Of die klompe in die grond ingesink sit en of hulle ho die oppervlakte uitgelig is, hang geheel en al af van die hoeveelheid vogtigheid in die grond. In die droë tye van die jaar is die plante ingekrimp, effens met sand of stof bedek in die grond weggesink. Na 'n goeie reën is hulle uitgeswel, steek ho die oppervlakte uit en kan maklik gesien word. In die droë toestand sal die oningewyde oor hulle stap, sonder om hulle te merk. Soms sit hulle in kalkgruis of tussen klein ronde vuursteenklippies, en kan nie maklik raak gesien word me. Ek het eenmaal 'n portret gemaak van *Lithops gracilidelineata* naby Pforte, S.W.A., en 'n goeie en groot kamera daarvoor gebruik. Die plant het tussen ronde vuursteenklippies gestaan en 'n trapsoetjie wat in die gesigsveld was, kon ek gebruik as 'n soort baken; maar na die negatief ontwikkel was, kon ek die plant nie bespeur nie, selfs na ek dié keer op keer en nog weer ondersoek het.

In die veld het ek al van tyd tot tyd 'n aansienlike aantal *Lithops* gesien. Heel selde het ek enige teengekom waaraan 'n dier gevreet het of selfs spore dat stukkies weggeknubbel is. Die protagoniste van die mimiek-leer sal wil beweer dat dit juis is van hul standpunt, maar dis nog glad nie duidelik teen watter diere hierdie plante hulself beskerm nie. Beskerming teen oortollige transpirasie is hoogswaarskynlik die rede van die insinking van die plantliggaam in die grond. Hierdie plant kom dikwels enkel voor, en sou vir enige dier, hoe klein ook al, nie veel beteken as voedsel nie. Dikwels vind 'n mens *Lithops*-species verskuil onder bossies of Aalweë, (*L. Bromfïeldii*). *L. Lesliei* aan die anderkant groei in grasveld en is in die somer en winter tot so'n mate met gras bedek, dat 'n klomp plante nie sigbaar is nie. Myns insiens word die mimiek-verskynsels wat by hierdie plante voorkom veels te veel oordryf. Marloth verwys in sy „Stone Plants" na *Didymaotus lapidiformis* as 'n goeie voorbeeld om die mate van ooreenstemming tussen hierdie plante en hul omgewing, te illustreer. My ondervinding is dat na die eerste waarneming van *Didymaotus lapidiformis* in die veld, dit later op 'n afstand 16 tree kan herken word. Dit is 'n groot afstand as in ag geneem word dat hy maar 1-2 duim in deursnee, en nie meer as 'n half duim hoog is nie. Selfs *Lithops*-species is nie, soos soms beweer word, altyd moeilik om te vind nie. Dit hang alles daarvan af in watter groeistadium hy verkeer, of hy kort tevore reën gehad het, en of die persoon 'n geoefende waarnemer is. In tye van droogte is die boonste oppervlakte van die plant gelyk met die droë, stowwerige grond en boonop bedek met 'n dun lagie stof, of los grond korreltjies dieselfde kleur as dié van die plant. Dit spreek vanself dat hulle dan beswaarlik ontdek word.

Natuurlik, die vraag waarom hierdie plante beide in vorm en kleur soos Mille omgewing lyk, is nie beantwoord nie en m.i. sal hierdie antwoord nog lank skuldig bly. Of die vraag ooit sal opgelos word is baie twyfelagtig. Dit is natuurlik baie maklik om op die Pegasus van die verbeelding te styg en dan sonder om rekening te hou met die werklikheid 'n oplossing te vind. Daar is mense wat allerlei onsigbare en geheimsinnige strale of invloede, wat van die omgewing uitgestraal word en dan bewerkstellig dat die lewewese sy vorm of kleur of beide aanneem postuleer. Op dié wyse, verlaat 'n mens die terrein van die natuurwetenskap, want dié is gebaseer op die eksperiment. Waarom b.v. *L. Lesliei* roesbruin is, as dit in die rooierige grond afkomstig van verweerde ysterklip groei en *L. gracilidelineata* weer wit-agtig is en lyk soos die kwartsklippetjies van sy omgewing is 'n onopgeloste raaisel. Wat my betref verkies ek om met du Bois-Reymond te sê „ignorabimus", as om allerlei fantastiese verklaringe aan te neem.

DIE PROBLEEM OM DIE SOORTE VAN DIE GESLAG TE BEPAAL

Die vasstelling van soorte van hierdie genus word bemoeilik deur die feit dat die blomme van die verskillende soorte so min varieer dat hulle nie

enigermate vir taxonomiese doeleindes kan gebruik word nie. Dis waar dat die kleur van die blom bruikbaar is; maar of hierdie kenmerke 'n genoegsame of veilige leidraad is, sou ek nie wil ontken of bevestig nie. Dis wel bekend dat die kleur van 'n blom dikwels afhang van die soort grond waarin die plant groei. *L. Helmuti* is 'n baie definitiewe soort. Hy het soos reeds hierbo vermeld 'n geel blom, en tog staan dit aangeteken dat daar 'n vorm voorkom met wit blomme. Is iemand geregtig om alleen op grond hiervan 'n nuwe soort te skep? 'n Ander beswaar teen die gebruik van die blomkleur vir die vasstelling van 'n soort is dat hierdie plante gewoonlik in die vegetatiewe stadium aangetref word, en dit duur soms jare eer hulle blom. Ek het, derhalwe, die blomkleur vir taxonomiese doeleindes heeltemal uitgeskakel en het verkies om die topoppervlakte van die blaar in plaas daarvan te gebruik. Ek wil vir geen oomblik beweer dat die gekose kenmerk absoluut bevredigend is nie,—maar wat is dan eintlik 'n bevredigende kenmerk ! Ons hele begrip van soort is per slot van rekening gebaseer op 'n subjektiewe oordeel. Sommige is van oordeel dat 'n soort gebonde moet wees aan 'n sekere kenmerk, wat sekere gestelde perke nie moet oorskry nie, andere wil die kring wyer trek en onder een soort verskillende plante insluit.

Die leser sal gemerk het dat ek glad nie of alleen by toeval melding geinaak het van die grootte van die plante. Sover ek kan oordeel is daar net een soort, *L. Nelii*, wat deur sy geringe grootte gekenmerk word. Die grootte van 'n sukkulent hang tot 'n groot mate van die hoeveelheid water beskikbaar af. Is die watervoorraad gering, dan is hy verkrompeld en klein, terwyl die plant na 'n reën heelwat groter is, en 'n mens sal beswaarlik glo dat dit dieselfde verlepte plant is van 'n week of wat gelede. 'n Entoesiastiese liefhebber van *Lithops* het daarin geglo om sy plante water te gee. Toe hy my sy versameling wys, het hulle so abnormaal groot gelyk, dat ek hulle glad nie met 'n *Lithops* kon vereenselwig nie; ek dag dat hulle *Pleiospilos Bolusii* was. Dis vanself sprekend dat in hierdie genus grootte geen leidraad hoegenaamd vir die bepaling van soorte kan wees nie.

Dinter en Tischer het probeer om nie minder as vier soorte uit *L. pseudotruncatella* te maak me. Dinter het selfs sover gegaan om die sade van *L. pseudotruncatella* te veeg en dis op krag o.a. van die saadgewig dat hy die soort *L. alpina* geskep het. Na sy bevindings was die gewig van die individuele saadjies van laasgenoemde 0·118 mg. en 0·9 mm. lank; van eersgenoemde 0·226 mg. en 1·1 mm. lank. Hy het klaarblyklik vergeet dat die gewig van 'n saad 'n hoogs fluktueerende entiteit is, en dat daar geen einde aan die soorte van hierdie genus sal wees nie, as jy dergelyke criterea son toepas nie. Ek het etlike monsters van Dinter se L. alpine aan my laat aanstuur en het toe gevind dat hierdie kleiner variant van *L. pseudotruncatella* Die tot een besondere plek op die Ruschgebergte beperk is me, maar dat dit ook elders voorkom. Tischer aan die anderkant het 'n nuwe species, *L. Mundtii*, beskryf, enkel en alleen omdat die plante aldus genoem, groter was as wat *L. pseudotruncatella* gewoonlik is.

Drie plante elkeen waarvan uit twee plantliggame bestaan het, was aan my gestuur onder die benaming *L. Mundtii*. Hulle werklike mate was as volg:—

(A)	3·5 × 2·6 cm.	3·3 × 2·3 cm.
(B)	2·8 × 2 „	2·3 × 1·7 „
(C)	2·8 × 2·2 „	2·4 × 1·7 „

Ek het ook 'n besending van 193 plante waarvan slegs 157 bruikbaar was van *L. pseudotruncatella* uit dieselfde lokaliteit naby Windhoek ontvang. Al na hulle grootte na die deursnit van die top is hulle toe in die volgende groepe verdeel:–

0·5–0·7	cm.	10 plante
0·7–0·9	„	23 „
1·0–1·1	„	58 „
1·2–1·3	„	57 „
1·3–1·5	„	6 „
1·5–1·7	„	3 „

Die plante was gedurende Julie maand d.w.s. in hul rustoestand versamel. Gedurende die somer of reëntyd son hulle effens groter wees. Die leser word verwys na Fig. 10 wat 'n tros plante van elk van die groepe hierbo 'n beeld voorstel. Uit die illustrasies kan 'n mens baie duidelik sien, dat die grootte van 'n plant onbruikbaar is in die bepaling van 'n soort van *Lithops*.

Van die monsters van *L. pseudotruncatella* wat aan my gestuur was van Heather Bell naby die Swart Nossop (Gobabis) was sommige 5 em. in deursnee. Dit moet egter nie uit die oog verloor word nie dat hierdie plante in sanderige grond groei, en hulle abnormale grootte is toe te skryf aan die sanderige bodem. Trouens die grootte van 'n plant verskil al na die geaardheid van die plek waar hy groei en die tyd van die jaar waarin hy versamel was. Dinter se *L. alpina* aan die anderkant groei op 'n hoogte van 2420 meters op die rand van 'n krans. Die geringe grootte moet blykbaar toegeskryf word aan die geaardheid van sy woonplek.

Onteurs het in die verlede dikwels die fout gemaak om 'n nuwe soort te beskryf met net een enkele eksemplaar of gebrekkige materiaal tot hulle beskikking. *L. terricolor* het 'n baie wye verspreiding en 'n poging is gemaak om 'n soort *L. Peersii* te skep wat, soos veronderstel word, in sekere belangrike opsigte van die tipiese *L. terricolor* verskil. Ek het 'n besending van ongeveer 400 plante uit een en dieselfde plek aan my laat stuur en dit het geblyk dat hierdie plante in net soveel soorte kan verdeel word as wat daar graadverskille in die topoppervlakte was. Deur betragting van die kleurplate van hierdie species, sal die leser dadelik verstaan wat bedoel word. Waarnemings in die veld gemaak op verskeie voorbeelde van *L. terricolor*, het my bewering gestaaf dat daar wesentlik net een species is, daarby effens veranderlik. As 'n poging son aangewend word om hierdie soort in verskeie soorte op te splits, sal dit

uiters moeilik, wellig onmoontlik wees om vaste kenmerke te vind waardeur hulle van mekaar kan onderskei word.

Dinter het probeer om 'n nuwe soort *L. summitata* te skep, wat, na vermoeding in sekere opsigte verskil van *L. karasmontana*. Gestel dat 'n mens Dinter se metode vir die bepaling van species van die genus *Lithops* aanvaar, dan kan jy net so goed afsien van enige poging om die plante, wat daar onder ressorteer, te klassifiseer of name te gee. In 'n portret deur homself afgeneem en gepubliseer in Moeller's Deutsche Gaertnerzeitung Nr. 27 (1927), p. 102 is dit heeltemal duidelik dat daar twee soorte plante op dieselfde plaat verskyn en albei noem hy *L. summitata*. Die plant heel links is bepaald donkerder gekleurd in die induikings as die ander. Hy gaan voort deur te sê dat *L. summitata* „hellgrau-blau am Kegelteil" en *L. karasmontana* „tauben-grau blau" is. Dit veronderstel dat daar 'n definitiewe kleur „taubengrau-blau" is, en hierdie fyn verskille in die kleur kan onmoontlik nie gebruik word om soorte te onderskei nie. Dr. Geyer, wat ook *L. karasmontana* en die sogenaamde *L. summitata* versamel het, het op my versoek die kleurverskille as maatstaf geneem en sy pasversamelde materiaal in net soveel groepe verdeel as wat hy kon. Hy het sewe groepe gemaak, almal deur oorgangsvorme met mekaar verbonde. Gestel dat die groepe weer verenig word, en iemand anders gevra word om die plante uit te sorteer, sou dit uitloop op 'n verskillende groepering waar die groepe nie dieselfde plante sal bevat as tevore nie. Dinter beweer dat die gewig van die saad van *L. summitata* 0·072 mg. die van *L. karasmontana* 0·64 mg. is; maar dit is 'n drywery van die kuns om soorte van mekaar te onderskei in die rigting van haarklowery. Na my oordeel is daar net één species, nl. *L. karasmontana*, en ek het tot hierdie gevolgtrekking gekom nadat ek plante ondersoek het wat uit elkeen van die twee woonplekke waar *L. karasmontana* en *L. summitata* voorkom.

SLEUTEL OM DIE SOORTE TE BEPAAL

Alleen 'n kort woord is nodig met betrekking tot die sleutel wat hier aangegee word. Soos reeds beweer, is die blom van geen nut in die bepaling van 'n soort van hierdie genus nie. 'n Mens word derhalwe, teen jou sin gedwing om die aard en kleur van die topoppervlakte vir taxonomiese doeleindes te gebruik, hoewel dit besef word dat 'n sleutel waarin net een oorgaan, en dit nogal die blaar, in aanmerking geneem word, nie volkome bevredigend kan wees nie.

Die genus kan gerieflik in twee onderafdelings verdeel word: die Afenestratae en die Fenestratae.

I.—AFENESTRATAE

Hierdie groep sluit al die soorte in met 'n skynbaar deurskynende topoppervlakte, hoewel laasgenoemde in werklikheid genoeg lig deurlaat vir die groei van die plant. Behalwe *L. Meyeri, L. turbiniformis, L. divergens,*

L. verruculosa, en *L. Van-Zylii*, kom die soorte wat onder hierdie groep resorteer, almal noord van die Oranjerivier voor, en almal is ook bewoners van Suidwes-Afrika. Met uitsondering van *L. divergens*, word hul almal in die omgewing van die Oranjerivier self aangetref.

II.-FENESTRATAE.

Hierdie groep bevat die plante waarvan die topoppervlakte of heeltemal deurskynend is of deur helder, deurskynende vlekkies geperforeer is.

Ongelukkig Sal sekere soorte nie bevredigend met behulp van die sleutel kan bepaal word nie. In dergelike gevalle moet gebruik gemaak word van die portrette en gekleurde plate. In sommige gevalle is die verskille tussen die soorte heeltemal duidelik as jy die plante voor jou het, maar dit word haas onmoontlik om 'n woordelike beskrywing van hierdie verskille te gee.

Ernst Rusch, 'n entoesiastiese versamelaar van sukkulente plante in Suidwes-Afrika, het gevind toe hy *Lithops*-saailinge ondersoek het, dat 'n mens hulle in twee groepe, wat duidelik van mekaar te onderskei is kan plaas, nl.: (A) Die spleet is beperk in die vorm van 'n klein opening in die middel van die twee blare, en (B) die spleet skei die twee blare geheel en al. Dinter het hierdie reel uitgebrei tot die meer algemene een dat alle saaiplantjies met 'n ronde opening (*Schlitzkeimlinge, Groep* (A)) aan soorte behoort wat wit blomme het, terwyl die saaiplantjies met 'n spleet wat die twee blare skei (*Spaltkeimlinge, Groep* (B)) van plante is met geel blomme. Ongelukkig het Dinter en Rusch net omtrent 28 van die destyds bekende soorte ondersoek en dié was ook meestal net uit Suidwes-Afrika. Die 28 soorte deur Dinter genoem en ondersoek moet heelwat in getal verminder word, want daar is heelwat sinonieme onder hulle. Of hierdie reel, soos deur Dinter opgestel, kan toegepas word op alle soorte is 'n vraag wat verder ondersoek sal moet ophelder.

Dinter beweer dat die regte tyd om te bepaal of 'n saaiplantjie aan een of ander van die bovermelde groepe behoort, is van die drieweekstadium tot net voor die saadlobbe (eerste blare) opdroog.

Dinter gee die volgende lys van saaiplantjies wat Rusch en hy ondersoek het:

Groep A (geel blomme en saaiplantjie met ronde opening):

L. Comptonii, L. Dinteri, L. fulviceps, L. Franciscii, L. gracilidelineata, L kuibisensis, L. kunjasensis, L. olivacea, L. pseudotruncatella L. Ruschiorum, L. Schwantesii, L. urikosensis, L. Vallis-Mariae.

Groep B (wit blomme, en spleet):

L. bella, L. Eberlanzii, L. Fulleri, L. karasmontana, L. optica.

Die sinonieme is weggelaat uit die lys soos deur Dinter gepubliseer.

BESKRYWING VAN DIE GESLAG.

Planteliggaam enkel of vorm klompe van 2–20, ingebed in die grond, met net die boonste vlak vry, gewoonlik 2-6 em. in deursnit, klompe tot 20 em. in deursnit, verkeerd keëlvormig; boonste vlak eenvoudig, plat, konveks, skuinskonveks of obkonies; boonste vlak vorm groot deursigtige areas wat dikwels gereduseer is tot klein ingedrukte lyne of kolletjies, soms net deursigtige miniatuurvensters wat uitstaan bokant die oppervlakte van die venster of ingesink is in die oppervlakte; venster met min of baie eilande of bedek deur 'n skynbaar ondeursigtige bedekking wat geperforeer is deur 'n aantal klein ronde openinge; venster dikwels omsoom deur 'n oranjegeel band; boonste vlak eenvoudig of gerimpeld, met of sonder donkerder gekleurde ingedrukte lyne, met of sonder rooi tot donker-rooi lyne of kolletjies ingesink in die blaar of staan daar bokant uit; soms vratte tussen die riwwe; soms met dendritiese merke; venster met of sonder 'n geslipte of getande soom; soom soms afwesig of binneste soom reguit of met 'n driehoekige deursigtige deel waar die twee some mekaar ontmoet; kleur van boonste top witroomerig, wit, gryswit, geelwit, geelagtig, groen, groenwit, ligrooi, rooiagtig, ligpers tot donkerpers.

Blom kom te voorskyn in die spleet tussen die twee blare; kelk niemembraanagtig, gewoonlik 4–7 lobbig, soms 8-lobbig, steek effens bokant die blare uit, geen buis bokant die vrugbeginsel; kroon met baie kroonblare, geel, wit, wit met effens oranje, 1–4 kringe, lynvormig, stomp, gerond, met 'n keep aan die toppunt; meeldrade baie, regop in 'n kolom, laere deel van helmdraad soms papille: vrugbeginsel onderstandig 4–7 hokkig, placentae op die buitenste wand of vloer van die saadhok; saadknoppe baie; styl kort of so te sê afwesig, stempel 4–7, draadvormig: doosvrug 4–7 hokkig met 4–7 kleppe; die kleppe met 'n dik sentrale kiel wat uitsit, kiel aan die punt gesplits, glad of gerimpeld; sade baie, klein met 'n nippel aan die een kant, rond of gerond, glad of fyn gerimpeld, donkerbruin of gedeeltelik donkerbruin en deursigtig of eenkant deursigtig.

1. LITHOPS AUCAMPIAE

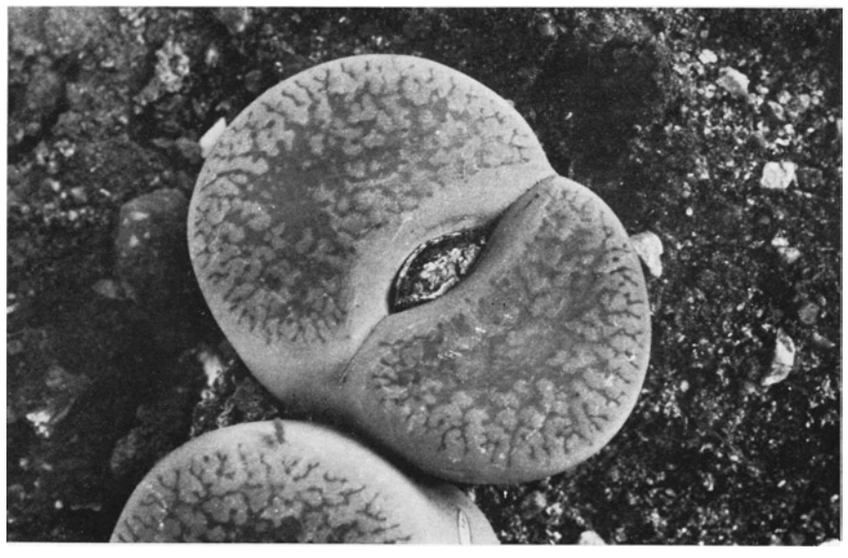
* Indicates Original Description.

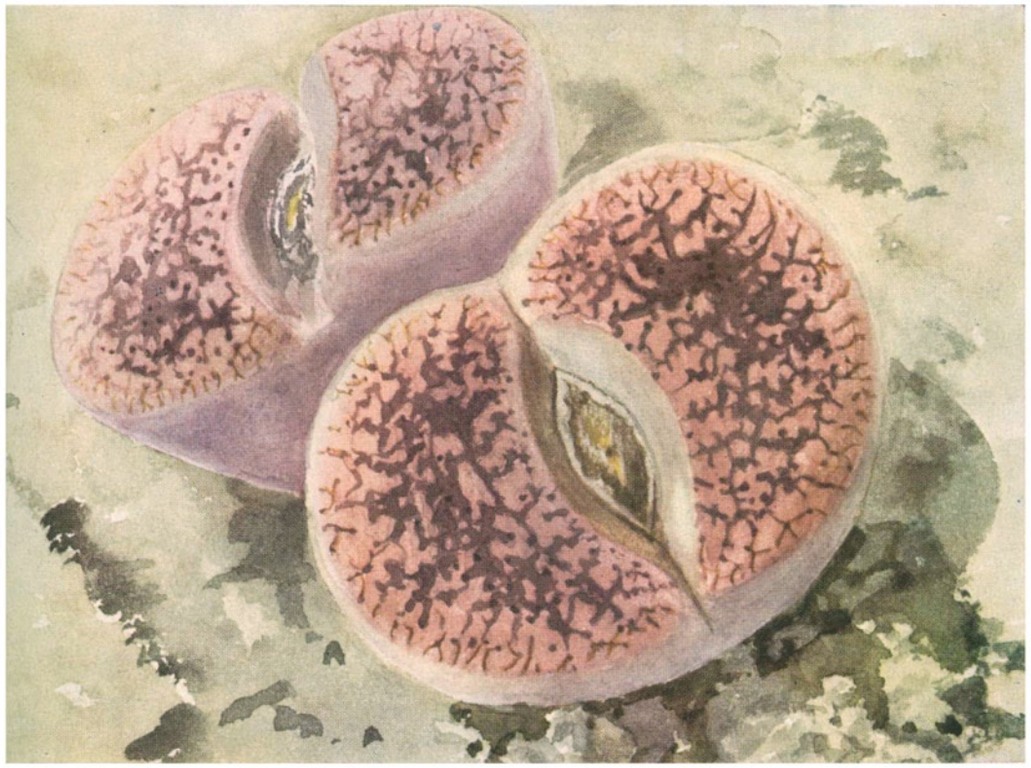
Lithops Aucampiae. (Plates 1, 2.) Growths solitary, in pairs or many in a clump, turbiniform; the sides of the body coloured a reddish or light-brown; top of leaves flat; window consisting of a large number of parts, of irregular shape and size, sometimes narrowed down to transparent or semitransparent lines confluent with one another; in the irregularly shaped window a large number of irregularly shaped islands, which divide the window into various small parts, or the window is large and open, olive-green with so to say no islands and with a distinct brown border, the latter coloured slightly red; these islands raised slightly above the level of the window and coloured reddish-brown, giving the whole upper surface a slightly rugose appearance; the margins of the window of the same colour; the outer margin of the window with islands, provided with a number of prominent, dendritic light olive-green, semitransparent lines; that of the open window laciniated, the borders of the lines or laciniae coloured slightly red. Flowers yellow.

Griqualand West: Postmasburg; Danielskuil; between Kuruman and Vryburg; Bechuanaland, Vryburg.

This is a very variable species. In the same locality two distinct types

FIGURE 14 . LITHOPS AUCAMPIAE L. BOL.





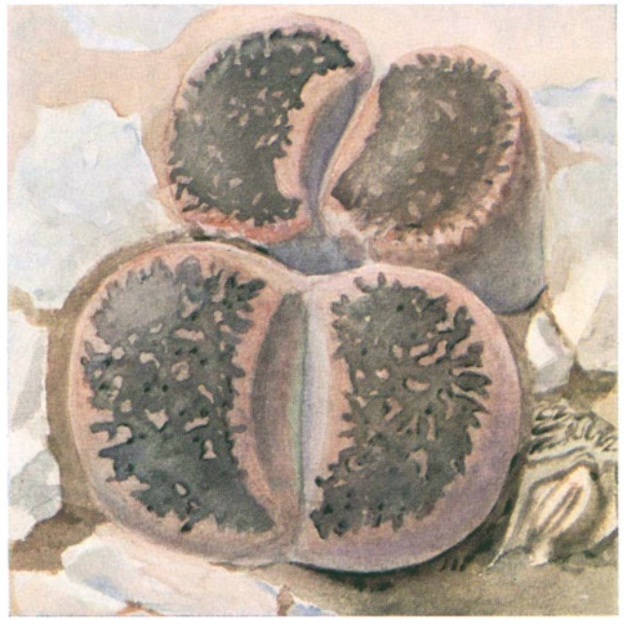


PLATE 1 . LITHOPS AUCAMPIAE L. BOL.

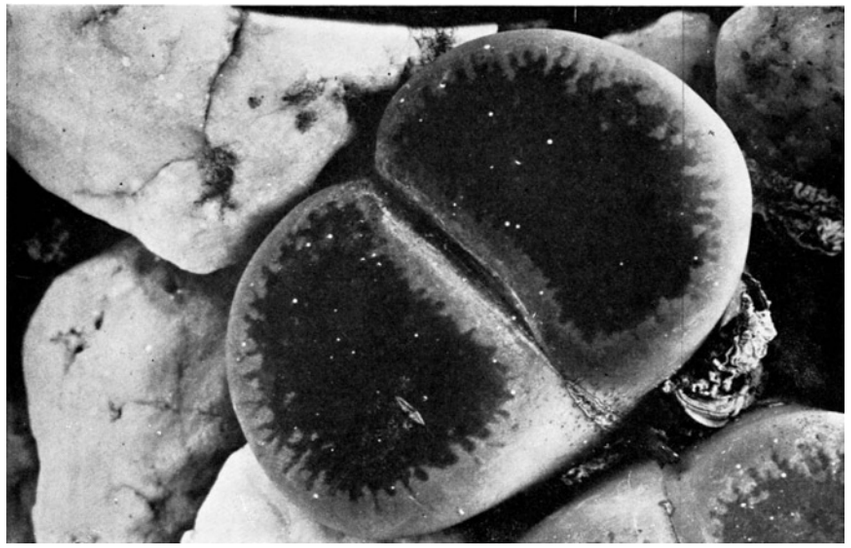


FIGURE 15 . LITHOPS AUCAMPIAE L. BOL.

are found. The plant represented in Fig. 14 and Plate 1 corresponds to the original, i.e. reddish, whereas that in Fig. 15 and Plate 2, although apparently a different plant, is also *L. Aucampiae*. The latter plant was very nearly described by the author as a new species, since it differs quite considerably from the type as originally described. On examining material fresh from the field collected by Dr. Geyer of Cape Town, it was quite obvious that neither the nature nor the colour of the window is a safe criterion for determining this species. It appeared that the plant represented in Fig. 15 was growing alongside the plant in Fig. 14 at Danielskuil. The borders of the laciniated or dendritic margins are coloured red, and this appears to be the constant character of this species, whether the window is large and open or dotted with islands. The delicate red colouration between the laciniae of the margin is a character by which this species can easily be recognised. These coloured lines are absent in both *L. Lesliei* and *L. Venteri*, to which this species is related. Mr. Minnaar of Vryburg informs me that clumps of *L. Aucampiae* are sometimes 8 inches in diameter and that the plants from the vicinity of Griquastad are redder than those from the neighbourhood of Vryburg. The soil of the former is also tinted a deeper red than that of the latter place. Fig. 15 is one of the plants in Fig. 16 somewhat enlarged to show the markings more clearly.

Lithops Aucampiae. (Plate 1, 2.) Plante enkel, in pare of baie in 'n klomp; planteliggaam verkeerdkeëlvormig; die boonste vlak gelyk; die mantel 'n ligte roesbruin kleur of effens rooierig; die venster bestaan uit 'n groot aantal dele van onreëlmatige grootte en vorm, vat mm of meer in mekaar saamvloei en dus met mekaar verbind is; soms is die venster vereng tot deursigtige of half-

FIGURE 16 . LITHOPS AUCAMPIAE L. BOL.

deursigtige lyne wat in mekaar vloei; in hierdie onreëlmatige gevormde venster in die middelgedeelte van die boonste vlak, vorm die deursigtige dele (venster) 'n vrywel groot aaneengeslote olyfgroen venster; in die boonste vlak is daar 'n aantal onreëlmatige eilande, wat die venster dus in kleinere dele verdeel; hierdie eilande is effens bokant die oppervlakte van die venster verhewe, hulle is rooi gekleurd en gee dus 'n gerimpelde voorkome aan die boonste vlak; die venster is omsoom deur 'n soom wat prominente dendritiese, halfdeursigtige vertakkinge aantoon; die kante van hierdie dendritiese vertakkinge is effens rooi gekleurd; soms is daar net een groot, oop, olyfgroen venster met 'n duidelike buitenste bruinerige soom, wat effens geslip is en in die inhamme van die slippe is daar 'n effens, nouliks sigbare rooi kleur; die binnesoom is byna reguit. Blomme geel.

Grikwaland Wes: Postmasburg; Danielskuil; tussen Kuruman en Vryburg; Bechuanaland: Vryburg.

Mnr. Minnaar van Vryburg skrywe in verband met die voorkome van *L. Aucampiae* as volg: „In die nabyheid van Grikwastad kom die plant op 'n heuwel voor wat uit mooi rooi lakklip, geheel en al rooi, net soos lak bestaan. Die grond is gruisagtig en afdraend sodat water nie daar kan dam nie. *Lithops* soek gewoonlik skuilte onder klein bossies en lang graspolle, maar die gras daar is nie hoog nie en die polle yl. Naby Kuruman kom die plant tussen hoe en ruig gras en dan is daar ook kareebome (*Rhus lancea*) en taaibos (*Rhus obavata*)."

Hierdie soort is baie variabel. Op dieselfde plek groei daar twee plante

PLATE 2 . LITHOPS AUCAMPIAE L. BOL.

PLATE 3 . LITHOPS BELLA (DTR.) N.E. BR.

wat heelwat van mekaar in die aard van die boonste vlak verskil. Die plant in Fig. 14 is die een vat ooreenstem met die oorspronklike tipe, rooierige, van hierdie soort, terwyl die plant in Fig. 15, die bruinerige, alhoewel op die oog 'n verskillende plant is tog maar 'n *L. Aucampiae*. Laasgenoemde (Fig. 15) was byna deur die skrywer as 'n nuwe soort beskrywe, want dit verskil blykbaar heelwat van die plant soos oorspronlik deur *L. Bolus* beskrywe. By 'n besoek aan 'n versameling van Dr. Geyer in Kaapstad, het dit geblyk dat die twee blykbaar verskillende plante op die een en dieselfde woonplek by Danielskuil versamel is. Dr. Geyer se materiaal was vars van die veld. Hierdie twee plante groei dus by mekaar en daar is dus geen twyfel nie, dat ons net een soort het, *L. Aucampiae*, maar dat hierdie soort vrywel variabel is wat betref die boonste vlak.

Die kante van die geslipte of dendritiese some is rooi gekleurd en dit blyk dat hierdie kenmerk 'n konstante een is van hierdie soort of die venster nou groot en oop is of met eilande voorsien. Die fyn rooi kleur tussen die slippe van die soom is 'n kenmerk vat ons in staat stel om hierdie soort te herken. Hierdie gekleurde lyne is afwesig by beide *L. Venteri* en *L. Lesliei*, waaraan dit verwant is. Mnr. Minnaar deel my mee dat klomnpe van *L. Aucampiae* in die nabyheid van Vryburg 'n deursnit van by die 8 duim bereik. Die grond rondom Grikwastad is ook effens rooier getint as die van Vryburg.

Die plant in Fig. 15 is net een van die plante vat vergroot is uit Fig. 16.

***Lithops Aucampiae** Corpuse. turbiniforme ferrugineum, apice saturatius planum opacum grosseque notatum, notis prominentibus pallidioribus, punctis

FIGURE 17 . LITHOPS BELLA (DTR.) N.E. BR.

FIGURE 17A . LITHOPS BELLA (DTR.) N.E. BR.

atratis conspicuis plus minusve copiose interspersis; fissura brevi vel subnulla vel ad lineam impressam 4 mm. l. reducta; recept. 8 mm. l., ad 1 cm. diam.; sep. 6–7, obtusa vel apice rotundata, 0·8–1 cm. l., basi 2–3 mm. lata; pet. 3-vel 4-seriata, obtusa vel interiora emarginata vel acuta, inferne angustata, aurea, 1·2–2·3 cm. l., ad 2 mm. lata vel 1·3–1·6 cm. l.; stamina 9 mm. l.; discus acute divisus; ovarium circa marginem planum medium versus lobis leviter compressis elevatisque; stig. 6–7 ad 1 cm. l.

Griqualand West: Postmasburg. Miss Aucamp, D. McCormick (N.B.G. 616/31) Fl. Apr.

2. LITHOPS BELLA

Lithops Bella. (Plate 3, 4.) Growths solitary or forming clumps of two or more; turbiniform; in the young stage slightly convex, in the older stage more or less flat; sides light grey; window large, irregular, dark-green to light-green, surrounded by a buff-coloured, light-green, light-brown or grey-brown border. The outer part of the border provided with lobes varying in length and shape, giving the border a toothed or dendritic appearance; a few irregularly shaped, jagged lobes raised above the level of the dark-green parts of the window generally and projecting into the window, subdividing it into smaller areas; sometimes in the older forms, if fully turgid, the upper surface is strongly convex and then it has a zebra appearance; the inner margin straight or minutely lobed or toothed; in the older forms and sometimes in the young stage the buff colour tends to disappear and is then replaced by a very light-green

1

2

3

PLATE 4 . 1 AND 2. LITHOPS BELLA (DTR.) N.E. BR.
3. LITHOPS BREVIS L. BOL.

grey (fawn) colour, the projections disappear, increase in size, become flatter, and in that way the window is divided into smaller areas. The upper surface has then a zebra appearance and assumes a more or less uniform colour. Flowers white.

South-West Africa: Granite mountains near Aus-Gubub; Garub Gr. Karasberge; Wittputz.

This beautiful species is characterised by the large, transparent, irregular window; the projecting laciniae raised above the level of the window and thereby giving the whole a pronounced rugosity. These laciniae resemble the projections of a very mountainous coast with its many irregular inlets and bays into the sea. In the turgid condition the raised portions tend to become flat. Usually the opaque parts are buff-coloured, although this is not a constant feature.

Figs. 17 and 17A and Plates 2 and 3 show quite clearly the nature and the variation of the top surface. The parts of the transparent window are distinctly shown.

In the transparent lines a few dark-red lines can sometimes be observed, although this does not seem to be a constant feature of this species.

Lithops Bella. (Plate 3, 4.) Plante enkel of klompe van twee of meer; verkeerd keëlvormig; in die jong stadium is die boonste vlak effens konveks, terwyl in die ouere stadia dit mm of meer plat is; die mantel effens grys-groen; venster groot, deursigtig, onreëlmatig, donker tot liggroen omgewe deur geelbruin, liggroen, ligbruin tot grysbruin soom; die buitenste kant van die soom is geslip, die slippe varieer in lengte en in vorm, Maardeur die soom 'n getande of dendritiese voorkome kry; 'n paar onreëlmatige gevormde, getande slippe bokant die oppervlakte van die donkergroen dele van die venster; hierdie slippe vorm uitlopers in die venster in, waardeur die venster in kleinere areas verdeel word; soms in die ouere vorms, indien geheel en al turgied, is die boonste vlak sterk konveks en dan het dit 'n sebravoorkome; die binneste soom reguit, fyn getand of geslip; in die ouere sowel as in die jongere stadia het die geelbruin kleur 'n neiging om te verdwyn en word dan vervang deur 'n baie ligte groengrys kleur; die slippe in die venster word groter en verdwyn, word platter en daardeur word die venster in kleinere dele verdeel. Die boonste vlak het dan 'n sebravoorkome en is dan mm of meer van een kleur. Blomme wit.

Suidwes-Afrika: Granietberge naby Aus-Gubub; Garub; Gr. Karasberge; Wittputz.

Hierdie soort groei blykbaar net op die sagte hange van die berge en nie aan hulle basis nie en ook nie op die bergtoppe nie. Hierdie mooi soort is een van die wenige *Lithops*-soorte met wit blomme en word gekenmerk deur die groot, deursigtige, onreëlmatige venster; die slippe (uitlopers in die venster)

verhewe bokant die oppervlakte van die venster. In die turgiede toestand neig die verhewe dele om plat te word. Gewoonlik is die ondeursigtige dele (die ruë) geelbruin gekleurd, alhoewel dit nie 'n konstante kenmerk is nie.

Deurdat die ruë effens bokant die vensteroppervlakte verhewe is, gee dit die boonste vlak 'n ongelyke voorkome. Die slippe lyk baie soos die uitlopers van 'n baie rotsagtige kus met die baie onreëlmatige inhamme en baaie in die see in. Fig. 17 en Plate 3 en 4 toon duidelik die geaardheid en variasie van die boonste vlak aan.

In die deursigtige duike is daar soms donkerrooi lyne waar te neem, alhoewel dit nie 'n konstante kenmerk is van hierdie soort nie.

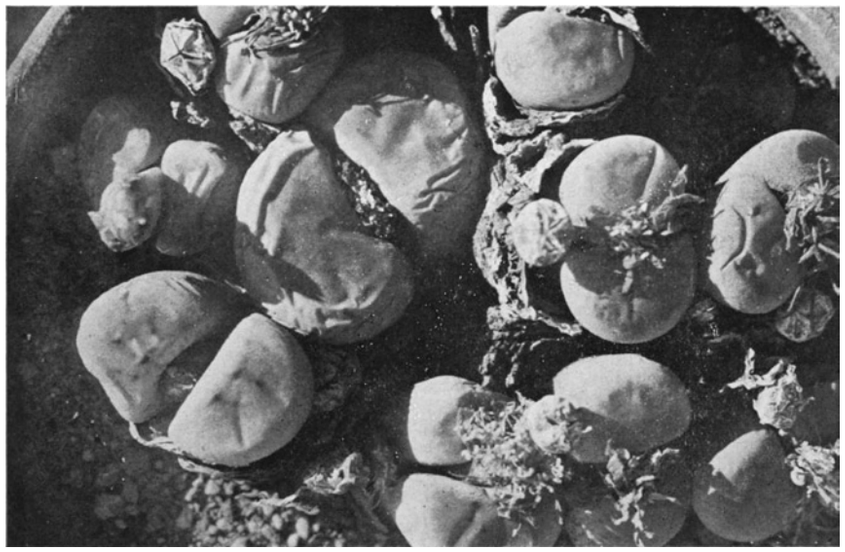
***Lithops Bella.** Growths at first solitary, forming clumps with age, increasing slowly, each up to about 1 in. high and 1 in. in their greater diameter, with the top lobes convex, having a rather broad, light-brown or buff-brown border, enclosing an irregularly lobed fuscous or greenish central area with or without 1 or 2 brown spots upon it. Flowers not seen, stated to be white and shining.

Great Namaland: Aus near Aus, Phillips.

This plant was subsequently re-described by Dinter in 1923 as *Mesembryanthemum bellum* as follows:

Pflanze 1–6 köpfig. Korpuskel 2·5–3 cm. lang, ihre Oberfläche 22 × 15 mm. flach, bräunlichgelb, mit vertiefter, schwach, verästelter (im Vergleich mit

FIGURE 18 . LITHOPS BREVIS L. BOL.



M. pseudotruncatellum) dunkler Zeichnung. Einschnitt zwischen den beiden Blättern 8 mm. tief. Cuticula sehr fein gekörnelt. Blütenstiel 3.5 cm. lang, unterm Fruchtknoten 7 mm. breit, 4 mm. dick, grün. Blüte unter den Kelchzähnen 10 mm. breitgedruckt, 4–5 mm. dick. Kelchzähne fünf, 5 mm. lang, an der Basis 3 mm. breit, alle fünf gleich, mit schmalen häutigen Rande versehen, weisslichbraun, deutlich sichtbar dicht punktiert. Korollendurchmesser 25 mm. Petalen rein weiss, zweireihig, unten frei ca. 30, verkehrt lanzettlich, abgerundet, grösste Breite 2 mm. Stamina 6 mm., aufrecht, weiss, mit einem schmalen Ringe kurzer, farbloser Haare nahe ihrer Basis, Antheren hellgelb. Stigmata fünf, 8 mm. lang, schlank, bis auf den flachen Fruchtknoten frei, unten grünlich, im oberen Teile gelb aufrecht, dann etwas divergierend und oben wieder zusammengeneigt.

Grossnamaland: Auf Granitgrus in den Bergen von Aus und Gubub, sowie Kuckaus an der Wasserstelle 2 (Kessel), in Blüte Juni 1922.

Die prächtige, mittelgrosse Art, deren man in der Blütezeit in den ersten Nachmittagstunden Tausende an einem Tage sehen kann, passt sich so hervorragend gilt an ihr Substrat an, dass ich, während ich (ganz zufällig) auf einer kleine horizontalen Granitgrusfläche an einem Vormittage nur drei Exemplare trotz aller Anstrengungen meiner guten Augen entdecken konnte, auf der gleichen Stelle am selben Nachmittage zu meiner grossen Überraschung deren weit mehr als 100 fand.

3. LITHOPS BREVIS

Lithops Brevis. (Plate 4.) Growths solitary or forming clumps of two or more; turbinate; top of lobe flat; window large, open, transparent, very light-green, with a few round, elliptical blood-red lines near inner margin or blood-red markings absent; outer margin slightly sinuous or minutely serrate; inner margin straight; window bordered by a buff-coloured band, with many minute dots in the band. Flowers yellow.

Namaqualand: Hill 5 miles S.E. of Viool's Drift, Orange River.

In the description of this plant L. Bolus states that it is related to *L. olivacea* and may be a variety of the latter. To my mind this species, *L. brevis*, is definitely related to *L. Dinteri*, which grows just across the river, and these two species are not related to *L. olivacea*. *L. Dinteri* was examined in the live condition. The main point of difference between *L. brevis* and *L. Dinteri* is that the red spots of the latter are fulgent red, 10–15, whereas those of *L. brevis* are fewer in number and dull red and not so prominent. One need only compare Fig. 18 with Fig. 28 to see in what way these two species differ from one another. It may, however, on a further study of these two species appear that they are identical and in that case *L. brevis* would have to disappear.

FIGURE 19 . LITHOPS BROMFIELDII L. BOL.

Lithops Brevis. (Plaat 4.) Plante enkel of twee of meer in 'n klomp; verkeerd keëlvormig; boonste vlak plat; venster groot, deursigtig, oop, baie liggroen gekleurd, met 'n paar elliptiese, bloedrooi lyne naby die soom (binne) of die rooi merke afwesig; buitenste soom effens bogtig, fyn getand; binneste soom reguit; die venster omsoom deur 'n liggeel gekleurde band met baie fyn stippels. Blom gee!.

Namakwaland: Heuwel 5 myl S.O. van Viool's Drif, Oranje Rivier.

In die beskrywing van hierdie soort word dit deur L. Bolus vermeld dat dit naverwant kan wees met *L. olivacea* en dat dit moontlikerwys 'n varieteit daarvan kan wees. Hierdie sienswyse is m.i. nie juis nie, want ek het altwee soorte in die lewende toestand gesien en ek meen dat *L. brevis* eerder met *L. Dinteri*, wat net oorkant die Oranje R. groei verwant is. Met *L. olivacea* het dit niks meer geineen nie as die oop venster nie. Die hoofverskil tussen *L. brevis* en *L. Dinteri* is dat daar by laasgenoemde 'n 10–15 gloeiende rooi kolle in die middel van die venster is, terwyl by *L. brevis* die rooi merke mm of meer beperk is tot die kant van die venster en verder hulle is nie so baie en ook nie so intensief glinsterend gekleurd as die van *L. Dinteri*. Deur 'n vergelyking van Fig. 18 met Fig. 28 en die Plate 3 en 6 sal dit heel duidelik wees wat die verskil is. Dit kan egter by verdere ondersoek blyk dat hierdie twee soorte tog identies is en dan sou *L. brevis* moet verdwyn. Die skrywer hiervan het die geleentheid gehad om ook *L. Dinteri* in lewende toestand te ondersoek.

PLATE 5 . LITHOPS BROMFIELDII L. BOL.

✱**Lithops Brevis.** Folia subaequalia, ad 3·2 cm. longa, parte libera brevi, 5–6 mm. longa, apice per 5 mm. divergente, 1·5–1·6 cm. lata, apice ad 1 cm. diam., superne brunneo-glauca vel in cultis glauca, pallide roseata suffusa, fenestra bene visa, sat parva, sordide olivaceo viridi, saepius enotata, margine exteriore integra vel inconspicue diviso; flores pomeridiani vespertinique; pedunculus inclusus, ad 1·8 cm. longus; receptaculum ca 3 mm. longum, ad 6 mm. diam.; sepala 5, brevia 5–6 mm. longa, basi 2–5 mm. lata; petala 1–2 seriata obtusa, inferne attenuata, aurea, 7–8 mm., vel in flore altero L 1·1–1·2 cm. longa, ad 2 mm., vel rarius ad 25 mm. lata; filamenta lutea, superne aurea, ad 6 mm. longa, antheris luteis; ovarium supra planum, lobis vix visis; stigmata 5, 6–7 mm. longa; capsula senectissima tantum visa, supra fere plana.

Namaqualand: "Hills 5 miles S.E. of Viool's Drift," Orange River, Oct. 183, Pillans, 6608. Fl. Maio-Jun. 1932. *L. olivacea*, L. Bol., valde affinis, fortasse varietas mera.

4. LITHOPS BROMFIELDII

Lithops Bromfieldii. (Plate 5.) Growths solitary or forming clumps of two or more; window irregular, very dark olive-green, and on this a number of bifurcated blood-red to dark brown-red lines, the forks ending in the sinuses of the outer margin; outer margin lobed or laciniated, the lobes or laciniae projecting into the window and forming ridges or islands; islands and lobes bullate, coloured a brown-yellow; margin coloured light brown-yellow. Flowers yellow.

Keimoes, Gordonia.

This species is easily recognised by (1) the bullate yellow-brown markings of the dark-green window, and (2) the many dark to blood-red lines. It is related to *L. insularis*, which grows in the immediate neighbourhood of this species, but *L. Bromfieldii* differs from *L. insularis* in that there are no yellow-brown markings in the window. In my own mind, however, I am not so sure that *L. insularis* is not a variant form of *L. Bromfieldii* and that it stands at the one end of the breadth of variation of *L. Bromfieldii* and that *L. Bromfieldii*, as described by L. Bolus, is at the other end. This can only be settled by an examination of these two species in their natural habitat (Fig. 19).

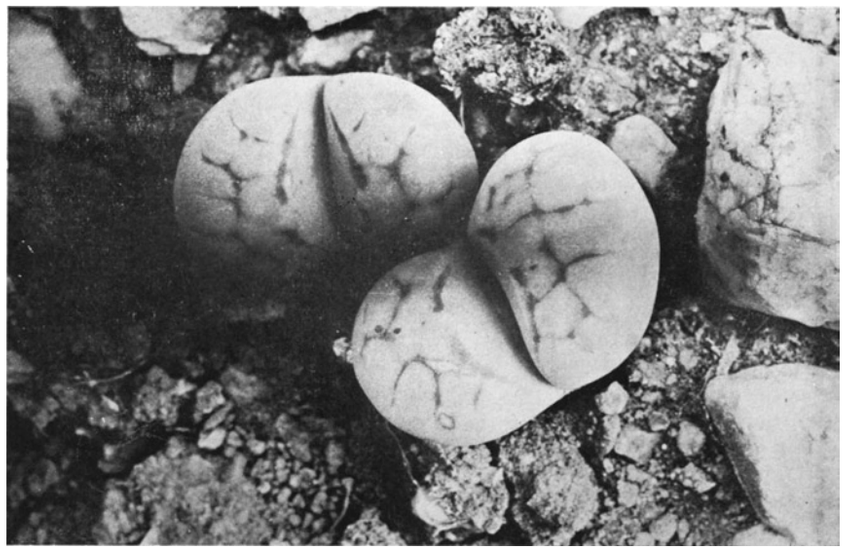
Lithops Bromfieldii. (Plaat 5.) Planteliggaam enkel of 2 of meer in 'n klomp, venster onreëlmatig, baie donker olyfgroen en in hierdie deursigtige deel 'n aantal gevurkte bloedrooi tot donker bruinrooi lyne, die vurke eindig in die inhamme van die buitenste soom; buitenste soom geslip; sommige van die slippe vorm uitlopers in die venster in en vorm eilande; die eilande en die slippe opgeblaas, geelbruin; op die eilande 'n groot aantal klein wit stippeltjies; binnesoom byna reguit; eilande en some lig bruingeel gekleurd. Blomme geel.

Keimoes, Gordonia.

Hierdie soort is maklik te herken deur (1) die opgeblase eilande en die geelbruin slippe en (2) die baie donker tot donker-rooi kolle of lyne. Dit is na verwant aan *L. insularis*, mat naby voorkom, maar dit verskil daarvan deurdat laasgenoemde nie die geelbruin merke het nie. Ek is, egter, nie so seker nie dat *L. insularis* nie 'n variante vorm is van *L. Bromfieldii* nie. My wil dit voorkom dat *L. insularis* aan die een einde van die variasie-breedte van *L. Bromfieldii* staan en *L. Bromfieldii* self, soos L. Bolus beskrywe, aan die ander punt. Hierdie vraagstuk kan slegs opgelos word deur 'n noukeurige ondersoek van die twee soorte in hulle natuurlike woonpiek. Aan mnr. A. A. Roux, Keimoes, is ek vir die volgende beskrywing van die woonplek van *L. Bromfieldii* dank verskuldig: „*L. Bromfieldii* groei in hoë koppe of heuwels met loodblou klipriwwe, tamelik rof. Grond vas en hard met klein klippies versprei oor die oppervlakte. Grondkleur rooi, kop baie rof. Waar *L. Bromfieldii* groei is baie mm bosse. Hulle groei ook nie onder bosse nie." Mnr. Roux is een van die ywerigste *Lithops*-versamelaars in die land (Fig. 19).

***Lithops Bromfieldii.** Corpusculum maximum visum latere altero 3 cm. latere altero 3·7 cm. longum, parte latissima ad 2·2 cm., fissura 1·6 cm. lata 3 cm. diam. cum fissura per 3–4 mm. ubi flos emerget tantum divergente, fissura ad 4 mm. longa, saturate columbine griseum, supra planum sinon irregulariter bullatum, fenestra ipsa in conspicua, brunneo grisea, margine exteriore inaequaliter pectinate lobato, lobus pallide griseis, parte inter lobos ferrugineo rubra, intra marginem notis prominentibus, linearibus vel ramosis, pallide griseis, sparsis, ubique punctis parvis, ferrugineo rubris, leviter prominentibus, sat copiose ornata; pedunculus superne gradatim ampliatus, 3 cm.

FIGURE 20 . LITHOPS CHRYSOCEPHALA NEL



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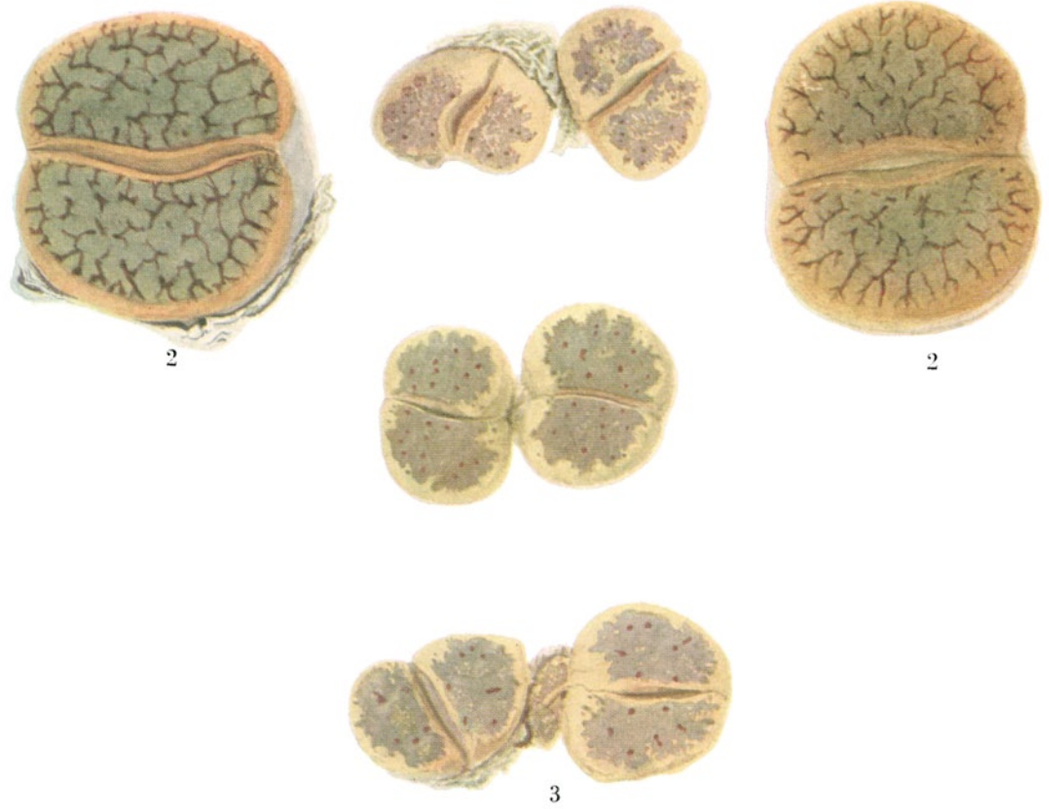

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PLATE 6 . 1. LITHOPS CHRYSOCEPHALA NEL
2. LITHOPS DENDRITICA NEL
2. LITHOPS DINTERI SCHWANT.

PLATE 7 . LITHOPS COMPTONII L. BOL.

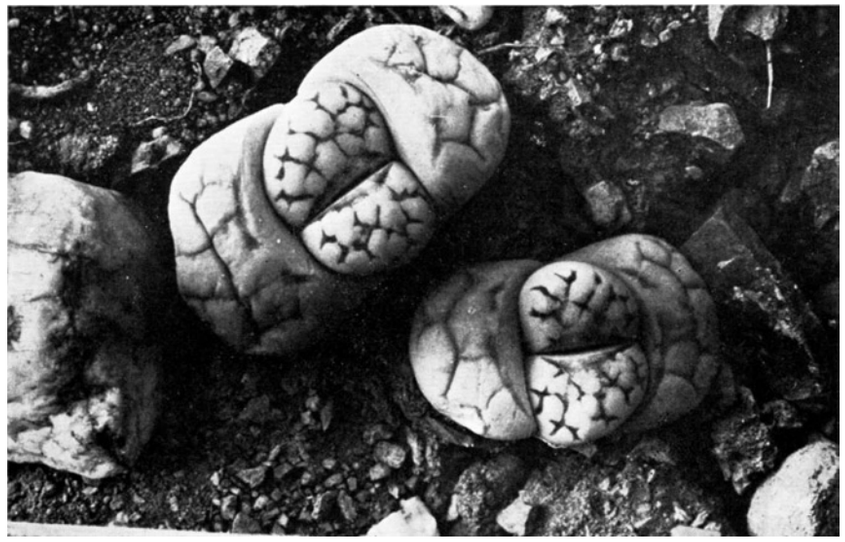


FIGURE 21 . LITHOPS CHRYSOCEPHALA NEL

longus; receptaculum valde compressum, subexsertum, 5 mm. longum, 8·5 et 4 mm. diam.; sepala 5, obtusa 8 mm. longa, 3–5 mm. lata, 3 anguste marginata; petala 5-seriata, 1·5, 1·8, 2, et 2·2 cm. longa, ad 2 mm. lata, intima pauca angusta acuminata, exteriora acuta vel subacuta, extima obtusa, inferne leviter angustata, aurea; filamnenta parum supra basin constricta, alba, superne aurea, ad 8 mm. longa, exteriora e basi per 3 mm. papillate ciliata, intima epapillata, antheris aurantiacis; discus conspicuus crenatus; ovarium obscure lobatum, apicem versus gradatim leviterque elevatum, ibique altitudinem disce vix attingens; stigmata 5, superne aurantiaca, 1·2 longa.

In dit. Gordonia, prope Upington, Sept. 1933, H. Bromfield (N.B.G. 2286/33). Fl. Mart. 1934.

5. LITHOPS CHRYSOCEPHALA

✱**Lithops chrysocephala.** (Plate 6.) Corpuscularia 2–2 cm. longa, 1–1·5 cm. lata, turbiniformia folio aequalia vel sub-aequalia, subconvexa, pallide griseo-albida, rugulosa; fissura 1·2 cm. longa, 5 lata; fenestra impellucida intus rugulosis lineis viridibus et semipellucidis notata et in lineis sparse rubro-punctata; margo exterior simplex vel bifurcata; margo interior viridis et semipellucida, lineis punctis rubris vel atrorubris notata; flos diam. 1·2 cm.; sepala lineari-ovata, acuta, fusco-virida, 5 mm. longa, 2–3 mm. lata; petala linearia, acuta, alba, 10 mm. longa, 2 mm. lata, 1-seriata; stamina 5 mm. longa, filamenta alba, antherae fulvidae; ovarium medio planum; discus crenulatus; stigmata 5, 10 mm. longa. Capsula quinquelocularis.

Upington: Geelkop: Dry; Sept. 1939; Fl. Hort. Bot. Univ. Stellenbosch; 13 Apr. 1943, 5 p.m.

***Lithops chrysocephala.** This *Lithops* was received from Mr. Dry of Geelkop, but the exact locality is unknown. It resembles in colour *Argyroderma testiculare*. This species is characterised by (1) an opaque light grey-white (silvery white) window and (2) dark-green transparent lines. At one stage in the life of the plant these lines seem to divide the upper lobe into 3–4 equal rectangular areas. The inner margin is dark-green and parallel with this runs a second similar line connected with the former margin by 3–4 lines, and these connecting lines divide the upper surface into 3–4 subequal areas. These two lines are about 5 mm. apart. From this second line, which passes through the middle of the lobe, 3–4 lines run to the outer margin and end there. At the intersection of these lines transparent rectangular areas are formed, and in these areas small dark-red dots embedded in the tissue or colouring the tissue are found. Flower white.

As regards the above features it appears that these characteristics are not constant. At a later stage in the life of the plant, the lobes are slightly convex and the upper surface is divided into a number of areas or wrinkles, each of which is slightly raised above the level of the dividing depressions. The general appearance is thus a slightly wrinkled one. At the intersection of these lines and at other points a few dark-red dots or lines occur. The inner margin more or less straight and in this are found a varying number of dark-red lines or dots in the tissue. The lines ending in the outer margin are either straight or slightly bifurcated. These red colourations are in the tissue. Although this plant conies ostensibly from a locality near to where *L. insularis, L. Bromfieldii, L. Mennellii* occur, yet it is a distinct species. In some respects it resembles *L. Fulleri*, but the outer and inner margin of *L. Fulleri* is much more lobed, and in these lobes there is a distinct dark colouration absent in the above species. From *L. Mennellii* it differs in that the lines of *L. chrysocephala* are dark-green, those of *L. Mennellii* black, and the upper lobe of the latter is far more subdivided (Hebrew script).

The coloured plate (Plate 6) shows the nature of the lobe of the plant at one stage in its life very well. Fig. 20 is a photo of this plant in 1939 and as originally described. Fig. 21 is a photo of the same plant a few years later. Fig. 22 is the same plant as shown in Fig. 20 but after 6–8 years. These photos show conclusively that one cannot rely too much on the markings of the upper surface as this tends to change beyond recognition. These photographs and those of *L. Inae* show quite definitely that great care has to be exercised in making use of the markings of the lobes, as these markings are very liable to variation. It is not sufficient to make an accurate drawing of only one lobe and from that fix the characters of the species. These lobes are after all only leaves, and it is a matter of experience that leaves show a great deal of variation. In determining the characters of species this must be borne in mind.

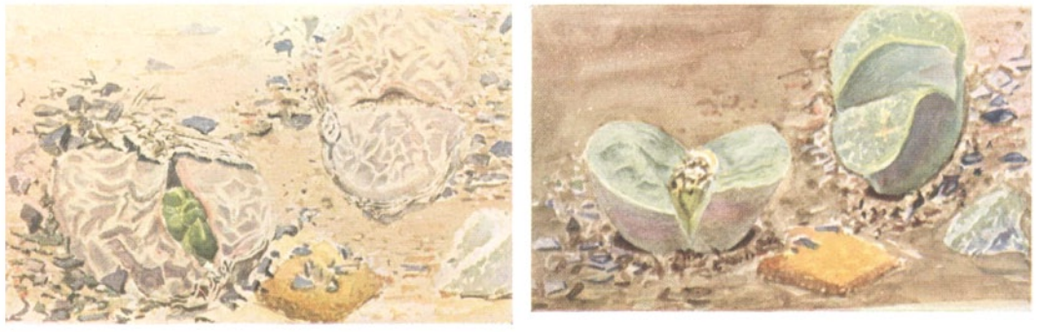


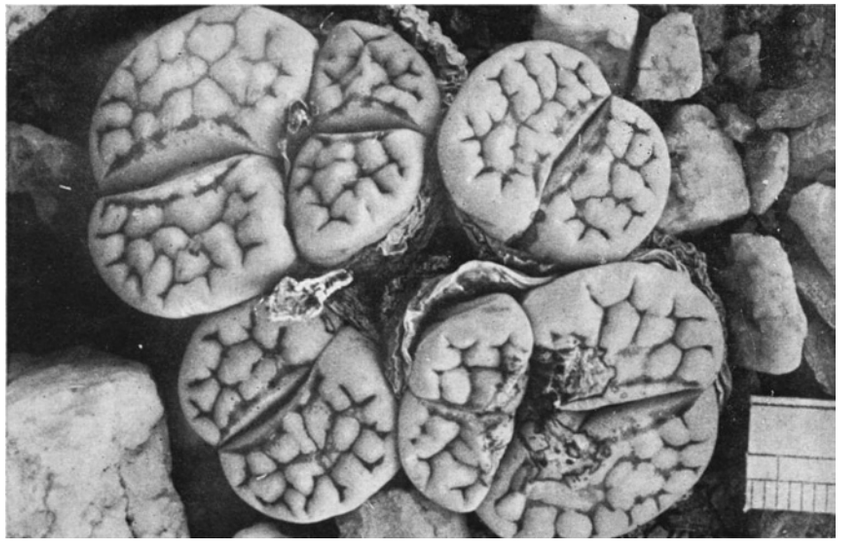
PLATE 8 . LITHOPS DIVERGENS L. BOL.

Lithops chrysocephala. (Plaat 6.) Hierdie soort word gekenmerk deur (1) 'n ondeursigtige ligte grys-wit venster en (2) donker-groen deursigtige lyne. Die kleur van die lyne varieer effens na die ouderdom van die plant, soms is hulle effens geel getint. Op een stadium in die lewe van die plant skyn dit of hierdie lyne die boonste vlak in 3–4 reghoekige areas verdeel. Die binneste soom is donker-groen en parallel met hierdie lyn loop 'n soortgelyke een, wat met die vorige genoemde soom deur 3–4 lyne verbind is en hierdie lyne wat die twee verbind verdeel die boonste vlak in 3–4 byna gelyke dele. Hierdie twee lyne is omtrent 5 mm. van mekaar. Van hierdie tweede lyn wat deur die middel van die vlak loop, is daar weer 3–4 lyne wat na die buitenste soom loop en daar eindig. By die kruispunte van hierdie lyne is daar reghoekige areas gevorm en in hierdie klein areas is daar klein donkerrooi kolle ingeplant in die weefsel of kleur dit.

Dit blyk dat die bovermelde kenmerke nie konstant is nie. Op 'n latere stadium in die lewe van die plant is die vlak effens konveks en die boonste vlak is verdeel in 'n aantal areas en plooie, elk waarvan bokant die oppervlakte van die duike verhewe is. Die algemene voorkome is dus 'n gerimpelde een. By die kruispunte van hierdie lyne en op ander punte kom daar 'n paar donker-rooi punte of lyne voor. Die binneste soom is mm of meer reguit en in hierdie soom is daar 'n aantal donker-rooi lyne of punte van wisselende getal. Die lyne wat in die buitenste soom eindig is mm of meer reguit of effens gevurk. Hierdie rooi kleur is in die weefsel. Die blom is wit.

Alhoewel hierdie plant blykbaar in die nabyheid van die woonplek van

FIGURE 22 . LITHOPS CHRYSOCEPHALA NEL



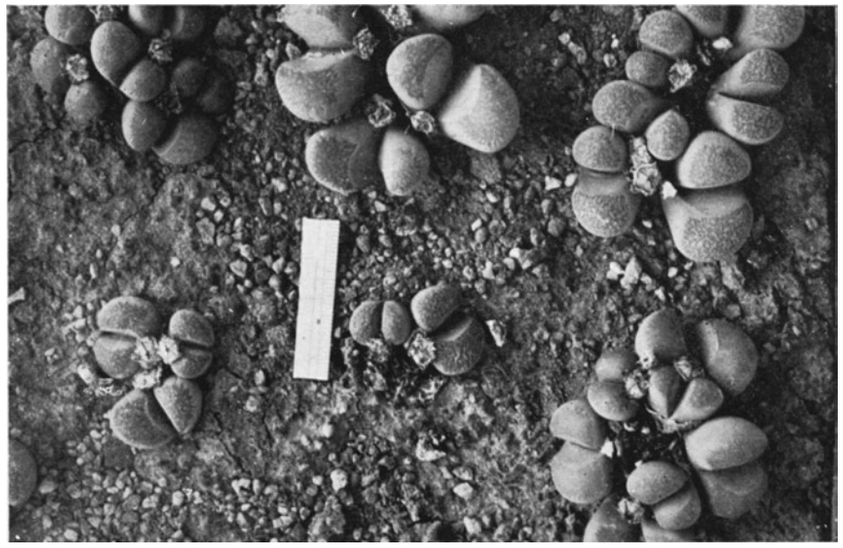


FIGURE 23 . LITHOPS COMPTONII L. BOL.

L. insularis, L. Bromfieldii, en *L. Mennellii* voorkom is dit tog heel duidelik 'n aparte soort. In sommige opsigte lyk dit soos *L. Fulleri* maar die buitenste en binneste soom van *L. Fulleri* is baie meer geslip en tussen hierdie slippe is daar 'n duidelike donker kleur, wat afwesig is by hierdie soort. Van *L. Mennellii* verskil dit deurdat die lyne van onse soort donker-groen is terwyl die van *L. Mennellii* swart is. Die boonste vlak van *L. Mennellii* is baie meer gerimpeld as wat dit die geval is by hierdie soort.

Plaat 6 wys die aard van die lobbe van die plant op een stadium in sy lewe baie mooi. Fig. 20 is 'n portret van die plant soos oorspronklik beskrywe in 1939 en Fig. 21 is 'n portret van dieselfde plant 'n paar jaar later. Fig. 22 is dieselfde plant as afgebeeld in Fig. 20 maar 6 of 8 jaar later. Hierdie portrette toon heel duidelik aan dat 'n mens jou nie te veel kan verlaat op die merke van die boonste vlak want dié kan so verander dat 'n mens dit nie meer kan herken nie. Hierdie portrette en die van *L. Inae* toon heel duidelik aan dat 'n mens baie versigtig moet wees om gebruik te maak van die merke van die lobbe want hulle is geneig om te varieer. Dit is nie genoeg om 'n noukeurige tekening van net een lob te maak nie en dan daarvan die kenmerke van die soort te wil vaslê. Die lobbe is per slot van rekening net blare en die ondervinding leer ons dat blare aan variasie onderworpe is. By die bepaling van die kenmerke van 'n soort moet dit onthou word.

6. LITHOPS COMPTONII

Lithops Comptonii. (Plaat 7.) Growths usually solitary, sometimes 2 or 4 or up to 15 in a clump, turbinate; lobes, especially in the young stage obliquely

convex and of unequal size or convex; window large, unbroken, dark-green, purple-green or purplish red, or window broken up into a large number of confluent windows by irregular-shaped islands sometimes giving the window a fine rugulose appearance and on these islands white dots; outer margin numerous irregularly-shaped laciniae or teeth; inner margin minutely lobed. Margin greyish-green. Flowers yellow.

Ceres Karroo; Karroo Poort in clayey soil on sides of hillock.

This species is very difficult to find in the field, especially when slightly covered with a fine somewhat reddish sand of the one locality. The colour of the sand approximates that of the upper surface of the lobes, and these are practically level with the soil.

Fig. 23 shows a number of plants fresh from the field. Note the variation in the upper surface of the lobes. Figs. 24–26 are reproductions of photos taken of this species in its natural habitat.

Lithops Comptonii. (Plaat 7.) Die planteliggaam enkel, soms vorm hulle klompe van wisselende grootte en dan bevat 'n klomp tot 15 enkele plante; die boonste vlak vernaamlik in die jong stadium skuins-konveks en van ongelyke grootte of konveks; venster groot, onverdeeld, deursigtig, donkergroen, purpergroen, of purperrooi of die venster is verdeeld in 'n groot aantal klein vensters wat saamvloei met onreëlmatige gevormde eilande, waarop daar baie klein wit stippels voorkom en hierdie baie eilande gee die vlak 'n effens gerimpelde voorkome; die buitenste soom het baie onreëlmatige slippe of tande; die binneste soom fyn getand. Die soom grysgroen. Blomme geel.

FIGURE 24 . LITHOPS COMPTONII L. BOL.

FIGURE 25 . LITHOPS COMPTONII L. BOL.

Ceres Karroo: Karroo Poort op die hange van kleiagtige heuwels, die oppervlakte waarvan hedek is met 'n ligte rooierige waaisand.

Hierdie soort is uiters moeilik om in sy natuurlike woonplek te vind want soms is die effens rooi gekleurde plante en vernaamlik as hulle droog is barn effens hedek met die rooierige sand en dan lyk hulle soos die grond. Hierdie soort kom op verskillende plekke in die omgewing van Karroo Poort voor.

Fig. 23 is 'n portret van 'n aantal plante van hierdie soort net kort na hulle uit die veld aangekom het. Die andere drie Fig. 24-26 is portrette om die plante in hulle natuurlike woonplekke aan te toon.

***Lithops Comptonii.** In March the 3 olive-green purple-tinged bodies flowered, the flowers 2·5 cm. in diameter, the peduncle completely enclosed and the tips of the 6 sepals scarcely reaching the level of the body, so that the spreading golden petals rested on the windows. This species is closely allied to *L. terricolor*, but differs in having the window clear except for the lacerated pattern surrounding the outer margin, the lobes widely diverging and the stigmas scarcely reaching the apex of the stamens.

Ceres Karroo: Karroo Poort, in clayey soil on sides of hillock.

The above description is the original one by L. Bolus.

7. LITHOPS DENDRITICA

Lithops Dendritica. (Plate 6.) Growths forming clumps of 2 or single; leaves subequal, convex or plane; sides violaceous grey; window opaque, buff-coloured, rugose, between the slight elevations a large number of dendritic inter-connected slightly blood-red lines, these dendritic lines ending in bifurcations in the outer margin; inner margin bordered by irregular lines; round the upper surface a narrow buff-coloured band, 1–2 mm. broad. Flowers unknown.

South-West Africa: Locality unknown M. Otzen.

This species is evidently related to *L. pseudotruncatella*, but the latter is characterised by the very large number of light to dark-green miniature windows, clearly absent from *L. dendritica*. The seemingly very regular arid prominent impressed dendritic lines characterise this species, and no other species of this genus is so well marked in this respect as this one (Fig. 27).

Lithops Dendritica. (Plaat 6.) Plante enkel of 2 in 'n klomp; blare gelyk of ongelyk; boonste vlak effens gewelfd of plat; mantel effens violetgrys; venster ondeursigtig, geeloranje, gerimpeld, tussen die plooie is daar dendritiese effens bloedrooi lyne wat met mekaar verbind is, hierdie lyne eindig in die vurke van die buitenste soom; rondom die boonste vlak 'n 1–2 mm. breë geeloranje band. Blomme onbekend.

Suidwes-Afrika: Woonplek onbekend; M. Otzen.

Hierdie soort is nou verwant aan *L. pseudotruncatella*, maar laasgenoemde word gekenmerk deur die baie groot getal lig- tot donkergroen miniatuurvensters, terwyl hierdie vensters geheel en al afwesig is by *L. dendritica*. Die blykbaar reëlmatige en prominente dendritiese lyne vat in

FIGURE 26 . LITHOPS COMPTONII L. BOL.

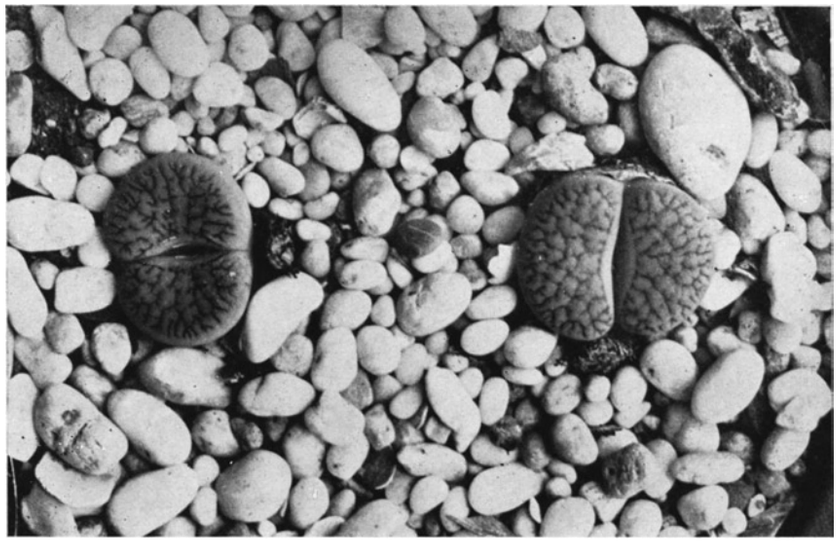


FIGURE 27 . LITHOPS DENDRITICA NEL

die oppervlakte ingedruk is kenmerk hierdie soort en dit is 'n eienskap wat by geen ander soort van hierdie geslag voorkom nie (Fig. 27).

Lithops Dendritica Nel, spec. nov. Corpuscularia turbiniformia; folia aequalia vel subaequalia, convexa vel plana; fenestra opaca, aurantiaco-lutea, rugosa vel subrugosa; inter rugas liniis atro-rubris notata; exteriore margine bifurcata. Flores ignoti.

S.W. Africa: M. Otzen.

8. LITHOPS DINTERI

Lithops Dinteri. (Plate 6.) Growths solitary or few in a clump, turbinate; more or less equal lobes; top of lobe flat or slightly convex; the sides coloured purplish green; top of lobes with a large transparent window and a few islands, seldom large, in which several white dots can be observed; window coloured transparent brown-green; in the window 10–15 very prominently coloured blood-red dots distributed unevenly over the surface; window bordered by a coloured band, outer part of which is light to dark yellow tinged with brown, this coloured margin more prominent and broader than the inner part of the border; in the margin at both ends where the fissure ends several dark-green to dark blue-green dots in the surface; inner margin practically straight and scarcely lobed or laciniated; outer margin with irregularly shaped laciniae, some projecting into the window and forming islands. Flowers yellow.

South-West Africa: Witsand (E. Rusch, 1926); Eendoorn, south of Warmbad.

This species is characterised by the fulgent blood-red dots such as have not been observed, so far, in any other *Lithops*.

Fig. 28 is a reproduction of the photo accompanying the description of this species by Schwantes. It shows very clearly the prominent red spots. Fig. 29 is a photo of the plant in the young stage.

Lithops Dinteri. (Plaat 6.) Plante enkel of 'n paar in 'n klomp; blare mm of meer ewe groot; boonste vlak plat of effens gewelfd; die mantelkante persgroenerig; boonste vlak met groot ongebroke oop venster, baie selde bestaande uit 'n aantal klein vensters; in die groot venster 'n klein aantal eilande, selde groot en in die eilande 'n aantal wit puntjies; die venster deursigtig bruingroen; in die venster 10–15 sterk glinsterende bloedrooi kolle oneweredig oor die oppervlakte versprei; venster omsoom deur 'n soom waarvan die buitenste deel lig-tot donkergeel gekleurd is met 'n bruinrand, hierdie gekleurde rand meer prominent en breër as die binneste deel; in hierdie rand is daar waar die spleet eindig aan al twee eindes verskeie donkergroen tot donker blou-groen punte in die oppervlakte; die buitenste soom van die venster met onreëlmatige gevormde slippe, sommige waarvan in die venster projekteer en die bovermelde klein vensters vorm; die binneste soom is so te se reguit en nouliks geship. Blomme geel.

Suidwes Afrika: Witsand; Eendoorn, suid van Warmbad en Kwarts.

Hierdie soort maklik herkenbaar deur die glinsterende bloedrooi kolle soos by geen ander *Lithops* so ver waargeneem nie.

FIGURE 28 . LITHOPS DINTERI SCHWANT.

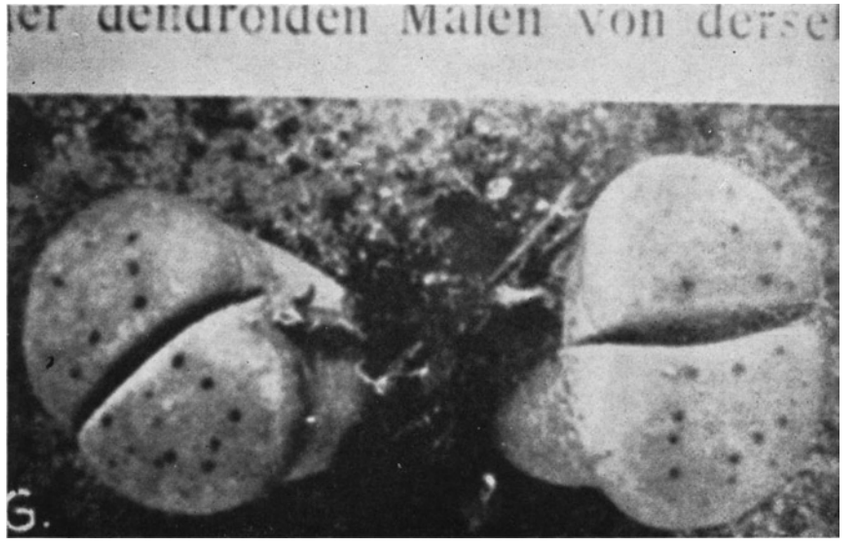


FIGURE 29 . LITHOPS DINTERI SCHWANT.

Fig. 28 is die portret vat die beskrywing van die soort deur Schwantes begelei het en toon duidelik die uitstaande kolle op die lobbe. Fig. 29 is 'n portret in die jong stadium.

✱**Lithops Dinteri.** Corpuscularia 2–3 cm. longa; 2–3 cm. lata; 1·8–2·8 mm. crassa; obconica, fissura transversa 5–7 mm. alta, apice lobis subplanis vel leviter convexis pellucidis, punctis circa 5–12 purpureis dispersis notata. Flores ignoti.

Dinter subsequently re-described the species as follows, and added some points omitted by Schwantes in his original description:

Lithops Dinteri. Körperchen 2–3 cm. lang, 2–3 cm. breit, 1·8–2·8 dick, umgekehrt kegelförmig. Spalt 5–7 mm. breit eingeschnitten. Seitenflächen-milchfarben perlgrau. Endfläche der Blätter mit entweder ganz einheitlicher durchscheinender und in der Aufsicht dunkel erscheinender Fensterfläche, oder diese ist nur von vereinzelten kleineren Flecken oder dendroiden Malen von derselben Färbung wie die Seitenflächen unterbrochen, Rand des Fensters ab und zu etwas dendroid, oft von vereinzelten dunklen Punkten umgeben, die Fensterfläche zeigt auf jedem Blatt etwa 5–12 annäherend purpurrote, vereinzelte, regellos verstreute Punkte. Blüte unbekannt. Kapset geschlossen bis 8 mm., geöffnet bis 12 mm. breit. 5-fächerig. Quellseiten bis zum äussersten Ende einander berührend. Zellenwande mit schmalen rudimentären Zellendecken. Samen sehr klein. 1/3 mm. lang, kugelig-birnförmig mit scharf abgesetzten Spitzchen, hellbräunlich gelb. Wittsand., Aug. 1926.

9. LITHOPS DIVERGENS

Lithops Divergens. (Plate 8.) Growths solitary or forming clumps of 2 or more; top of leaves oblique, sometimes more or less rounded at apex: sides coloured green in the young stage; window large, open, transparent light greyish-green, smooth, or very minutely rugulose, covered with a fine misty covering, very nearly like cobweb, giving the window a greyish tint; one leaf usually larger than the other: in the old stage leaves gaping apart: inner and outer margins whitish, usually plain, at times with a wavy appearance or even with minute teeth. Flowers yellow.

Van Rhynsdorp: Knersvlakte in clayey soil in hillocks, 30 miles from Van Rhynsdorp; Nuwefontein: between Bitterfontein and Garies.

Fig. 30 is a photo of a number of plants fresh from the field, whereas Fig. 31 shows the plant after it has been in cultivation for a time. Note how the plants have changed.

Lithops Divergens. (Plaat 8.) Plante enkel of vorm klompe van 2 of meer; boonste vlak skuins, soms effens rond aan die bopunt: in die ouere stadium die mantelkante groen, in die jongere stadium liggroen; venster groot oop, deursigtig, lig grysgroen, glad of baie effens gerimpeld, hedek deur 'n fyn mistige bedeksel byna soos spinnerak, waardeur die venster 'n grysagtige voorkome kry; een blaar effens groter as die ander; in die ouere stadium gewoonhik die twee blare ver van mekaar (in 'n gapende toestand); binneste en buitenste soom witagtig, gewoonlik reguit, soms effens gegolfd of self met fyn wit tandjies. Blomme geel.

FIGURE 30 . LITHOPS DIVERGENS L. BOL.

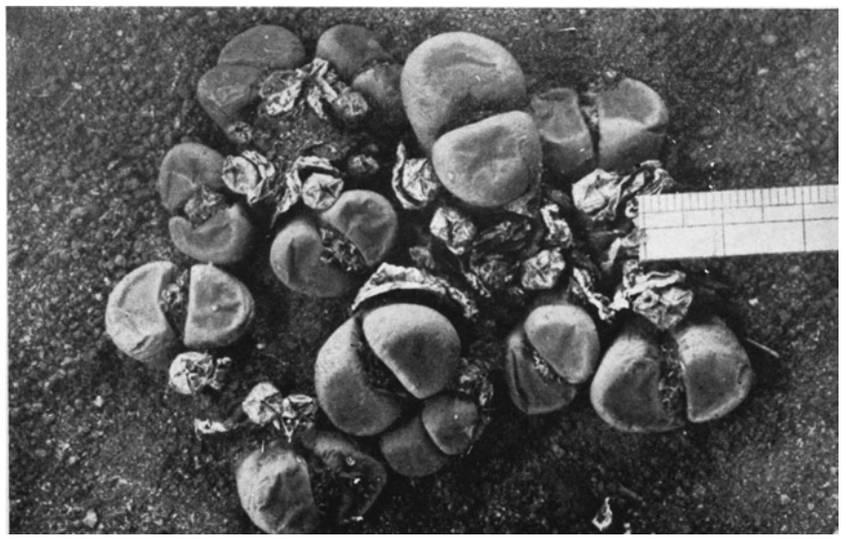


FIGURE 31 . LITHOPS DIVERGENS L. BOL.

Knersvlakte: Omtrent 30 myl van Van Rhynsdorp op pad na Nuwe Rus in kleiagtige grond op die heuwels; naby Nuwefontein; tussen Bitterfontein en Garies.

Fig. 30 is 'n portret van 'n aantal plante vars van die veld, terwyl Fig. 31 die plante aantoon nadat hulle 'n tyd lang gekweek is en dus uit die droë lug na 'n vogtige klimaat verwyder is.

***Lithops Divergens**. Corpusculum dorso folii majoris 3·5 cm., folii minoris 3 cm., longum metiens, pagina interiore 3 cm. et 2·5 cm. longa, 2·5 cm. diam. cum rima apice per 9 mm. ringente; folia per 1·5–1·8 cm. coalita, apice vaginae 1·4 cm. diam., alterum 1·2 cm. latum, 1 cm. diam., alterum 1 cm. latum, 8 mm. diam., fenestra bene visa, convexa obliqua, subgrisea, rugis tenuissimis crebris, levissime prominentibus, pallidiore griseis, et punctis paucis minutis, obscuris vel vix visis, saturate griseis, onusta; flos post horas 3 p.m. expansus; pedunculus prope apicem leviter constrictus, ad 1·5 cm. longus, ad 6 mm. diam.; receptaculum subexsertum, leviter compressum, 3 mm. longum, 6 mm. et 4 mm. diam.; sepala 5, obtusa, rubide brunnea, 4–5 mm. longa, basi 3–4 mm. lata, 3 marginata; petala 2-seriata, subaequalia, obtusissima, integra vel obscurius emarginata, inferne angustata, aurea, basin versus alba, 0·9–1 cm. longa, saepius 1·5–2 mm. lata; filamenta alba, basi obscure ciliate papillata, ad 6 mm. longa, antheris pollineque luteis; discus acute profundeque divisus, luteus vel rubide viridis; lobi ovarii bene visi, dorso complanati, e margine ad medium ad per 0·75 mm. gradatim elevati, altitudinem disci parum superantes; stigmata gracilia 5·5 mm. longa.

In dit. van Rhynsdorp: in collibus, Knechtsvlakte, "30 miles north of Van Rhynsdorp," Dec. 1933, Mrs. Eksteen (N.B.G. 2295/33). Fl. hort. G. van Zyl, Pofadder, Mart.-Apr. 1934.

10. LITHOPS DOROTHEAE

Lithops Dorotheae. (Plate 9.) Growths forming clumps of 5–7; top of leaves convex or plane; window large, open, transparent; in the window a number of small irregularly-shaped islands, buff-coloured; in the windows a number of blood-red, short lines and small dots, some of the lines in the immediate neighbourhood of the outer margin bifurcated and the bifurcations end in the sinuses of the outer margin; outer margin irregularly serrated; inner margin straight and sometimes there are a number of blood-red dots, lines more or less parallel and near to the margin. In the older stage the margin of the window is buff-coloured, otherwise the colour is of a lighter tint. In the window there are in the older stage a number of light green to deep dark black miniature windows. Flowers yellow.

Namaqualand: Pella. (Fig. 32).

This plant is related to *L. Dinteri*, which grows just across the Orange River on its northern side. There are 10–15 prominent red spots on each lobe of *L. Dinteri*, whereas one finds blood-red dots and lines, the latter very often bifurcated in *L. Dorotheae*. *L. Dorotheae* is also related to *L. Bromfieldii*, but the latter has a far greater number of blood-red dots and lines and its window is dark-green, whereas that of *L. Dorotheae* is transparent and light-green.

FIGURE 32 . LITHOPS DOROTHEAE NEL

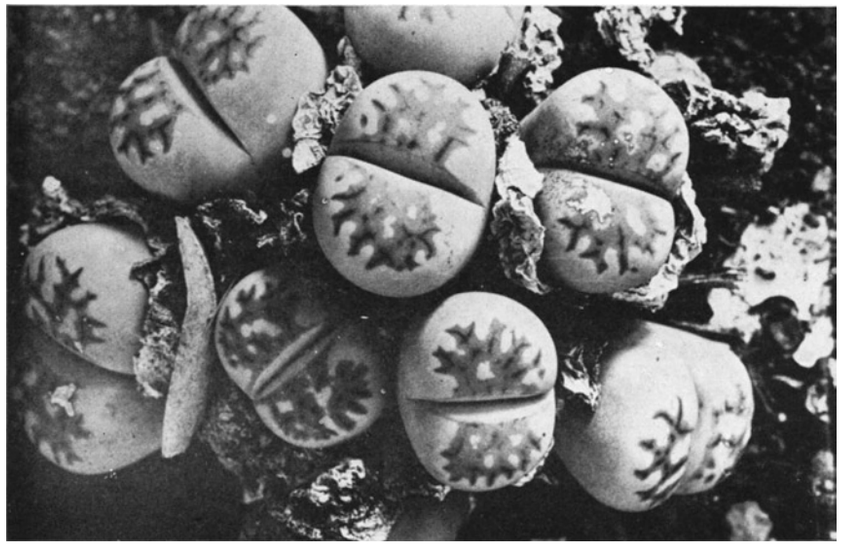


FIGURE 33 . LITHOPS EBERLANZII (DTR. ET SCHWANT.) N.E. BR.

Lithops Dorotheae. (Plaat 9.) Planteliggaam 2–3 cm. hoog, verkeerd-keëlvormig. Die boonste vlak is liggewelfd of gelyk, so te se glad, met ’n groot deursigtige venster, waarin daar ’n aantal klein eilande van onreëlmatige vorm en wat lig rooigeel („buff”) gekleurd is, voorkom. In die venster is daar ’n aantal bloedrooi, kort lyntjies en klein puntjies aanwesig, sommige van die lyntjies in die onmiddellike nabyheid van die buitenste rand van die venster is gevurk en die anus van die vurke loop in die inhamme van die soom; die buitenste en die binneste soom is onreëlmatig ingesny-gesaagd; die binneste soom is reguit en soms is daar ’n aantal bloedrooi punte of lyne wat weer ’n ononderbroke lyn vorm parallel met die soom; in die ouere stadium is die kleur ietwat ligter getint. In die venster is daar in die ouere stadium n aantal liggroen tot donkerswart miniatuur-venstertjies. Doosvrug 5-hokkig. Blom geel.

Namakwaland: Pella. (Fig. 32).

***Lithops Dorotheae.** Corpuscularia turbiniformis; folia aequalia vel subaequalia, convexa vel subplana; fenestra magna et bene visa, pellucida, liniis et punctis rubris notata; margine exteriore irregulariter inciso-erenata, roseo-lutea, laciniae obtusae, inter lacinias liniis rubris et saepe bifurcatis, margine interiore plana. Flores ignoti. Capsula quinquelocularis, 6 mm. lata.

Pella.

PLATE 9 . 1. LITHOPS DOROTHEAE NEL
2. LITHOPS EBERLANZII (DTR. ET SCHWANT.) N.E. BR.

11. LITHOPS EBERLANZII

Lithops Eberlanzii. (Plate 9.) Growths solitary or forming clumps of 2 or more: leaves more or less subequal; top of lobe flat or subconvex; sides and top tinted a violaceous grey; window semi-opaque, surface slightly uneven, the depressions coloured lighter than the ridges, which are coloured a deeper grey; outer margin of numerous (20) more or less uniform teeth; inner margin very nearly straight with here and there a lacinia projecting into the window; laciniae very slightly raised above the surface of the window. Flower white. (Figs. 33 and 34).

South-West Africa: Kuckaus-Pockenbank plain; Kovisberge.

This species resembles L. hello to such an extent that at first sight one is at a loss to state what the actual difference is. The main points of difference are (1) window of *L. bella* is transparent and pellucid, whereas that of *L. Eberlanzii* is so to say opaque; (2) the ridges of the top surface in *L. bella* are raised slightly above the level of the window and are coloured at one stage buff-coloured, in *L. Eberlanzii* the window and the laciniae seem to merge into a wavy surface and the ridges are coloured greenish-white; (3) outer margin of *L. bella* has a few laciniae of very irregular shape, some consisting of a large irregular body joined by narrow strip to the margin, and in *L. Eberlanzii* outer margin consists of laciniae giving the whole the appearance of being toothed. Fig. 34 is a photo of the plant in the young stage and shows the nature of the lobe distinctly and also how the young leaves appear between the remains of the old ones.

FIGURE 34 . LITHOPS EBERLANZII (DTR. ET SCHWANT.) N.E. BR.

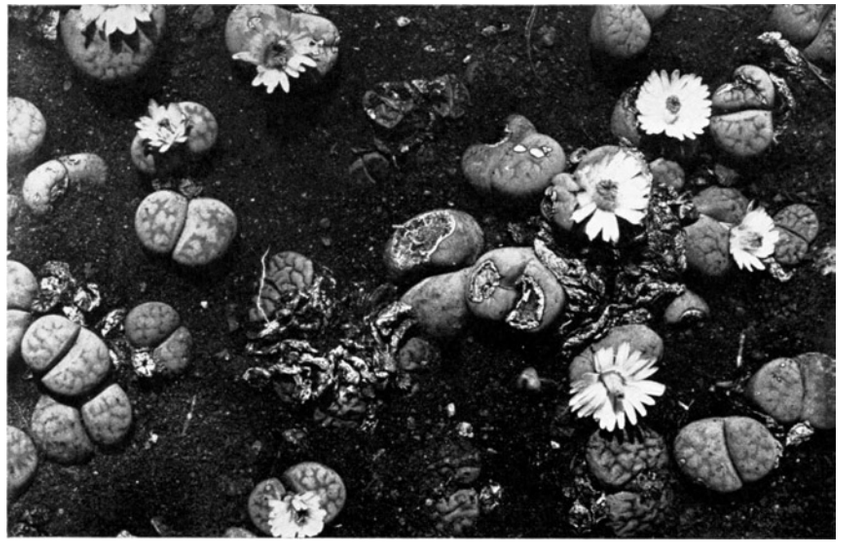


FIGURE 35 . LITHOPS EBERLANZII (DTR. ET SCHWANT.) N.E. BR.

Lithops Eberlanzii. (Plaat 9.) Plante enkel of vorm klompe van 2 of meer; blare min of meer ongelyk in grootte boonste vlak gelyk of effens konveks; mantel en top persagtige grys getint; venster half-ondeursigtig ; oppervlakte effens gewelfd; die insinkinge ligter as die rande, wat 'n donkerder grys gekleurd is, die buitenste soom bestaan uit baie (20) mm of meer eenvormige tande; die binneste soom byna reguit met hier en daar 'n slip vat in die venster in projekteer: die slippe effens bokant die oppervlakte van die venster verhewe en daardeur kry dit 'n ongelyke voorkome. Blomme wit.

Suidwes-Afrika: Kuckaus-Pockenbank; Kovisberge.

Hierdie soort lyk baie soos *L. bella* sodat niet die eerste opslag 'n mens nie eintlik meet wat die verskil tussen die twee soorte is nie. Die hoofverskille is: (1) die venster van *L. bella* is deursigtig en helder. term 1 die van *L. Eberlanzii* so te se ondeursigtig of halfondeursigtig is; (2) by *L. bella* is die me meer prominent en soms liggeel gekleurd en staan beslis bokant die oppervlakte van die venster, terwyl by *L. Eberlanzii* dit lyk of die venster en die ruë so te se in mekaar vloei en daardeur die geheel 'n sagte gewelfd voorkome gee en die ruë is grys-groen gekleurd; (3) die buitenste soom van *L. bella* het maar mm slippe van onreëlmatige vorm, sommige waarvan uit 'n groot liggaam bestaan, wat deur 'n nou streep met die soom verbind is, terwyl by *L. Eberlanzii* die buitenste soom uit 'n groot aantal slippe bestaan, waardeur dit 'n getande voorkome kry. (Fig. 35).

Suidwes-Afrika: Kuckaus-Pockenbank Kovisberge.

***Lithops Eberlanzii.** Corpuscula 2–4 cm. alta, $1\frac{1}{2}$–$3\frac{1}{2}$ cm. lata, obconica, apice plus minus orbicularia vel lunata, fissura transversa 5–10 mm. alta, apice lobis subplanis vel levissime convexis, griseo-ochracea vel griseo-violacea, lineis ramosis notata. Flores ignoti. Capsula quinquelocularis, expansa ca 1 cm. lata.

South West Africa: Kuckaus-Pockenbank-Fläche; Kovisbergen.

12. LITHOPS ERNIANA

Lithops Erniana. (Plate 10.) Growths forming a clump of two or more; top of lobe subconvex; lower part of sides coloured a pale grey; near top of lobe a dark-grey hand as border; top of lobe light fawn-grey, rugulose with a few brown dots from which radiate 3–4 yellow-brown lines and many broad brown lines not interconnected with one another; these lines with a few side branches are placed more or less at right angles to the main depressions; the lines end in 3–4 dendritic branches, side branches and dendritic markings coloured a light yellow-brown; on top surface a few blue-green miniature windows; window opaque. Flowers white. (Fig. 36).

South-West Africa; near Wittpütz; near Pockenbank; 50 miles south of Aus in granite.

The slightly rugulose appearance with the interconnected brown lines ending in the fine yellow-brown dendritic lines characterises this species.

Lithops Erniana. (Plaat 10.) Planteliggaam vorm 'n klomp van 2 of meer; boonste vlak subkonveks; onderste gedeelte van die mantel liggrys; naby die top en aan die boeinde van die mantel is daar 'n donkergrys band; boonste vlak liggrys, effens gerimpeld, met 'n paar bruin punte, waarvandaan 3–4 geelbruin lyne uitstraal en daar is nog baie breë lyne wat nie met mekaar verbond is nie; aan hierdie lyne is daar 'n paar taklyne wat mm of meer met 'n reghoek op die hoofinsinkinge(klowe) staan; hierdie taklyne eindig in 3–4 dendritiese takke; die taklyne en dendritiese merke is lig geelbuin gekleurd; 'n paar blou-groen miniatuur venstertjies. Blomme wit.

Suidwes-Afrika: naby Wittputz; by Pockenbank; 50 myl suid van Aus in graniet.

Die effens gerimpelde voorkome van die top met die met mekaar verbonde bruingeel lyne wat in die fyn geel-bruin dendritiese lyne eindig kenmerk hierdie soort.

***Lithops Erniana.** Corpuscula ad 2–4 cm. alta, 2–3 mm. lata obconica apice plana vel levissima convexa, rugosa, griseo vel griseo violacea, rugae excavatae, violacea. Fissura transversa, 3–4 mm. alta. Sepala 5, petala 33, 2–3 mm. lata, ad 1·5 cm. longa, obtusa, alba. Filamcnta alba, antheris luteis. Stigmata 5, lutea.

FIGURE 36 . LITHOPS ERNIANA LOESCH ET TISCH.

Groot Namaqualand, prope Witputz Erni.

Corpusculum tot 4 cm. hoog, aan den bovenkant 2–3 cm. in diameter, verkeerd kegelvormig, bovenzyde vlak of zeer zwak gewelfd; voorzien van een netwerk van gootjies en groeven, die jets verdiept zyn. Kleur plantenlichaam fyn grauw, dikwels jets okerkleurig of violet overwaasd. De groeven in het bovenvlak zyn in den grond meestal bruin tot violet getint. Spleet doorlopend, 3-4 mm. diep. Kelkslippen 5, geskeid. Middellyn van de blom ongeveer 3–3·5 cm. Blomkroonblaadjes 33, glimmend wit, spatelvormig, 2–3 mm. breed, aan den punten afgerond. Meeldraden 12 mm. lang, niet in den vorm van een kegel staande. Helmknoppen zeer klein, licht gee!, helmdraden wit, aan den onderkant sterk gewimperd. Stempels 5, tamelyk boven de meeldraden uitstekend, geel. Blom op A.M. by sonneschyn geopend, swak geurend. Doosvrucht 5 hokkig.

Wy geven aan deze *Lithops* den naam van den vinder F. Erni, die ze vond in de nabyheid van Witputz in Groot-Namaqualand.

Voor alles is deze *Lithops* gekenmerkt door haar gebobbeld bovenvlak en door de donkerbruin roode tot violette grondkleur der groeven op de bovenzyde en ook door de fyne, iets violette kleur, waarmede liet geheele plantenlichaam is overtrokken, wanneer de zon er op schynt.

13. LITHOPS FRANCISCII

Lithops Franciscii. (Plate 11.) Growths solitary or forming clumps of 2 or more; top of leaves distinctly rounded convex or slightly flat; window large,

PLATE 10 . LITHOPS ERNIANA LOESCH ET TISCH.

transparent, light-green or whitish-green, provided with numerous lines or dots which at times become confluent and form one large window in the middle in the grey-white covering of the windows minute circular openings; outer margins denticulate, inner margin denticulate, very often projections from the margins projecting into the window and forming irregular islands in the window. In the old stage whole tipper surface is covered with an opaque covering and in this are irregularly distributed more or less circular openings. Flower yellow.

South-West Africa: Halenberg near lüderitzbucht; Kovisbergen.

The miniature circular transparent windows in the opaque covering is a distinctive character of this species and this is only found in *L. Lesliei* and *L. Venteri*. From the former this species differs in colour as the *L. Lesliei* is rust-brown. The upper lobes of *L. Venteri* are far rougher in appearance and the plant as a whole is much larger than this species, so that one could hardly mistake the one for the other. A reference to Fig. 37 and Plate 11 will make this plain.

Lithops Franciscii. (Plaat 11.) Plante enkel of klompe van 2 of meer; boonste vlak rond konveks of effens plat; venster groot, deursigtig, liggroen of effens witgroen, voorsien met baie lyne of punte, mat soms saamvloei en dan 'n groot venster vorm; in die fyn grys, ondeursigtige bedeksel van die venster is 'n aantal ronde openinge, wat deursigtig is; buitenste en binneste soom fyn getand, dikwels is daar uitsteeksels van die twee some wat in die venster inprojekteer en die vorm dan onreëlmatige eilande met ronde openinge daarin. In die ou-

FIGURE 37 . LITHOPS FRANCISCII (DTR. ET SCHWANT.) N.E. BR.

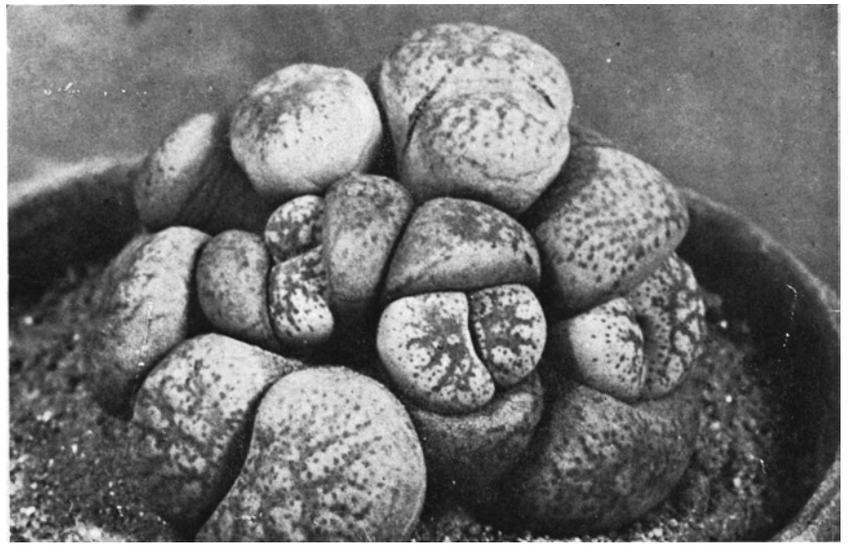


FIGURE 38 . LITHOPS FULLERI N.E. BR.

ere stadia is die hele boonste vlak met 'a ondeursigtige bedeksel bedek en hierin is daar onreëlmatige mm of meer ronde openinge versprei. Blomme geel. (Fig. 37).

Suidwes-Afrika: Halenberg by Luderitzbucht; Kovisberge.

***Lithops Franciscii.** Corpuscularia caespitosa (saepe brevi tempore), $1\frac{1}{2}$–4 cm alta et 1·2–2·5 cm. lata, obconica, truncata pallide griseo-viridia vel griseo-lurido-viridia, glabra, apice plus minus convexa vel subplana, fissura transversa $\frac{1}{2}$–$1\frac{1}{2}$ cm. alta, apice lineis ramosissimis confluentibus et punctis notata. Flores parvi, 1–$1\frac{3}{4}$ cm. lati, lutei. Ovarium non exsertum. Petala ca. 30 lineari-lanceolata. Antherae numerosae, luteae. Capsula quinque-locularis.

Rasen und klumpenbildend wie die Verwandten. Die Teilung erfolgt bei manchen Individuen verhältnismassig schnell. Körperchen $1\frac{1}{2}$–4 cm. lang, 1·2–2·5 cm. breit, kegelförmig, am Ende abgestützt, glatt, plus minus konvex, seltener annäherend flach. Spalt tief bis sehr tief, $\frac{1}{2}$–$1\frac{1}{2}$ cm. und darüber. Färbung graugrün oder graubräunlichgrün, ab und zu mit einem Anflug von rötlichgelb. Endfläche mit sehr verzweigten zusammenfliessenden, dunkeln, durchscheinenden Linien u. Punkten gezeichnet. Bei manchen Individuen fliessen die Linien in der Mitte des Lobenapex zu einem fast einheitlichen Fenster zusammen. Die Zeichnung ähnelt der des *L. pseudotruncatella* von der sich unsere Art aber sehr durch die mehr länglichen, sehr viel weicheren, mit Grün als Grundton gefärbten eingespaltenen Körperchen u. wesentlich kleineren Blüten unterscheidet. Die gelbe Blute ist 1–$1\frac{3}{4}$ cm. breit, mit ca. 30

PLATE 11 . LITHOPS FRANCISCII (DTR. ET SCHWANT.) N.E. BR.

lineal-lanzettlichen Petalen. Die zahlreichen Stamina haben gelben Pollinaria. Fruchtknoten im Spalt verborgen. Kapsel 5-fächerig.

S.W.A.; Halenherg bei Lüderitzbucht.

14. LITHOPS FULLERI

Lithops Fulleri. (Plates 12, 13.) Growths solitary or forming clumps of 2 or up to 5–6; top of leaves usually flat, at times scarcely convex; sides and margin smooth, light dove-grey with a slight violaceous tint; window large, dark-green; projections from margins into window raised above the level of the window surface and giving the top a rough appearance; projections forming at times numerous small islands of the same colour as sides, thereby dividing the window into small, more or less confluent areas; sometimes depressions between the ridges with interconnected impressed rust-brown lines, or at times the lines only to be seen between the short lobes of the inner and outer margins; inner and outer margins at times deeply lobed, lobes irregularly shaped. Flowers white.

Kenhardt. (Fig. 38).

The rust-brown lines mainly between the lobes of the margin is a specific characteristic of this species. According to N. E. Brown this species is related to *L. karasmontana*, but these two species have nothing in common with one another as a comparison of the photos of the two species will show.

FIGURE 39 . LITHOPS FULVICEPS N.E. BR.

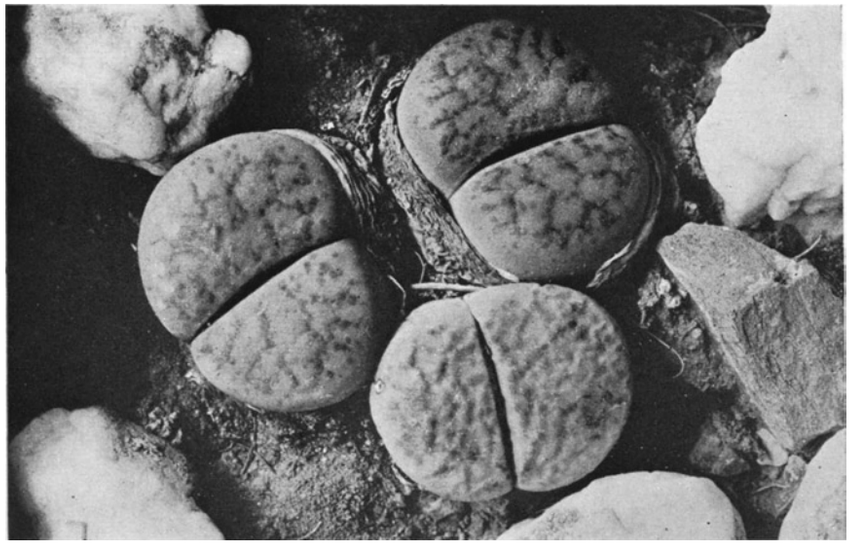


FIGURE 40 . LITHOPS FULVICEPS N.E. BR.

Lithops Fulleri. (Plate 12, 13.) Plante enkel of vorm klompe van 2 tot 5–6; boonste vlak gewoonlik plat, soms effens nouliks konveks; mantel en boonste rand van top glad, liggrys (duifgrys) met 'n effens persagtige tint; venster groot, donkergroen; die projeksies van die soom in die venster staan bokant die oppervlakte van die venster uit en daardeur kry die venster 'n growwe voorkoms; die projeksies vorm soms baie klein eilande van dieselfde kleur as die mantel en daardeur word die venster in 'n klein aantal mm of meer saamvloeiende dele verdeel; soms is die rimpels tussen die duike met mekaar verbonde; roesbruin ingedrukte lyne of soms is hierdie lyne net sigbaar tussen die kort slippe van die buitenste en die binneste soom te sien; binne- en buitesoom soms skerp geslip met diep inhamme, die slippe onreëlmatig. Blomme wit.

Kenhardt. (Fig. 38).

Die roesbruin lyne hoofsaaklik tussen die slippe van die soom om die venster is 'n spesifieke kenmerk van hierdie soort. Volgens N. E. Brown is hierdie soort verwant aan *L. karasmontana*, maar die twee soorte het niks met mekaar gemeen nie, soos blyk as 'n mens die portrette van die twee soorte met mekaar vergelyk.

***Lithops Fulleri.** Growths about an inch high, 12–14 lines broad, and 8–10 lines thick, obconic, elliptic in outline at the flat top which has a fissure 5–6 lines deep across it, dividing it into two contiguous lobes; surface glabrous, smooth on the sides and margin of the top, which is rough from being covered with small bumps caused by numerous impressed dendritic markings,

PLATE 12 . LITHOPS FULLERI N.E. BR.

light dove-grey with a slight violaceous tint ion the sides and margin of the top, and the dendritic markings of a bright rust-brown colour. making a very pleasing contrast. Flowers not seen. (Fig. 38).

Kenhardt Division; near Kenhardt, Fuller.

This very distinct species was very kindly sent to me by Professor H. H. Compton, Director of Kirstenbosch Botanical Gardens, with the information that it was discovered near Kenhardt by H. E. Fuller to whom I have much pleasure in dedicating this very pretty species, which is, perhaps, more nearly allied to *L. karasmontana* N.E. Br. than any other known to me, but is readily distinguished from that species by its more crowded dendritic markings, rougher top, and different colouration, and probably when flowers of it are known, they also will differ, for in my opinion it is certainly not a mere variety of that plant.

15. LITHOPS FULVICEPS

Lithops Fulviceps. (Plate 14, 14A.) Growths solitary or 2–4 in a clump; top of lobe nearly flat or slightly convex; sides coloured purple with a reddish tinge; colour of top varies from bright fulvous to dingy-pinkish-brown, thickly sprinkled with rather large, round, dark green transparent watery dots (miniature window), which are slightly raised in the moist condition, but sometimes almost even with the surface of the lobe and scattered among the dots are few or several inconspicuous slender dark-red or orange-red irregular distributed lines or dots, usually placed in the slight depressions of the surface, so that

FIGURE 41 . LITHOPS GEYERI NEL

the latter is usually very slightly tuberculate-rugulose to the touch. Margins absent. Flowers yellow. (Fig. 39, 40).

South-West Africa Great Karasmountains; farm Grünau; Narudas South.

The rust-brown colour of the top of the leaves, with the many transparent windows raised above the surface, is the distinctive feature of this species, and distinguishes it from all other *Lithops* species.

Lithops Fulviceps. (Plaat 14, 14A.) Planteliggaam enkel of 2-4 in 'n klomp; boonste vlak byna gelyk of effens konveks: mantel pers met 'n effens rooi tint, kleur van boonste vlak varieer van 'n ligte bruin (roeskleur) tot 'n vuil rooi-roesbruin; die boonste vlak met baie, tamelike groot ronde donkergroen deursigtige, waterige vensters (miniatuurvensters), vat effens in die nat toestand bokant die oppervlakte van die venster uitstaan; tussen die miniatuurvensters 'n paar byna onsigbare tengerige donkerrooi of oranjerooi onreëlmatige lyne of punte, vat gewoonlik in die effens vlakke duike van die oppervlakte lê, sodat die oppervlakte gewoonlik puisieagtig gerimpeld voel. Geen some nie. Blomme geel.

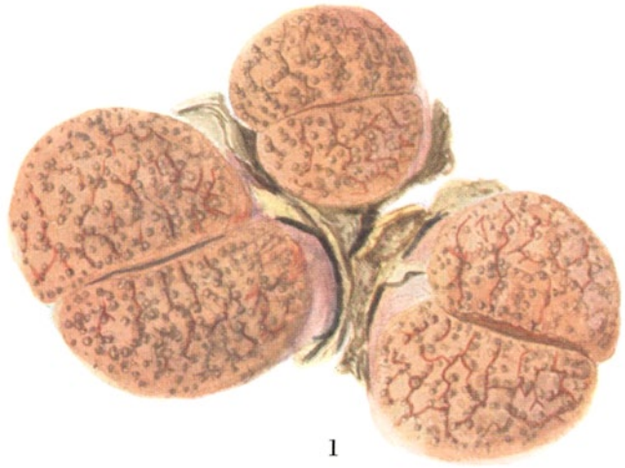
Suidwes- Afrika: Groot Karasberg; Grünau; Narudas Suid.

Die roesbruin boonste vlak met die groot getal deursigtige uitstaande miniatuurvensters, wat soos druppels water lyk is die kenmerk, wat hierdie soort van alle ander soorte *Lithops* onderskei. (Fig. 39, 40).

***Lithops Fulviceps.** Growths solitary or in a clump 2–4, up to 1 in. high, $1\frac{1}{4}$ in. broad and 1 in. thick, nearly flat or slightly convex at the top, which varies from bright fulvous to dingy pinkish-rust colour, thickly sprinkled with rather large, round, dark green dots, which are usually slightly raised, but sometimes almost even with the surface, and scattered among the dots are few or several inconspicuous slender orange-red irregular lines or dots, usually placed in slight depressions of the surface so that the latter is usually very slightly tuberculate-rugulose to the touch. Calyx 4–6 lobed; lobes $2\frac{1}{2}$–5 lines long, $1\frac{1}{2}$–3 lines broad, linear oblong, obtuse, brownish or brownish-fulvous, sometimes tinted with pale violaceous, dotted. Corolla 10-14 lines in diameter, expanding between 3 and 4 p.m. (Greenwich time) and closing at night, lasting about a week, odourless; petals 40–45 in about 2 series, 4–5 lines long, and less than 1 line broad, linear, subacute, the inner bright yellow on both sides, the other whitish with a faint pink tinge on the back, with the tips often becoming more or less red on both sides. Stamens about 3 lines long; filaments deep yellow or ochreous fading to pale yellow at the base; anthers yellow. Style short, up to 1 line long, stigmas 4-6, about 3 lines long, slightly exceeding the stamens, filiform, rich ochreous yellow.

M. fulviceps, N. Br. in *Kew Bull.*, 1914, p. 167; *Bot. Mag.* t. 8776*a*, an extremely had figure of the plant.

PLATE 13 . LITHOPS FULLERI N.E. BR.



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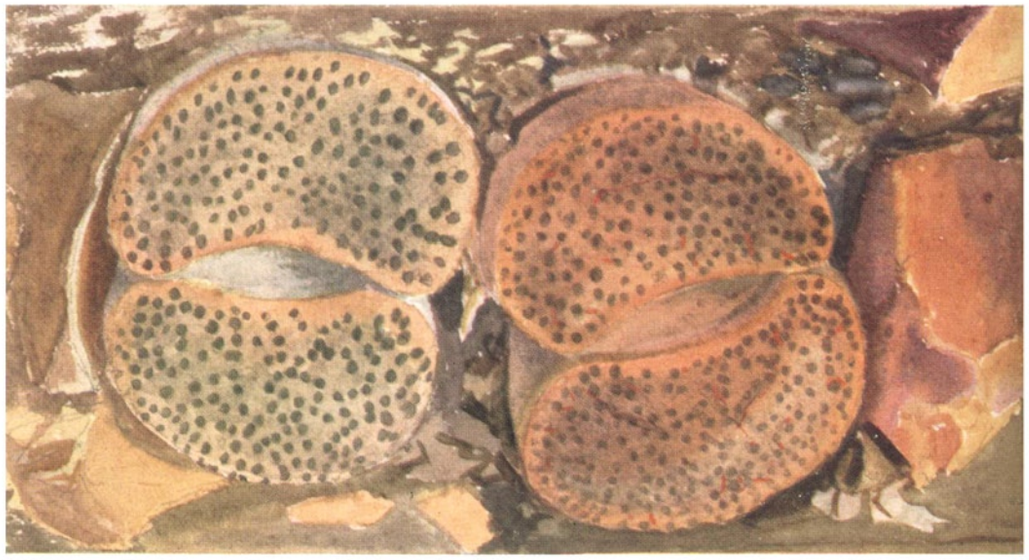

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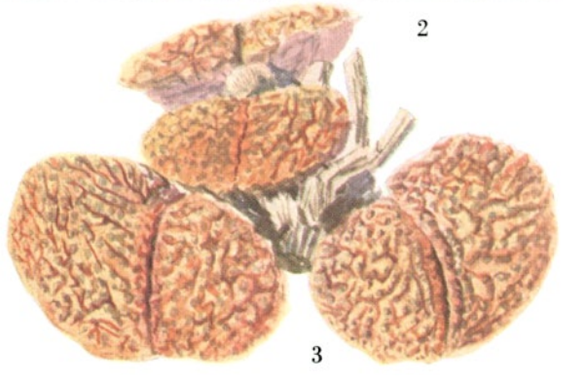

3

PLATE 14 . LITHOPS FULVICEPS N.E. BR.

1, in normal condition; 2, fully turgid
3, in a dry state

FIGURE 42 . LITHOPS GEYERI NEL

Great Namaqualand, Great Karasberg Range, on sandy plains at South Narudas, 4300 ft. above sea level, Pearson 7812.

Described from living plants sent to England by Prof. H. H. W. Pearson.

In my original description I stated that this plant is smooth on the top. That statement was based upon a single specimen which probably was nearly smooth, but numbers of others examined since then were as described above. N. E. Brown.

Top of the lobes entirely without tubercles or slight furrows or raised dots when in a plump growing condition, smooth except sometimes in *L. Lesliei*.

16. LITHOPS GEYERI

Lithops Geyeri. (Plate 15.) Growth ·5–1 cm. high, ·8–1·2 cm. broad, fissure ·5–1 cm. long; upper surface slightly oblique convex; window large, open, transparent, of a green violaceous colour: in the window a large number of whitish isolated irregularly-shaped islands. Inner margin more or less straight; outer margin laciniated or minutely denticulated. Flower yellow. (Fig. 41).

Namaqualand: Katberg.

This species is related to *L. marmorata* and *L. Herrei*, but it is characterised by the relatively small body and the large flower, and in this respect differs from the above-named species. Fig. 42 shows a few plants in flower and somewhat magnified.

FIGURE 43 . LITHOPS GRACILIDELINEATA DTR.

Lithops Geyeri. (Plaat 15.) Planteliggaam enkel of 2 in 'n klomp; boonste vlak effens skuins-konveks; venster groot, oop, deursigtig, groen, effens pers gekleurd; in die venster, 'n groot getal witagtige, enkele onreëlmatige gevormde eilande. Binnesoom byna reguit; buitenste soom geslip of fyn getand. Blomme gee!. (Fig. 41).

Namakwaland: Katberg.

Hierdie soort is naverwant aan *L. marmorata* en *L. Herrei*, maar verskil van hierdie twee soorte deur die betreklike kleinliggaam en groot blom. Fig. 42 toon 'n paar plante in die Mom en vergroot aan.

***Lithops Geyeri.** Corpuscularia turbiniformia; folia subaequalia vel aequalia, superne convexa; fenestra magna et bene visa, pellucida; olivaceoviridis vel minutis multis insulis, albidis, elevatis notata; margo exterior irregulariter dentata, laciniae multae, obtusae vel acutae, lineariae vel minute dentata, margo interior plana; flos diam. 2·8–3 cm.; petala 1·1 longa, 1–3 mm. lata, linearia, obtusa, lutea.

Namaqualand: Katberg.

17. LITHOPS GRACILIDELINEATA

Lithops gracilidelineata. (Plate 15, 15A.) Growths solitary or few in a clump; top of body flat or very slightly convex; window opaque; top rugose, consisting

PLATE 14A . LITHOPS FULVICEPS N.E. BR.

of numerous ridges and elevations, more or less uniformly coloured light-yellow with a whitish tinge, which changes to a light orange-red in the old stage, and then numerous light to dark-green miniature windows are to he seen; in the depressions delicate dark-brown lines or dots; the depressions usually slightly darker in colour than the ridges. Flowers yellow. (Fig. 43, 44).

South-West Africa between Uis and Neineis; Brandberge; Fransfontein; Randis; Pforte.

Fig. 45 is a photo taken of a small dump of plants in natural habitat not far from Swakopmund. The small clump is seen in the right half of the picture. Fig. 46 shows the lobes somewhat magnified of the clump in Fig. 43.

Lithops gracilidelineata. (Plate 15, 15A.) Plante enkel of vorm klompe van 2–3; boonste vlak gelyk of effens konveks; die kleur van die boonste vlak is liggeel; die boonste vlak gerimpeld, bestaan uit baie ruë en verhoginge eenvormig liggeel witagtig, wat in die ouere stadium tot 'n ligte oranjerooi verander; dan is daar baie donkergroen miniatuurvensters in die latere stadia te sien; in die duike fyn donkerbruin lyne of kolle; vensters ondeursigtig; geen some; die duike in die algemeen effens donkerder as die ruë. Blomme geel. (Fig. 43, 44).

Suidwes-Afrika: tussen Uis en Neineis by Brandberge; Fransfontein; naby Randis; by Pforte.

Fig. 45 is 'n portret van 'n klomp van hierdie soort geneem in die veld om die natuurlike groei en omgewing van die plant aan te toon. Die klein

FIGURE 44 . LITHOPS GRACILIDELINEATA DTR.

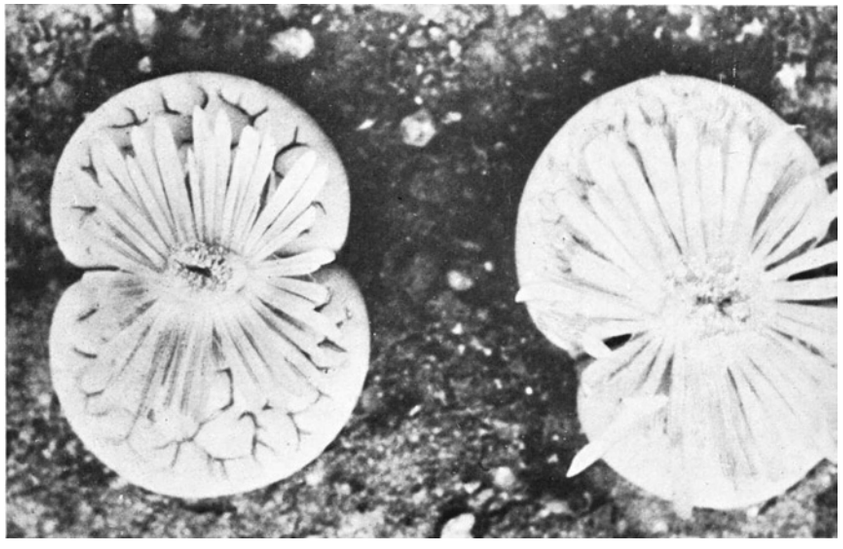

FIGURE 45 . LITHOPS GRACILIDELINEATA DTR.
Photo taken near Pforte. S.W.A., clump visible near middle slightly towards the right side.

klomp is sigbaar in die regterhelfte van die beeld. Fig. 46 is van die plante vergroot en toon duidelik die sagte rimpels aan.

***Lithops gracilidelineata.** Kleine, etwas schlanke von hellgelbgrauer Farbe am Kegelteil. Fenster von heller Milchteefarbe, ganz flach, in je 3 und mehr Buckel aufgelost mit einem dünn und scharflinigen, dunkelbraunen Zeichnungsnetz. Spalt nur 2–3 mm. tief. Hereroland zwischen Uis und Neineis am Brandberge, E. Rusch, August, 1927.

18. LITHOPS GULIELMI

Lithops Gulielmi. (Plate 16.) Plant growths in clump of 2; top surface convex; sides light grey with a narrow deeper grey band near the top; top surface rugulose, tight grey-white, in the depressions with many prominent blood-red dots or lines, the dots forming the prominent feature, lines and dots isolated and not connected with one another; window opaque; flowers yellow. (Fig. 47).

South-West Africa; Klein Karasberge.

Lithops Gulielmi. (Plaat 16.) Planteliggaam vorm klompe van 2; boonste vlak konveks; mantel liggrys met 'n nou band om die top van die mantel; die boonste vlak effens gerimpel, lig witgrys; in die duike baie prominente rooi kolle of kort lyne; die kolle vorm die uitstaande kenmerk; die kolle en lyne

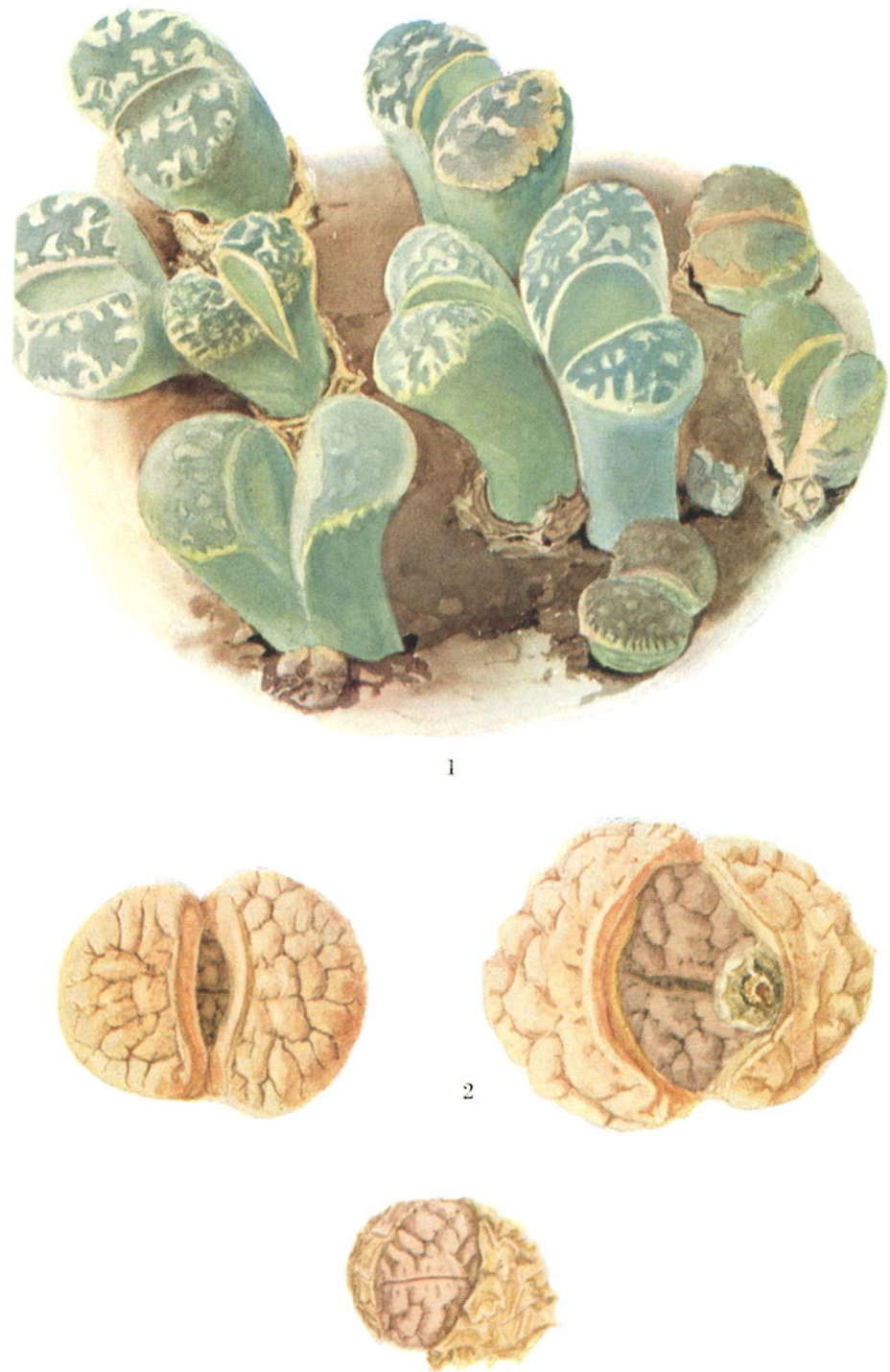

PLATE 15 . 1. LITHOPS GEYERI NEL
2. LITHOPS GRACILIDELINEATA DTR.

PLATE 15A . LITHOPS GRACILIDELINEATA DTR.

geisoleer en nie met mekaar verbind nie; venster ondeursigtig. Blomme geel. (Fig. 47).

Suidwes-Afrika: KI. Karasberge.

***Lithops Gulielmi.** Corpusculum florens 1·5 cm. longum cum vagina 12 cm., apice vaginae 1·5 cm. latum, apice 2·2 cm. diam. cum fissura divergente per 3–4 mm., lateribus saturate olivacea, apice rubre brunnea, rugosa, inter rugas translucentia ibique punctis parvis rubris ornata, margine interiore punctis rubris distantibus ornata; pedunculus 1·1 cm. longus; receptaculum a pedunculo haud distinctum, compressum, 3 mm. longum, 7 et 4 mm. diam.; sepala 5, obtusa, 5·5–6 mm. longa, basi 2–4 mm. lata, petala 2–3 seriata, ca. 34, aurea, apicem versus aurantiaca vel rubicunda, basin versus leviter angustata, prope apicem saepius angustata acuta vel obtusa, 0·8-1 cm. longa, ad 1·5 mm. lata; filamenta ad 7 mm. longa, interiora longissima, epapillata vel papillis obscuris, exteriora inferne ciliate papilata, antheris albidis; discus profunde divisus, ca. 0·3 mm. altus; ovarium levissime gradatimque ad medium elevatum, altitudinem disci subattingens, margine inter angulos fossis onustum; stigmata 5·7 mm. longa.

South-West Africa: Klein Karasberge (in quartz gravel on the farm Florida), Wilhelm Triebner (Bolus Herb., No. 21976). Fl. Apr. 1937.

Ad *L. Schwantesii*, Dtr. valde affinis fortasseque varietas mera.

FIGURE 46 . LITHOPS GRACILIDELINEATA DTR.

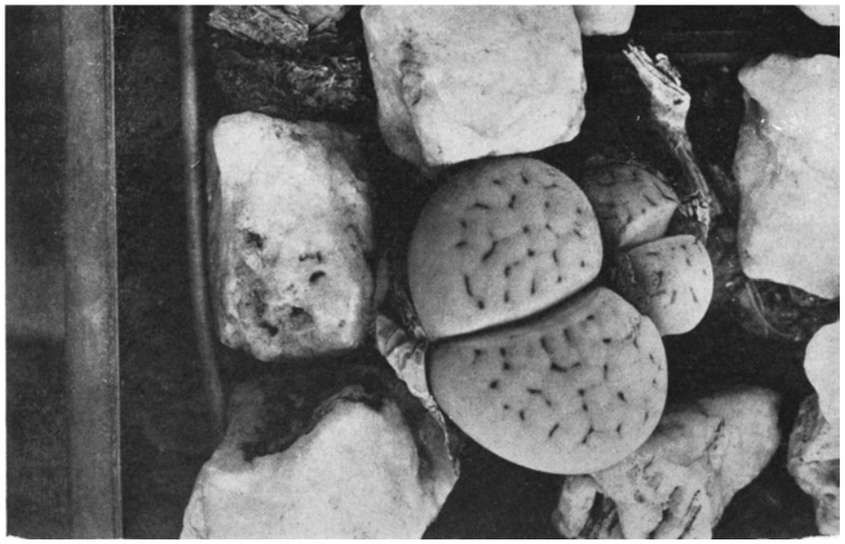

FIGURE 47 . LITHOPS GULIELMI L. BOL.

19. LITHOPS HELMUTI

Lithops Helmuti. (Plate 16.) Growths solitary or forming clumps of 10–21, turbinate; lobes obliquely convex, sometimes tapering to a point; unequal in size; window large, transparent, very light-green, mottled more or less with pale-grey, creamy-grey, sometimes only a few specks; outer margin irregularly lobed, sometimes denticulate; inner margin usually straight, plain, sometimes also denticulate; fissure small; flowers yellow. (Fig. 48.)

Namaqualand; between Steinkopf-Arrabies; Steinkopf-Kinderlê.

This is one of the few grey-green *Lithops* species with a semi transparent to transparent window and with an oblique upper surface. (Fig. 48.)

Lithops Helmuti. (Plaat 16.) Planteliggaam enkel of hulle vorm klompe van 10-21, verkeerd keëlvormig; die mantel lig grysgroen; boonste vlak skuins-konveks, baie keer spits toelopend; die twee blare ongelyk in grootte; venster groot, deursigtig, baie liggroen, gespikkeld met mm of meer liggrys, room-grys, soms net 'n paar spikkels; buitenste soom onreëlmatig, geship, soms fyn getand; binneste soom gewoonlik reguit eenvoudig, some ook fyn getand; spleet baie klein. Blomme geel.

Namakwaland; tussen Steinkopf en Arrabies; Steinkopf-Kinderlê.

Hierdie soort is ecu van die weinige Lithops-soorte wat grysgroen met 'n half deursigtige tot deursigtige vensters en verder is die boonste vlak skuins. Fig. 48.)

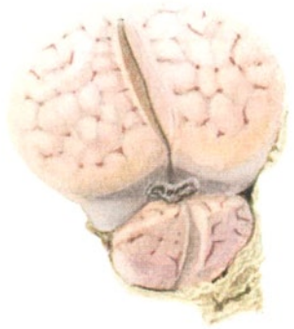

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PLATE 16 . 1. LITHOPS GULIELMI L. BOL.
2. LITHOPS HELMUTI L. BOL.

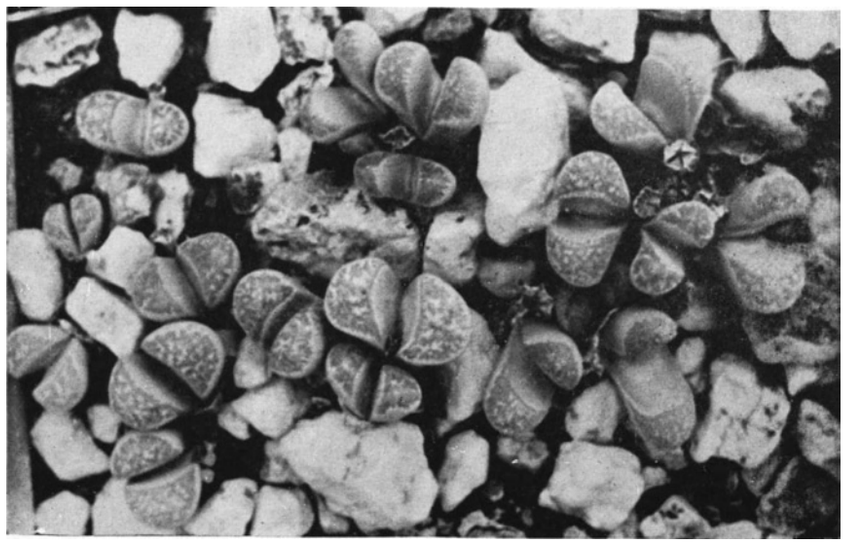
***Lithops Helmuti.** Corpuscula in reliquis dense vestita; fol. inaequalia, 2·7 cm. et 3·1 cm. l., vagina 1·5 cm. l., 1·2 cm. lata, 8 mm. apice in statu florente per 4 mm. divergentia, fenestra alte convexa, notis ramosis inconspicuis, haud prominentibus, columbine griseis; ped. compressus, 1·6 cm. l., apice 6 mm. diam., in recept. gradatim abeuns; recept. 4 mm. l., 7 mm. et 5 mm. diam. sep. 5, apicem versus tuberculata, 6–7 mm. l., basi 3–4 mm. lata, exteriora obtusa, in acuta, 3 marginata; pet. 2 seriata, emarginata vel obtusa inferne angustata, aureo lutea, basin versus alba, externe pallidiora, 1·1–1·4 cm. l. 1–2 mm. lata; filamenta erecta alba, ad 6 mm. l., exteriora inferne ciliate papillata, int, in ovarium incumbentia, aupra, basin papillata, antheris pollineque sordide diluteque luteis; discus conspicuus, crebre profundique divisus; ovarium concavum medio etiam haud elevatum, sparse tubereulatum lobis vix visis; stigmata 5, superne leviter angustata 6 mm. l.; capsula supra plana; suteris leviter elevatis, compressis, nigre punctata, 3 mm. l., 6 mm. et 4 mm. diam.

Namaqualand; inter Steinkopf et Arrabies, Jun. 1933 G. Meyer (Stellenbosch University Gardens, No. 10106).

Our species bears the name of Mr. Meyer's son, Helmut, who for some years has helped his father in collecting succulents, more especially in the Steinkopf area, and who has himself already discovered new species and has been associated with finding several other novelties recorded from there.

Of the two plants seen, one consisted of three, and the other of four

FIGURE 48 . LITHOPS HELMUTI L. BOL.



bodies. As far as the leaves go, *L. Helmuti* would he placed among tile smaller species of *Lithops*; but with cultivation one would expect a considerable increase in the size of these organs. The flower is about the average size found in the genus, being, when well flattened by hand, nearly an inch and a half in diameter. There are five sepals, the outer ones obtuse, and the inner ones more or less acute. The golden yellow petals are in about two series as regards their length, obtuse or notched at the apex and narrow at the base, where the yellow fades to white.

The stamens slightly overtop the five pale green stigmas, the filaments being white and the anthers and pollen rather a dull pale yellow. The top of the ovary is concave and is not even raised in the middle, and the five lobes are scarcely visible. The leaves are dove-grey in the lower part and a duller grey above, the window being greenish-grey with fawn-grey markings. The branching pattern on the window is rather vague and inconspicuous and not at all raised at the surface. The pattern extending from the margin inwards (and it may he noted that this occurs from the inner margin, that is, where the leaves face each other, as well as the outer) is perhaps a little more definite; the window itself is among the most convex I have seen; measured from the one side of the leaf it is up to 8 nun, in height.

20. LITHOPS HERREI

Lithops Herrei. (Plate 17, 17A.) Growths forming clumps of 10-15; turbinate; top of lobe convex; window opaque with a large number of transparent lines

FIGURE 49 . LITHOPS HERREI L. BOL.

PLATE 17 . LITHOPS HERREI L. BOL.

PLATE 17A . LITHOPS HERREI L. BOL.

FIGURE 50 . LITHOPS HERREI L. BOL.

or dots, thereby breaking the window tip into a large number of islands and thus giving the upper surface the appearance of a slight rugosity, the islands coloured slightly white and the transparent lines and dots a light-green to darkish-green; inner margin straight; outer margin none or irregular; sides grey-white. Flower yellow. (Fig. 49, 50.)

Namaqualand; Richtersveld, Swartwater.

Lithops Herrei. (Plate 17, 17A.) Plante in klompe van 10-15 of minder; verkeerdkeëlvormig; boonste vlak effens konveks, ondeursigtig, met n groot aantal deursigtig en liggroen lyne en kolle, waardeur die boonste vla in 'n groot aantal klein eilande verdeel is en daardeur verkry dit 'n effens gerimpelde voorkoms; binneste soom reguit of afwesig; buitenste soom onreëlmatig of afwesig. Blom geel. (Fig. 49, 50.)

Namakwaland: Richtersveld, Swartwater.

***Lithops Herrei.** Folia parum inaequalia, apice leviter vel ad per 9 mm. divergentia, olivacea, fenestra convexa, saturate sordideque griseis, notis nunc vix visis, nunc pluribus, sat magnis, vix prominentibus, olivaceis, simplicibus vel marginalibus interdum majoribus, rarius ramosis, 2–2·5 cm. longa, saepe per 1·5 cm. connata, prope apicem 1–1·2 cm. lata, 6–9 mm. diam.; flos pomeridianus, saepe late expansusa 4 horis ad 7 horis, clausus 8 horis, sinon senectus per noctem diemque expansus, petalis inarte in foliis arte adpressis; pedunculus compressus, a receptaculo haud distinctus. 1·8 cm. longus, vel cum aetate contractus itaque receptaculum demum in vagina fere omnino

inclusum; receptaculum apicem foliorum vix attingens, compressum, 4 mm. et 7 mm. diam.; sepala 5, subaequilonga, obtusa, 5–6 mm. longa, basi 3–4 mm. lata, marginibus angustis; petala lutea vel aurea vel cuprea, ad 9 mm., vel in fore altero ad 1·1 cm. longa, 1·5 mm. lata; filamenta pallida, ad 6 mm. longa, antheris pollineque albidis; discus crenulatus; ovarium circa marginem concavum, medio vix, vel demum leviter, elevatum, lobis inconspicuis; stigmata 5, gracillima, 7 mm. longa; capsula supra plana, exangulata vel senectissima visa, supra per 1 mm. elevata.

Namaqualand; Richtersveld, Swartwater, Oct. 1930, Herre (S.U.G. 9176).

One plant seen consists of 15 bodies, forming a semiglobose mass or cushion raised well above the ground. Fl. Mart.–Apr. 1932.

21. LITHOPS INAE

Lithops Inae. (Plate 18.) Plant growths $\frac{1}{2}$–$1\frac{1}{2}$ cm. long, 7 mm. broad, turbiniform; the two leaves slightly subequal, convex or plane; upper surface either with a number of irregular buff-coloured islands and in these islands a number of minute white dots; the transparent area forming a confluent window or the whole upper surface buff-coloured, very nearly opaque, the window being scarcely visible; in both cases the upper surface is covered with a large number of irregularly-distributed slightly-raised, round or oblong, dark blood-red or red shiny dots, these dots just visible to the naked eye and ap-

FIGURE 51 . LITHOPS INAE NEL

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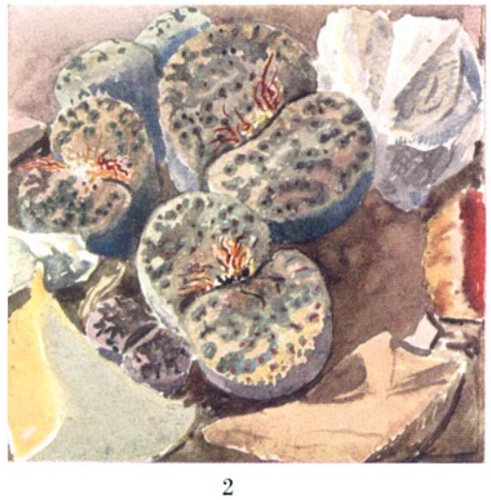

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PLATE 18 . 1. LITHOPS INAE NEL
2. LITHOPS INSULARIS L. BOL.

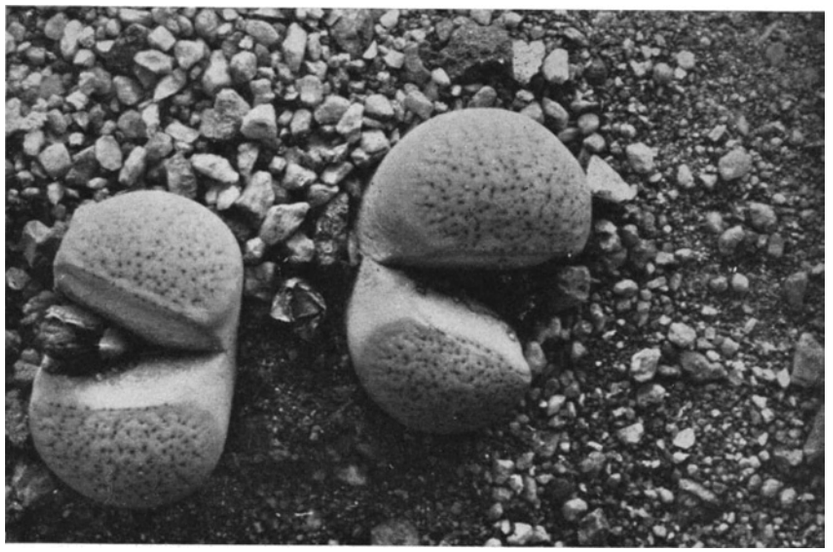


FIGURE 52 . LITHOPS HERREI L. BOL.

pearing to be solid; outer margin is formed either by the window forming branches, giving it a dichotomous appearance, or the outer margin may be quite simple and straight with slight indications of the future dichotomy; inner margin straight with red or dark-red, half-raised shining dots. Colour of flower predominantly white but with a faint tinge of purple-orange petals.

North-West Cape: probably Kenhardt.

This species is related to *L. Dorotheae, L. brevis*, and *L. Dinteri*, all red-spotted or red-lined species, but it differs quite definitely from these in the peculiar deep-red or black-red raised points, so far not yet observed in any other *Lithops*. In the case of *L. Dinteri, L. brevis* there is a large unbroken, open window, whereas in this species the window is either scarcely visible or is broken up into a number of confluent areas. The main difference, however, is that the red markings in the above-named species are lines or dots embedded in the tissue, whereas the red marks (dots) of *L. Inae* are raised slightly above the level of the window and stand out distinctly above the level of the lobes as sharp red shiny dots. Fig. 51 shows some of the plants in their natural size shortly after they were received. Fig. 52 shows a pair of plants with the lobes magnified, the red dots clearly visible. Fig. 53 shows a plant in flower and also the variable nature of the upper surface. The red spots are also visible.

This species is named after Lady Ina Oppenheimer, wife of Sir Ernest Oppenheimer, for her great interest and love of the South African flora.

FIGURE 53 . LITHOPS INAE NEL

Lithops Inae. (Plaat 18.) Planteliggaam enkel of meer in 'n klomp; blare effens ongelyk, konveks of glad; die boonste oppervlakte of bestaan uit 'n aantal onreëlmatige gevormde eilande, lig geelbruin gekleurd en in hierdie eilande 'n groot getal baie klein witpuntjies, die deursigtige dele vorm 'n groot venster of die hele boonste vlak lig geelbruin gekleurd, byna ondeursigtig, die venster nouliks sigbaar; in altwee gevalle is daar 'n groot aantal effens verhewe, ronde of langwerpige donker bloed-rooi of rooi blink kolle, onewerdig versprei; hierdie kolle net sigbaar vir die blote oog en hulle lyk vas; die buitenste soom of die venster vorm takke, waardeur dit 'n gevurkte voorkome kry of die buitenste soom is eenvoudig en reguit met effens aanduiding van toekomstige gevurktheid; binnesoom reguit met rooi of donker-rooi, halfverhewe skynende kolle. Blom hoofsaaklik wit met 'n effens pers-oranje tint.

Noordwes Kaap: Kenhardt.

Hierdie soort is na verwant ann die *L. Dorotheae, L. brevis* en *L. Dinteri*, wat ook rooi kolle of lyne het op die boonste vlak. Dit verskil egter van bogenoemde soorte deur die eienaardige diep rooi of donkerrooi verhewe kolle, wat sover nog nie by 'n ander Lithops waargeneem is nie. By *L. Dinteri* is die venster groot en oop, terwyl by *L. Inae* is dit òf nouliks sigbaar òf dit is opgebreek in 'n aantal saamvloeiende areas. Die hoofverskil is egter dat in die bovermelde soorte is die lyne en kolle in die weefsel, terwyl hierdie kolle effens bokant die oppervlakte van die venster staan as skerp uitstaande punte wat glinster.

Fig. 51 toon 'n aantal van die plante in hulle natuurlike grootte, net

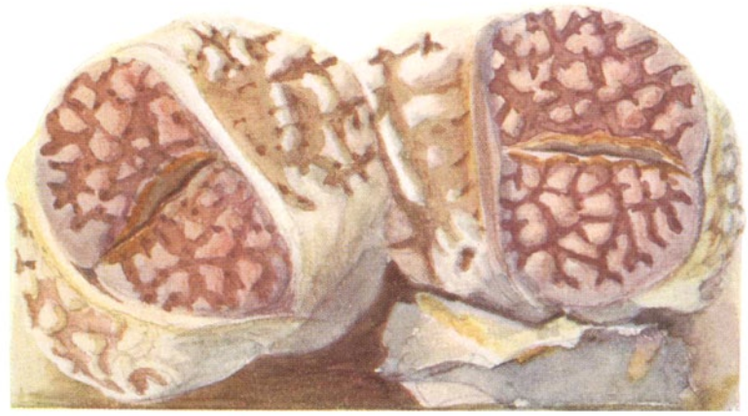


PLATE 19 . LITHOPS JULII (DTR. ET SCHWANT.) N.E. BR.

kort na huilt' ontvang is. Fig. 52 Loon 'n paar plante vergroot en daardeur is die rooi kolle heter sigbaar. Fig. 53 is van een van die plante in blom en dit toon verder die variasic van die boonste lobbe. Die rooi kolle is ook mooi sigbaar.

Lithops Inae. Corpuscularia turbiniformia; folia subaequalia, convexa vel plana; supra planum insulis multis, fulvis notatum; insulae impellucidae, albidis, minutis punctis ornatae; inter insulas fenestrae confluentes; vel supra planum fulvum, fenestra vix visum, punctis multis, albidis ornata; in fenestris punctae multae, rotundae vel oblongae, subelevatae, nitidae, atro-rubrae vel rubrae; margo exterior, dichotoma vel recta; margo interior recta, punctis subelevatis, nitidis, multis, rubris vel atro-rubris ornata; sepala 7 mm. longa, 5 mm. lata, linearia, acuminata, ectus minute pellucida, griseo-virida; petala 1 cm. longa, 1 mm. lata, linearia, multa, 1-seriata, acuta, auriantico-alba; flos diam. 2 cm.; stamina 5 mm. longa, filamenta albida, antherae stramineae; discus inconspicuus; ovarium medio planum; stigmata 5, 4 mm. longa; capsula quinquelocularis.

North West Cape Province: Dr. van der Westhuizen; flowered 22 Feb. 1943, 5–6 p.m.; Univ. Gard., Stellenbosch.

22. LITHOPS INSULARIS

Lithops insularis. (Plate 18.) Plants solitary or forming clumps of two or more; top of plant convex or flat; window dark-opaque green, smooth or

FIGURE 54 . LITHOPS INSULARIS L. BOL.

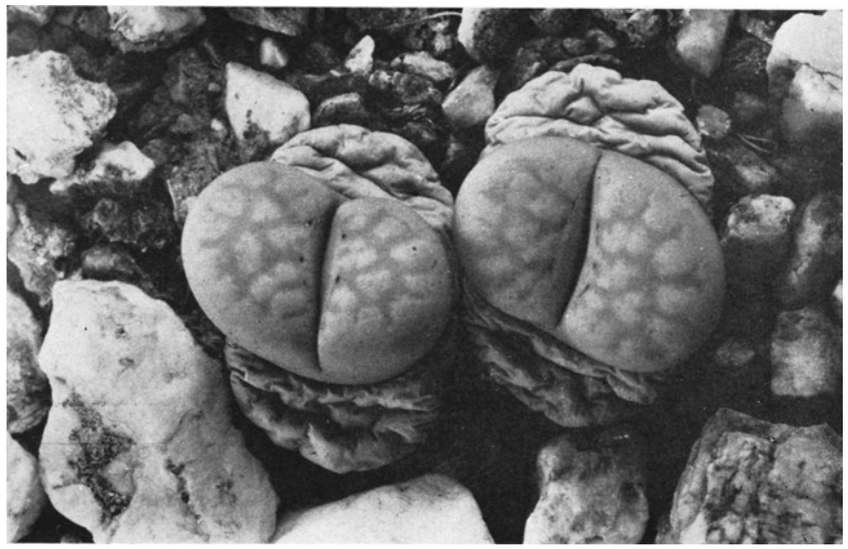


FIGURE 55 . LITHOPS JULII (DTR. ET SCHWANT.) N.E. BR.

slightly bullate, with numerous blood-red dots or short lines distributed unevenly over the whole surface; in the raised ridges numerous minute white dots; outer margin regularly serrate, some lobes projecting into the window; inner margin more or less straight. Flowers yellow. (Fig. 54.)

Keimoes, on banks of Orange River, E. Wilmot.

This species is closely related to *L. Bromfieldii* but the distinctive raised bullate hands of *L. Bromfieldii* are absent in this species.

Lithops insularis. (Plaat 18.) Plante enkel of vorm klompe van twee of meer; boonste vlak van plant konveks of plat; verkeerd keëlvormig; venster donker, ondeursigtig, groen, glad of baie effens gekreukel, met baie bloedrooi kolle of kort lyne, oneweredig versprei oor die boonste oppervlakte; in die ruë (verhoginge) baie, klein wit stippeltjies; buitenste soom reelmatig getand, sommige van die slippe of tande projekteer in die venster in; binneste soom byna reguit. Blomme geel. (Fig. 54.)

Keimoes; op die Groot Rivier.

Hierdie soort is na verwant aan *L. Bromfieldii*, die hoof onderskeid is dat daar so te s geen kreukels by hierdie soort voorkom nie.

***Lithops insularis.** Corpuscula inter minora in genere (an culta demum mnajora ?), 2–2·5 cm. longa, fissura saepius 2–3 mm., saepe 1 cm. lata, ante anthesin 1·5 cm. diam., apice leviter convexa, subpurpureo brunnea, fenestra brunneo viridis, maculis parvis lineisque brevibus leviter prominentibus, sat-

urata rubre brunneis, sat copiose notata, notis circa marginem exteriorem crebris brevibus; fibres pomeridiani; receptaculu 5–6 mm. diam.; sepala 5, 5·5–6 mm., vel in flore altero 7 mm. longa; basi 2–4 mm. lata; petala 2–3-seriata, obtusa vel rarius emarginata, inferne sat conspicue angustata, laete lutea, ad 1·5 cm. longa, ad 2 mm. lata; filamenta alba, ad 6 mm. longa, antheris pollineque albidis; discus crenulatus; ovarium demum ad 1 mm. elevatum, lobis inconspicuis; stigmata 5, gracilia, ad 8·5 mm. longa.

In dit. Gordonia; in insuta Keimoes in flum. Orange, C. W. Wilmot (N.B.G. 1353/34). Fl. Apr. 1935. Flores e dissectis siccis et pictura descripti.

23. LITHOPS JULII

Lithops Julii. (Plate 19.) Growths forming clumps of 2 or more; top of lobe flat or slightly convex; sides coloured pate to very pate (bordering on slightly yellowish -white); in the young stage rugulose, the islands irregular in shape, coloured same as sides; the depressions of a dark yellowish-brown colouration forming a fairly broad network, in the depressions isolated dark red dots and very short prominent, broad dark-red tines, sometimes all the tines interconnected with one another, thereby giving the whole depression a deeper tint; in the older stage the islands are fewer, due to the depressions flowing into one another and forming a fairly large window of a much tighter colour, with here and there the remains of a dot or tine; these entirely absent afterwards, giving the whole a much tighter colour and the appearance of a different plant; the islands verging on white and the depressions a pate grey-green

FIGURE 56 . LITHOPS JULII (DTR. ET SCHWANT.) N.E. BR.

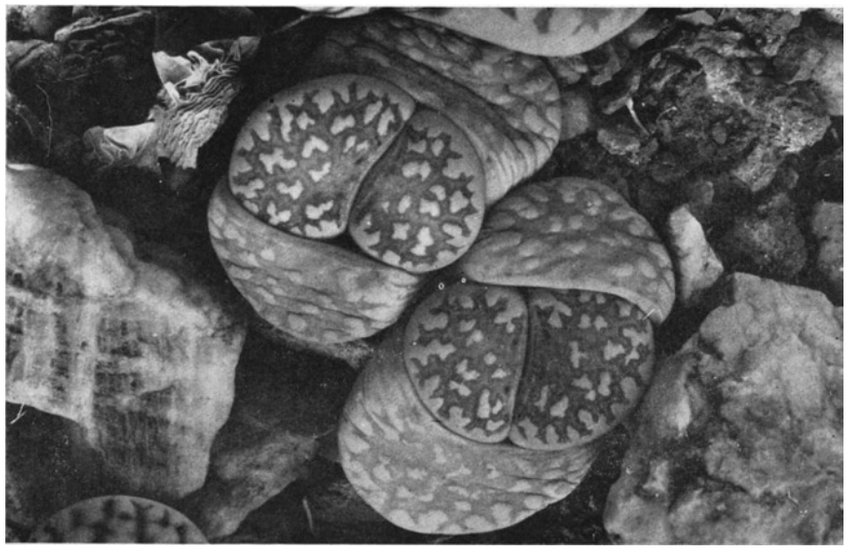


FIGURE 57 . LITHOPS JULII (DTR. ET SCHWANT.) N.E. BR.

colour; in the later stage the outer margin with teeth of irregular shape and size; inner margins straight; in the very old leaves blue-green dots. Flowers white.

South-West Africa: Vahldoorn; west of Warmbad, among quartz pebbles in desert limestone.

Fig. 55 corresponds probably to the undescribed variety, *L. Julii, var. pallida* Tisch., but I do not think that this variety is a good one, as the other two photos (Figs. 56 and 57) show very clearly the variation in the nature of the tipper lobes.

Lithops Julii. (Plaat 19.) Planteliggaam vorm klompe van twee of meer of enkel; boonste vlak plat of effens gelyk; mantel lig of baie ligwit (baie na aan geelwit); in die jong stadium effens gerimpeld, waardeur eilande ontstaan; die eilande onreëlmatig in vorm en van dieselfde kleur as die mantel; die duike van 'n donker geelbruin kleur, die duike vorm 'n breë netwerk: in die duike geïsoleerde donkerrooi kolle en baie kort prominente, breë donkerrooi lyne; soms is al die lyne met mekaar verbind, waardeur die duike 'n donker kleur kry; in die ouere stadium is die eilande minder in getal, dit is te wyte aan die feit dat die duike inmekaar vloei en dan vorm hulle 'n tamelike groot aaneengeslote deursigtige venster van 'n baie ligtere kleur met bier en daar 'n oorblyfsel van 'n kol of lyn; hierdie lyne of kolle later geheel en al afwesig, waardeur die venster 'n baie ligere kleur verkry en 'n mens geneig is out aan te neem dat dit 'n ander soort is; die eilande effens wit gekleurd;

PLATE 20 . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.

PLATE 20A . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.

die duike lig grysgroen; in die laasgenoemde stadium is die buitenste soom met tande of slippe van onreëlmatige vorm en grootte voorsien; die binneste soom reguit; in die ouere stadium baie blougroen kolle (miniatuur-vensters). Blomme wit.

Suidwes-Afrika: Vahldoorn; Warmbad.

Fig. 55 is miskien die soort *L. Julii var. pallida* Tisch., wat sover ek weet nog nie beskrywe is nie. Ek is egter van mening dat dit nie 'n konstante soort is en die twee Fig. 56 en 57 toon duidelik aan hoe die boonste lobbe kan varieer.

***Lithops Julii.** Corpuscula 2–3 cm. alta, $1\frac{1}{2}$–2 cm. lata, obconica, truncata, apice plus minus orbicularia vel lunata, fissura transversa, 4–6 mm. alta apice lobis levissime convexis rugosis. Rugae ramosae et levissime excavatae, obsolete semi-pellucidae. Corpuscula pallide opaco-griseo-opalina. Margines fissurae lineis vel punctis ochraeeo-brunnei notati. Corolla $2\frac{1}{2}$–3 cm. diametro, petala numerosa, lanceolata, obtusa 2 mm. lata, candida.

Koerperchen 2–3 lang, $1\frac{1}{2}$–2 cm. breit, kegelfoermig, gestuetzt, am Ende plus minus kreisfoermig oder halbmondfoermig, Spalt durchgehend 4–6 cm. tief, Blattenden schwach konvex, mit schwach vertieften verzweigten, undeutlich durchseheinenden Furchen gezeichnet. Die Färbung der Koerperchen ist aehnlieh der perlgrauer Kalk-steine oder sehwach opalartig schimmernder Kiesel mit starker Verwitterungsrinde an den Seiten mit roetlichem Anflug.

FIGURE 58 . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.
Plants from one habitat to show variation in colour and texture of upper surface.

Aeusserst bezeichnend und nie fehlend ist eine ockerbraune Linie oder eine Reihe ebensolche Punkte auf jeder Lippe des Spaltes, bisweilen auch am Aussenrande d. Koerperchens. Die Bluete ist 3 cm. breit mit zahlreichen stumpflanzettlichen. 2 mm. breiten weissen Kronblaettern. Die Bluetenstiel ca. 15 mm. lang. fast zweischneidig, unter dein Fruchtknoten 9×3 mm. dick. Kelch 5 zipfelig, gruenlichhraun stark punktiert, alle Zipfel plus minus haeutig umrandet, stumpf, gleich gross, an der Basis ca 5 mm. breit. Petalen ca 45–50, zweireihig, all der Basis frei, reinweiss, am oberen Teile 2 mm. breit, Stamina weiss, am Grunde kurz behaart 6–7 mm. lang. Staubbeutel gelblichweiss. Stigmata 5 bis zum Grunde frei, aufrecht mit rueckgekruemmten Spitzen, hellgelb ca 10 mm. lang. Ovarium flach 5 faecherig mit etwas hochgerichtteten Faecherleisten. Durchm. 7–5 mm. Die Lippen d. Blaetter sind unterlagert von einem nicht scharf begrenzten Chlorophyllgewebe.

S.W.A.: Haelfte des Weges zwischen Vahldorn nach Warmbad, spaeter auch der Naehe Warmbads.

24. LITHOPS KARASMONTANA

Lithops karasmontana. (Plates 20, 20A. 20B.) Growths solitary or forming clumps of 2 or more. top more or less flat or convex; sides coloured mauve-grey; rugulose or slightly bullate at times, windows usually opaque; top uniform colour, light grey-pale brown-yellow, the depressions being of a darker tint or in the depressions brown-ochre lines or at times only a brown-ochre dot; here and there is a deeper depression; at times the depressions are of a dark-green colouration forming a window and these depressions become confluent forming a fairly large semi-transparent window. Flowers yellow.

South-West Africa: Karas Mts.: Kl. Karas Mts. among quartz pebbles; foot of Kl. Karas Mt. near Klein Karas. Fl. Oct.-Nov.

L. karasmontana is one of the most variable species of this genus. The variation is of a twofold nature: (1) The colour of the elevations or ridges varies front a light fawn-grey, brown, dark-brown, reddish-brown to a distinct reddish tint. All these variations were observed in one of two clumps brought fresh from the field in South-West Africa. An attempt has been made—by, I think, Schwantes—to nature a species *L. Jocobseniana*, mainly because of the reddish tint of the ripper surface. To tiny mind this is not a good species, and though it was not described it does appear in the literature. I reckon it should not be retained. (2) The colour of the depressions is also liable to vary. The variation from fawn, fawn-grey, dark-brown, ochre-brown to a distinct brown with a tinge of red. In spite of these variations the species is easily recognised by (i) the peculiar rugose surface and (ii) the somewhat darker colour of the depressions. Fig. 58 shows clearly the range of the variation as all these plants conic front uric habitat. Fig. 59 shows quite distinctly the nature of the rugosity and the deeper colour of the depressions.

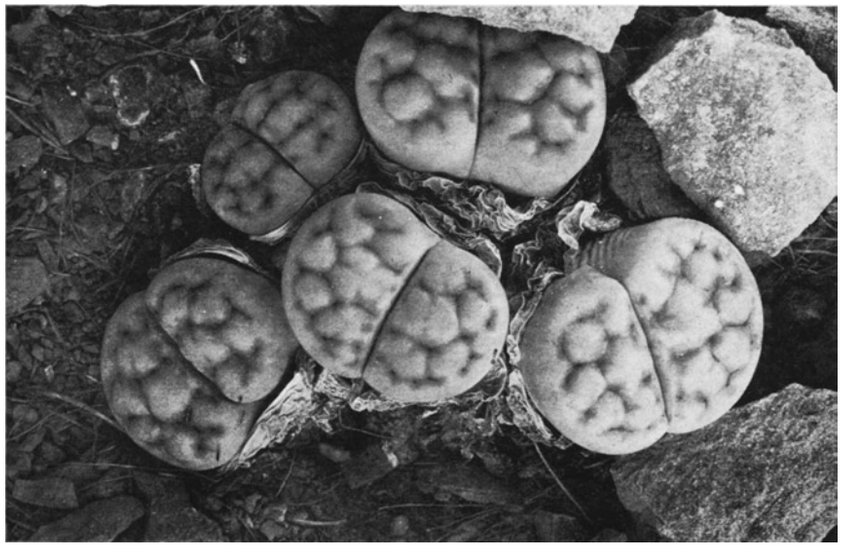


FIGURE 59 . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.

Lithops karasmontana. (Plate 20, 20A, 20B.) Plante enkel of vorm klompe van 2 of meer; boonste vlak min of meer plat of konveks, die mantel persgrys; top effens gerimpeld of kreukelagtig; boonste vlak eenvormig gekleurd, liggrys, ligbruingeel, die duike is donker getint, of die duike bevat bruin-oker lyne of soms net 'n bruin-oker kol; venster ondeursigtig; soms is die duike donkergroen gekleurd en vorm dan 'n venster en hierdie duike vloei dan saam en vorm dan 'n tamelike groot half-deurskynende venster. Blomme geel.

Suidwes-Afrika: Karasberge: Kl. Karasberge tussen kwarts klippies; Kl. Karas. Blom Okt.-Nov.

Hierdie soort is een van die mees variabele *Lithops*-soorte. As die Fig. 58 en die plaat noukeurig ondersoek word sal die variasie-breedte duidelik word. Die variasie is van tweërlei aard: (1) Die kleur van die ruë varieer van ligte bruingrys, bruin, donkerbruin, rooibruin tot 'n duidelike rooi tint. Al hierdie skakeringe is in 'n klomp wat van die veld uit Suidwes-Afrika gebring is, waargeneem. Schwantes het met onreg probeer om 'n nuwe soort *L. Jacobseniana* te maak op die rooi kleur van 'n sekere plant. Alhoewel hierdie soort nie beskrywe is nie, tog kom dit in die literatuur voor en m.i. moet dit verdwyn. (2) Die kleur van die duike is ook baie variabel. Dit loop van „fawn", „fawn-grey", donkerbruin, okerbruin tot 'n duidelike bruin met 'n rooi tint. Ten spyte van hierdie variasies is die soort maklik te herken deur (i) die eienaardige sagte gerimpelde oppervlakte, en (ii) die ietwat donkerder kleur van die duike. Fig. 58 toon duidelik die variasiebreedte van hierdie soort aan, want al die plante soos die in Fig. 11 kom van een en dieselfde plek. Fig.

FIGURE 60 . LITHOPS KUIBISENSIS DTR.

59 toon baie duidelik die aard van die gerimpeldheid en die donkerder kleur van die duike aan.

✱**Lithops karasmontana.** Corpuscula caespitosa, obconica, depressa vel oblongata, apice truncata ± orbicularia vel lunata, fissura percursa, pallide griseo-testacea, 3–4 cm. alta, apice $1\frac{1}{2}$–$2\frac{1}{2}$ cm. lata, et 3–4 cm. longa lacunoso-rugosa. Foveae et rugae apicis ramosae et saepe ferrugineae. Flores $2\frac{1}{2}$–$3\frac{1}{2}$ cm. lati nitido-candidi. Calyx quinquefidus vel quadrifidus, laciniis $\frac{1}{2}$ cm. longis margine membranacieis. Petala 2 mm. lata, lanceolata, 2-seriata. Filamenta numerosa sine colore. Antherae flavae. Ovarium inclusum vel vix e fissura exsertum. Styli pallide-flavidi, termine papillosi, erecto-recurvuli, staminibus breviores. Capsula expansa 1·2–1·5 cm. lata, quinque-locularis, seminibus numerosissimis parvis pallide fulvis.

Die Körperchen verzweigen sich langsam rasenformig, wobei die alten Blattpaare lange vollsaftig und funktionsfähig bleiben. Körperchen kegelförmig, niedergedruckt oder verlängert, mit ebener oder selten schwach gewölbter Endfläche von annähernd kreisrundförmigen oder (bei verzweigten Pflanzen) halbmondförmigen Querschnitt, mit durchgehendem Spalt, perlgrau-blassbräunlich-gelb, 3-4 cm. hoch, Endfläche $1\frac{1}{2}$–$2\frac{1}{2}$ cm. breit und 3–4 cm. lang, grubig runzelig. Die Gruben und Runzeln sind verzweigt und oft bräunlich-ockerfarben. Blüten $2\frac{1}{2}$–$3\frac{1}{2}$ cm. breit, glänzend weiss. Kelch 5- oder 4 zipfelig, mit 4 cm. langem, mit farbloser Haut gesäumten Zipfeln. Blumenblätter 2 mm. breit, lanzettlich, zweireihig. Staubgefässe gelb. Fruchtknoten eingeschlossen oder kaum aus dem Spalt hervortretend. Die 5 hellgelben

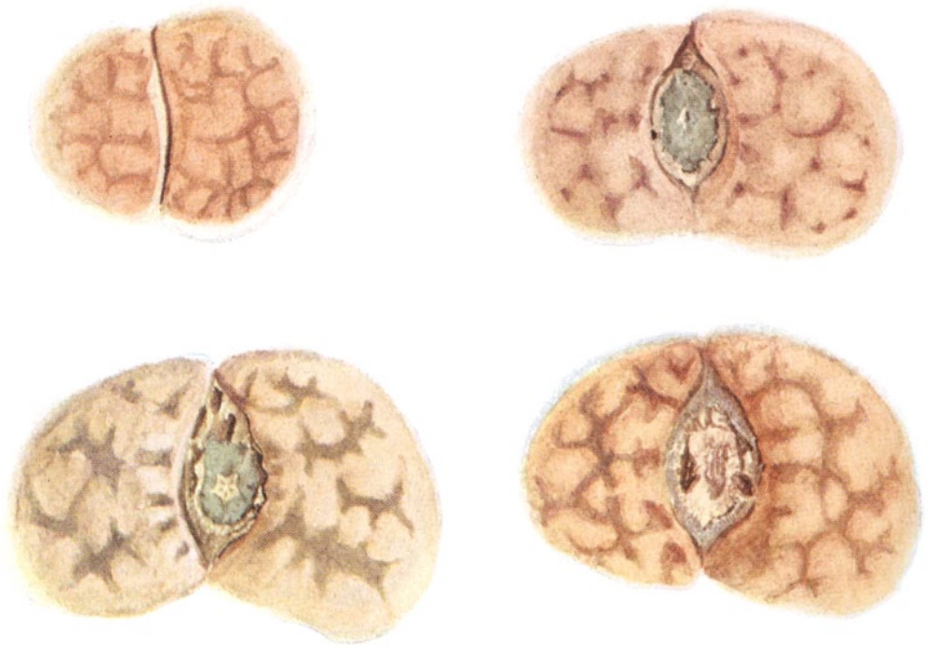


PLATE 20B . LITHOPS KARASMONTANA (DTR. ET SCHWANT.) N.E. BR.

Griffel überragen mit ihren zurückgekrümmten, papillösen Enden die Staubgefässe. Die 5-fächerige Kapsel ist in feuchtem, ausgebreiteten Zustande 1. 2-1 5 cm. breit. Sie enthält sehr zahlreiche hellgelbe, kleine Samen, die bedeutend kleiner als die Samen von *Mes. pseudotruncatellum* Bgr. sind. Gehört wegen der kalkoxalinkrustierten eigentümlichen Zellen der Epidermis und alter anderen Merkmale in die Sektion *Calculiformia*, in die Nähe von *Mes. Hookeri* Bgr., von dem es sich hauptsächlich durch die weissen Blüten unterscheidet.

Stammt von den Karasbergen im Sudosten von Deutseh Sudwest Afrika, von Frau Dinter entdeckt, von K. Dinter als neue Art erkannt.

25. LITHOPS KUIBISENSIS

Lithops kuibisensis. (Plates 21, 21A.) Growths solitary or forming clumps of 2 or more; top slightly convex or flat; window opaque; sides coloured purplish; top rugose, the ridges coloured white-grey and in the depressions purple-red dots or short lines and round these tines or dots a purplish border giving the whole top a suffused purplish tint; in the old stage the dots disappear or become less pronounced. Flowers yellow.

South-West Africa: Kuibis.

There seems to be some doubt about the validity of the name *L. kuibisensis*, as the plant was never adequately described by Dinter. Jacobsen in his "Succulent Plants" enumerates the plant as *L. kuibisensis* Dinter, but

FIGURE 61 . LITHOPS KUIBISENSIS DTR.

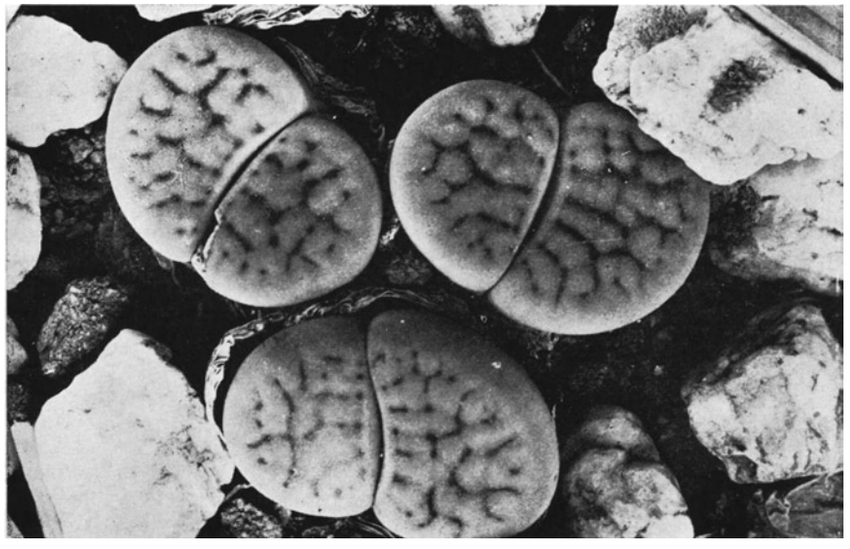


FIGURE 62 . LITHOPS KUIBISENSIS DTR.

so far I have failed to find where Dinter described the plant. I suggest that the name be retained as follows: *Lithops kuibisensis* Dtr. ex Jacobsen, Die Sukkulenten, p. 147 (1933). (Fig. 60, 61, 62.)

Lithops kuibisensis. (Plate 21, 21A.) Planteliggaam vorm klompe van twee of meer; boonste vlak konveks of gelyk; venster ondeursigtig; in die jong stadium mantel lig blougrys; in die ouere stadium 'n duidelike donkerblou tot donker blougrys; die boonste vlak in die jong stadium effens gerimpeld, grys; in die duike donker breë rooi lyne of kolle, met 'n deurskynend, oordekte blou naby die lyne, waardeur die boonste vlak 'n effens blouerige tint kry; in die ouere stadium effens gerimpeld; die hele plant insluitend die boonste vlak duidelik donkerblou gekleurd met donker rooi kolle of taamlike breë bloedrooi lyne, sommige waarvan met mekaar verbind is, ander weer geisoleer; geen soom. Blomme geel.

Suidwes-Afrika: Kuibis.

Ek wil aan die hand gee dat hierdie plant as volg beskryf word: *Lithops kuibisensis* Dtr., ex Jacobsen, Die Sukkulenten, p. 147 (1933). (Fig. 60, 61, 62.)

26. LITHOPS KUNJASENSIS

Lithops kunjasensis. (Plates 22, 22A.) Growths solitary or forming clumps of 2 or more; top slightly convex, very nearly flat sometimes; window opaque, rugose, grey-reddish yellow, with many brown points and lines in the depres-

PLATE 21 . LITHOPS KUIBISENSIS DTR.

sions. Diam. of flower 3·6 cm.; sepals 6 mm. long, 3 mm. broad, grey-green; petals 1·2 cm. long, 2 mm. broad, 1-seriated, linear, acute; stamens 1 cm. long. Colour of flower, shiny deep yellow. (Fig. 63-65.)

South-West Africa: Kunjas.

Lithops kunjasensis. (Plate 22, 22A.) Venster ondeursigtig; boonste vlak effens konveks of byna gelyk; sterk gerimpeld, grysagtig rooi-geel, met baie bruinrooi punte en lyne in die duike. Blomme geel. (Fig. 63-65.)

Suidwes-Afrika: Kunjas.

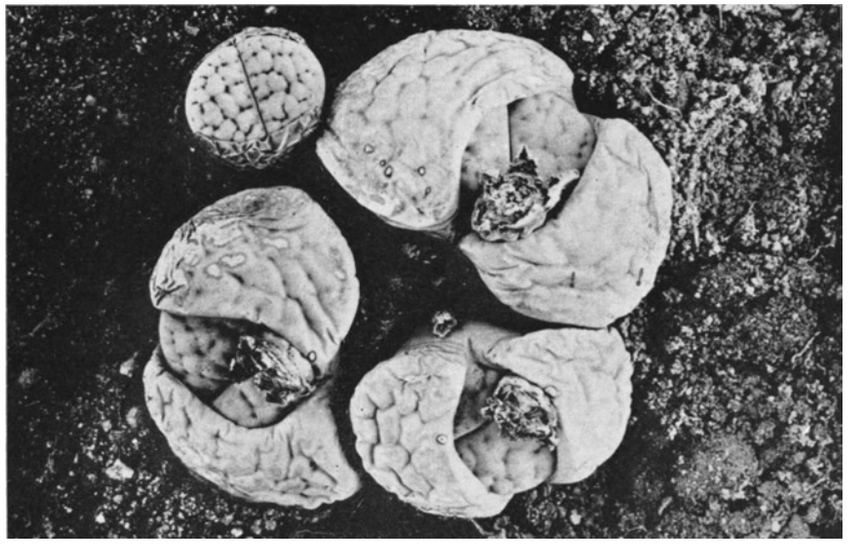
***Lithops kunjasensis.** Fenster nur schwach gewölbt, fast flach, aber ziemlich stark gebuckelt. Grundfarbe graurötlich-gelblich mit zahlreichen braunroten Punkten und Stricheln in den Tälchen zwischen den Buckeln. Epidermis dicht, nicht durchscheinend. Spalt am Rande der Fenster 3–4 mm. tief.

S.W.A.: Kunjas.

27. LITHOPS LESLIEI

Lithops Lesliei. (Plates 23, 23A.) Growth solitary or forming clumps of 2 or more; top of lobes flat, smooth, sometimes slightly convex; sides coloured purple-grey to green; windows dark-green, consisting of small irregular confluent areas; densely or sparsely covered with dull orange, yellowish or rust-coloured irregular projections from the margins; in these projections small

FIGURE 63 . LITHOPS KUNJASENSIS DTR.



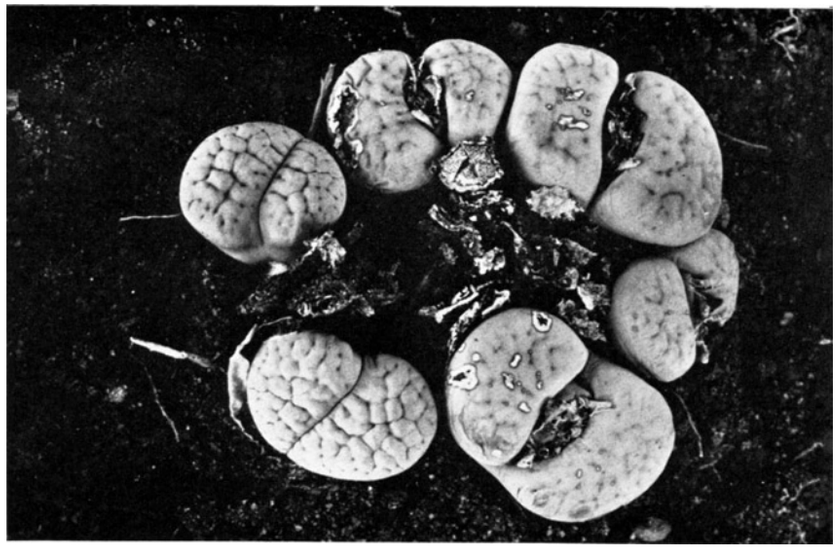


FIGURE 64 . LITHOPS KUNJASENSIS DTR.

round dark-green openings; outer margin very irregular, sonic laciniae being very short, others projecting into the window; inner margin nearly straight or provided with obtuse very short lobes, giving the whole margin a wavy appearance; on outer edge of the margins few or many irregular distributed more or less circular windows. Flowers yellow. (Fig. 66.)

Transvaal: Vereeniging; near Pretoria; near Klerksdorp; Bloemhof; Warrenton; Koster, Tvl.

O.F.S.: Bethlehem, on decomposed ironstone between grass and with *Euphorbia truncata*; near Senekal; near Verkeerdevlei. Flowers April.

Cape: Warrenton; Windsorton.

Lithops Lesliei. (Plate 23, 23A.) Plante enkel of vorm klompe van 2 of meer; verkeerd keëlvormig; boonste vlak plat, glad, some effens konveks; die kante persgrys tot groen; venster donkergroen, deursigtig, bestaan uit klein saanmbloeiende areas; dig of net effens bedek met dof oranje, geelagtige of roesagtige gekleurde onreëlmatige projeksies van die some af; in hierdie projeksies klein, ronde donkergroen openinge; buitenste soom baie onreëlmatig, sommige slippe baie kort, ander projekteer diep in die venster in; buitenste soom baie reguit of voorsien met stomp, baie kort slippe, waardeur die soom 'n golfagtige voorkome verkry; op die buitenste kant van die soom min of baie onreëlmatige verspreide min of meer ronde openinge (vensters). Blomme geel. (Fig. 66.)

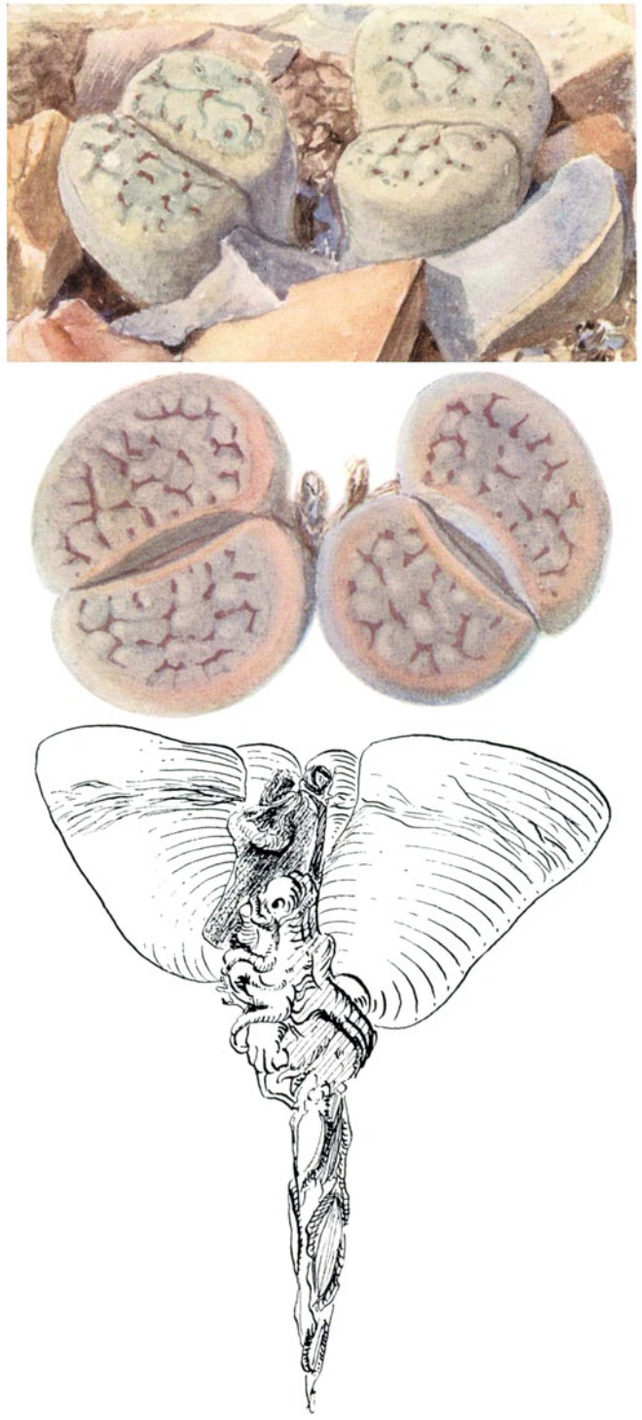


PLATE 21A . LITHOPS KUIBISENSIS DTR.

PLATE 22 . LITHOPS KUNJASENSIS DTR.

Transvaal: Vereeniging; naby Klerksdorp in ou klip; naby Pretoria; Bloemhof; Warrenton; Koster, TA.

O.V.S.: Bethlehem, op verweerde ysterklip tussen gras saam met *Euphorbia truncata*; naby Senekal; Verkeerde Vlei.

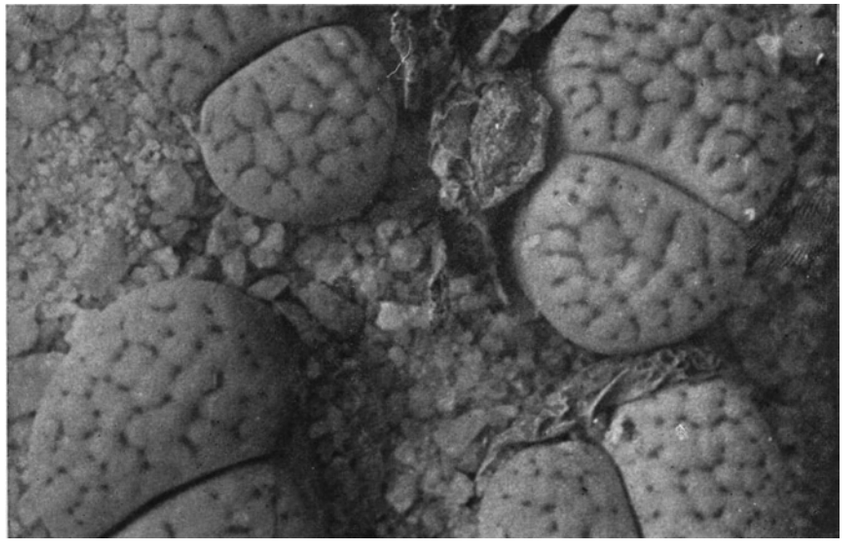
Kaap: Windsorton; naby Kimberley; Warrenton.

Hierdie soort is maklik te herken deur (i) die roesbruin kleur op die groenerige venster, en (ii) die ronde openinge in die bedeksel van die venster.

✱**Lithops Lesliei.** Growths solitary or 3–4 in a clump, up to $1\frac{1}{2}$ in. high; $1\frac{3}{4}$ in. broad; $1\frac{1}{4}$ in. thick, flat on top, smooth or slightly harsh or irregular to the touch, but without an impressed reticulation, dark-green or olive-green, densely or sparsely covered with dull orange or rust-coloured, irregular spots, or dendritic markings. Calyx 5–6 lobed; lobes $2\frac{1}{2}$–4 lines long, $1\frac{1}{2}$–2 lines broad, oblong or ovate, obtuse or green-brownish tinted. Corolla 1–$1\frac{1}{2}$ in. in diameter, expanding in the latter part of the afternoon (at Pretoria about 5 p.m. according to Professor Pole Evans) in bright sunshine only, scentless. Petals 50–60, in about 3 series, rather lax., 5–7 lines long and nearly 1 line broad, linear, acute, obtuse or slightly notched at the apex; bright yellow, whitish or pinkish white on the back. Column of stamens about + in. long, whitish or pale-yellow, anthers yellow. Style short; stigmas 4–5, about $4\frac{1}{2}$–$5\frac{1}{2}$ lines long, as long as the stamens, pale greenish yellow.

M. Lesliei N.E. Br. in *Trans. Roy. Soc. S. Afr.*, V. II, p. 369, with Fig. (1912).

FIGURE 65 . LITHOPS KUNJASENSIS DTR.



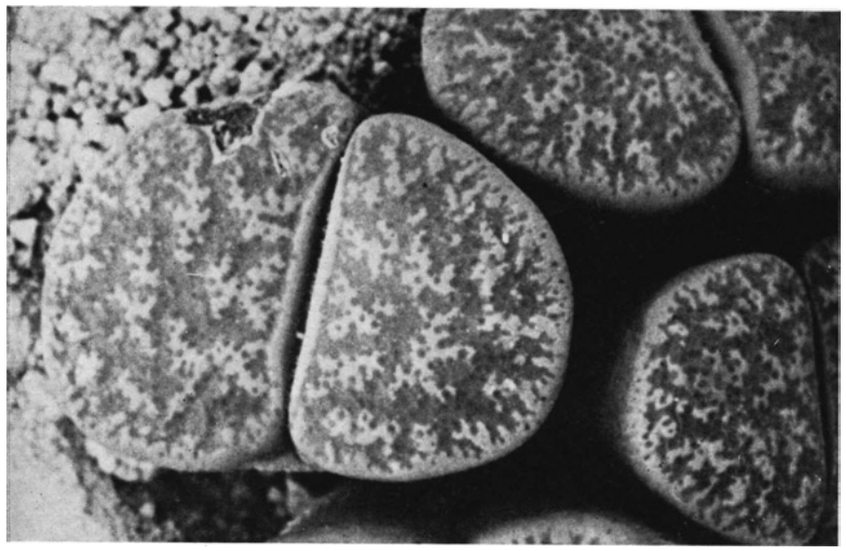


FIGURE 66 . LITHOPS LESLIEI N.E. BR.

M. Hookeri, Marloth, *Fl. of S. Afr.*, V. I, p. 205, 206, t. 51, Fig. B; not of Berger (N. E. Brown, *Gard. Chron.*, 1921).

Transvaal: near Vereeniging (Leslie, Gilfillan, Burtt Davy); near Bloemhof (Burn Davy); near Griqualand West; near Kimberley (Pearson, Pillans, Winsorton, Marloth, Warrenton, Mogg); near Griquatown (Marloth).

The biological peculiarities of this plant are detailed on P. 250, Vol. LXX (*Gard. Chron.*), but I would add that this appears to be one of the hardiest species of this type of plant, for in its native locality during winter, it is sometimes subjected to 20 degrees of frost at night only, not continuously, the days being warm, and the air and ground are both very dry at that period, the rainfall varying from 20–40 in., taking place during the summer, which corresponds to our winter, when these plants often want to grow.

✱**Lithops Lesliei.** Corpuscula caespitosa, crasse carnosa, lata compresso-obconica, apice perfecte truncata cum fissura transversa percursa, 1·5–2·5 cm. alta, apice 2·5–3 cm. longa et 1·8–2·3 cm. lata, levia, glabra, lateribus pallide purpureo-cinerascentibus, apice sordide olivaceo-viridi maculis parvis ramosis vel subdendriticis ochraceo-salmoneis notato. Flores 2·5 cm. diam. lutei. Calyx 5-lobus; tubus vix exsertus; lobi 7–8 mm. longi, ovato-lanceolati, subobtusi. Petala 1–1·2 cm. longa, linearia, obtusa, lutea, apice rubro-aurantiaco tincta. Stamina numerosissima alba.

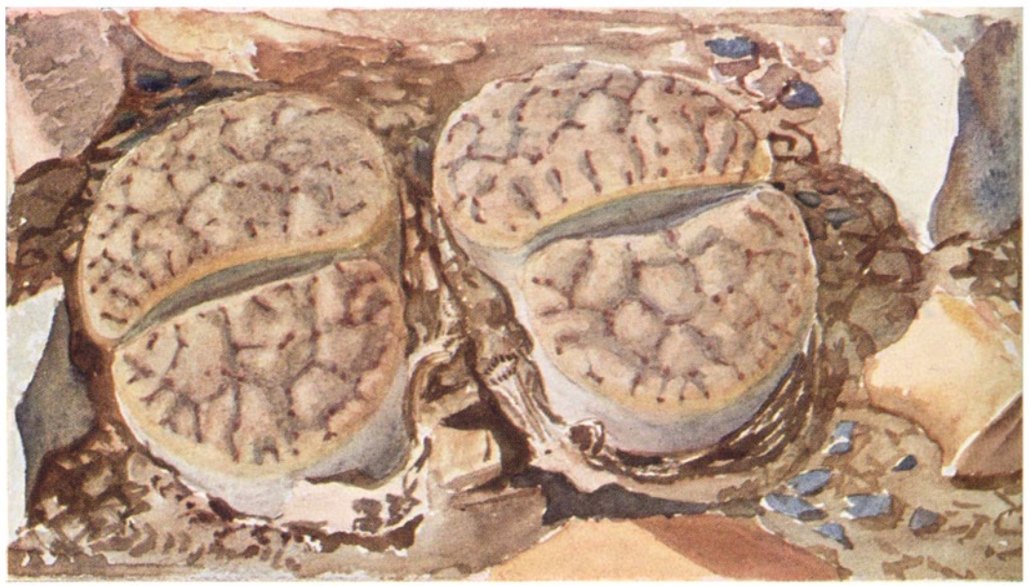


PLATE 22A . LITHOPS KUNJASENSIS DTR.

28. LITHOPS LINEATA

Lithops lineata. (Plate 24.) Growths 4-6 in a clump, turbinate; sides violaceous grey; top surface obconical, yellowish-grey to orange-yellow with a number of impressed orange-yellow lines and dots window opaque; outer margin none; inner margin absent or consisting of an impressed orange-yellow line. Flowers yellow.

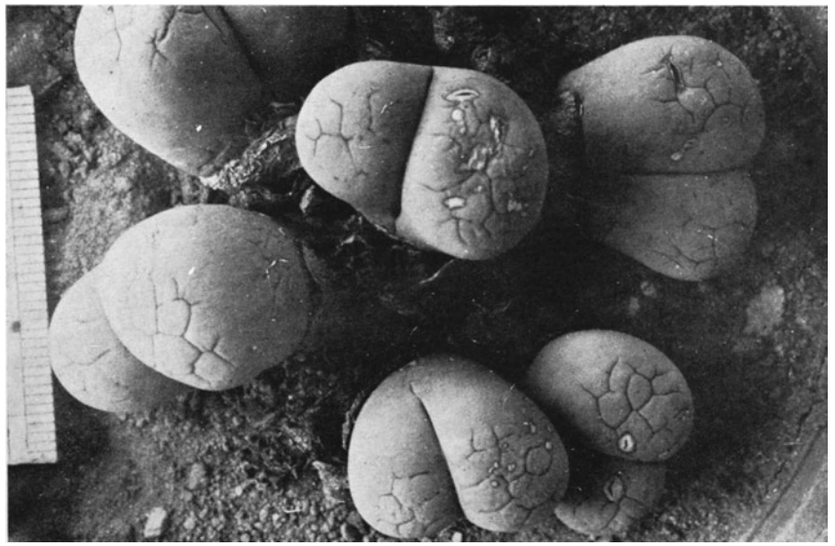
South-West Africa: Presumably 4() miles north of Walfisch Bay; Mr. Els.

I am indebted to Mr. Els, Town Clerk, Strand, for this very interesting beautiful new *Lithops*. This *Lithops* is related to *L. Ruschiorum*, but it differs from it in that the surface of the former is more or less smooth and of a uniform colour, whitish-grey, whereas the colour of this new species is orange-yellow and there are a number of lines of a deeper colour than the rest of the surface and impressed in the latter. (Fig. 67.)

Lithops lineata. (Plaat 24.) Planteliggaam 4-6 in 'n klomp; mantel violetagtig-grys; boonste vlak obkonies; geelagtig-grys tot oranjegeel met 'n aantal oranjegeel lyne en kolle ingesink in die oppervlakte; sommige van die lyne met mekaar verbind; venster ondeursigtig; geen buitenste soom; binneste soom of afwesig of bestaan uit 'n byna reguit ingesinkte oranjegeel lyn. Blomme geel. (Fig. 67.)

Suidwes-Afrika: Kom waarskynlik 40 my]. noord van Walvis Baai voor.

FIGURE 67 . LITHOPS LINEATA NEL



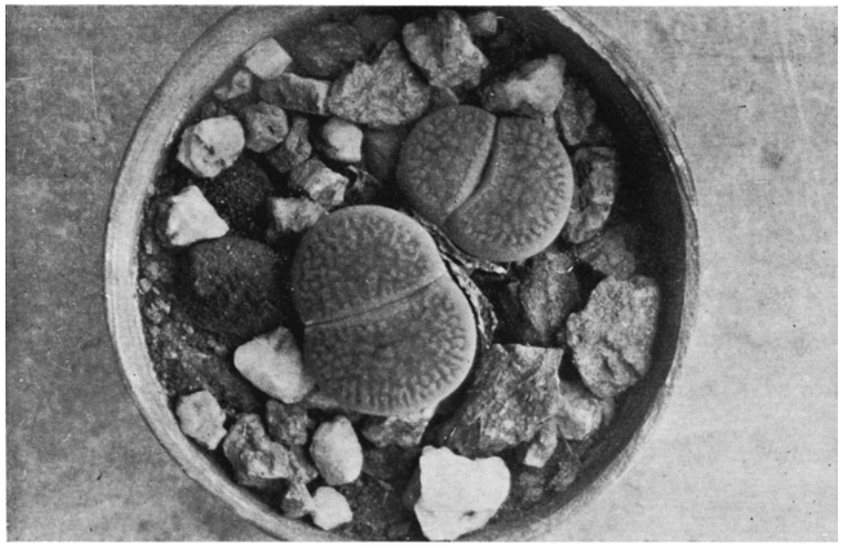


FIGURE 68 . LITHOPS MARGINATA NEL

Ek is aan Mnr. Els, die Stadsklerk van die Strand, vir hierdie interessante mooi nuwe soort, baie dank verskuldig. Dit staan baie naby *L. Ruschiorum* wat ook in daardie deel voorkom, maar dit verskil daarvan deur die meer geelagtige kleur en ook hoofsaaklik deur die ingedrukte oranjegeel lyne, wat nie by *L. Ruschiorum* in so 'n mate voorkom nie en meestal afwesig is.

Lithops lineata, Nel sp. nov. Corpuscularia turbiniformia, 1–2 cm. lata; 1–1·5 cm. longa, fissura 12–17 mm. longa, 2–3 mm. lata; obconica, folia subaequalia; apice lobis convexis, glabra, ochraceo-grisea bis vel aurantiaco-ochracea, liniis et punctis ochraceis notata, fenestra opaca; margo exterior nulla; margo interior nulla vel linea ochracea, plana. Flores lutei. (Fig. 67.)

S.W.A.: Inter Walfisch Bay et Omaruru Fl. (Els).

29. LITHOPS MARGINATA

Lithops marginata. (Plate 24) Growth forming clump of 2; plant body turbinate; leaves subequal, slightly convex; sides a violaceous tint; window large, transparent, very dark olivaceous green, slightly rugulose; in the window numerous islands of irregular shape; impressed in the plane and in the slight undulations are numerous dark blood-red dots and lines, scarcely visible with the naked eye; outer margin laciniated, laciniae very irregular and between them dark blood-red dots and lines; inner margin slightly denticulate or nearly straight. The islands in the window are formed from the projecting laciniae. Flower unknown. (Fig. 68.)

South-West Africa: M. Otzen.

PLATE 23 . LITHOPS LESLIEI N.E. BR.

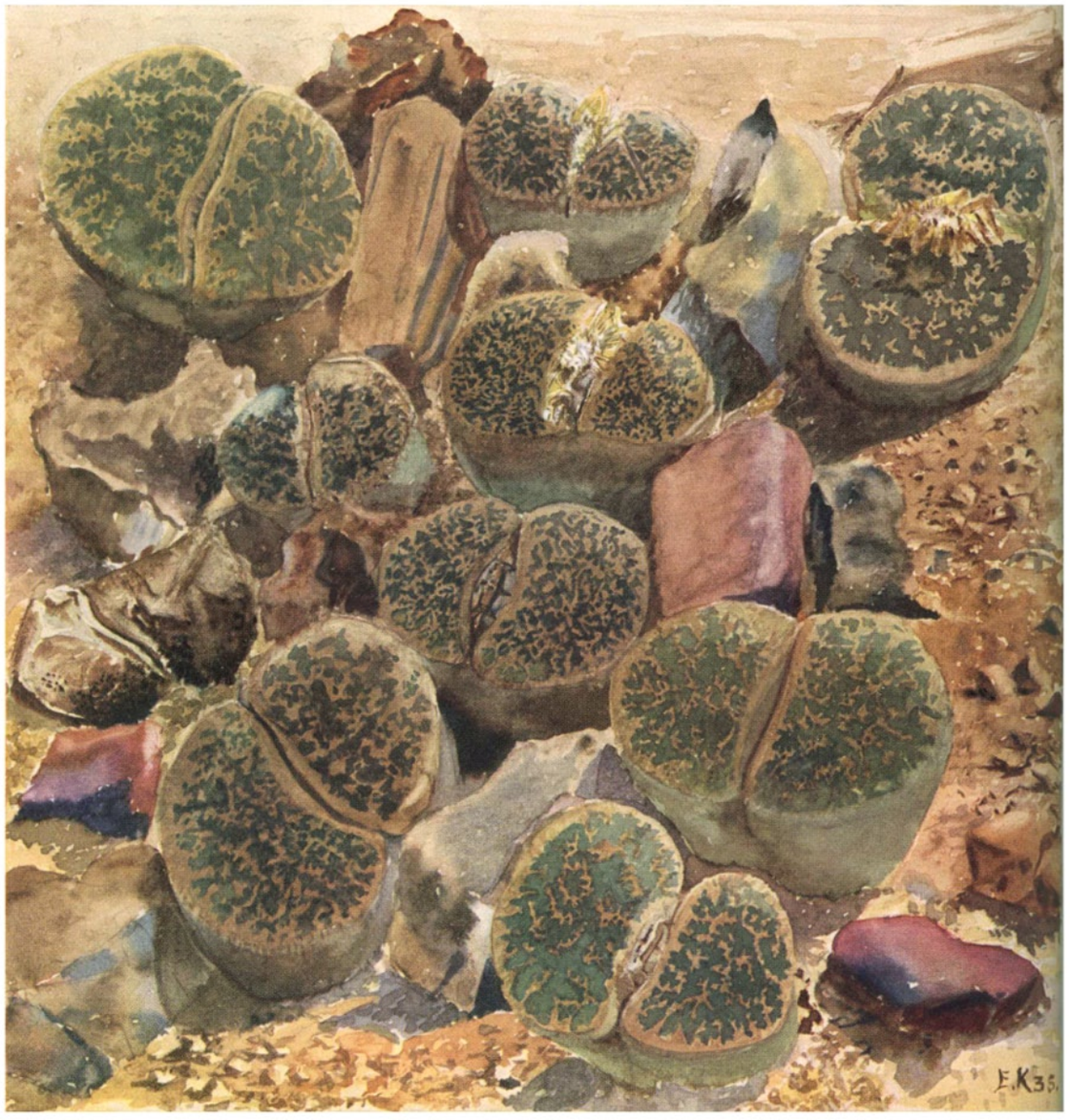


PLATE 23A . LITHOPS LESLIEI N.E. BR.

Lithops marginata. (Plaat 24) Planteliggaam vorm klomp van 2, verkeerd keëlvormig; boonste vlak effens gewelfd; venster groot, deursigtig, baie donker olyf-groen, effens gerimpeld; in die venster baie eilande met baie fyn wit stippeltjies; ingedruk in die oppervlakte en tussen die sagte voue is daar baie donker bloed-rooi kolle en lyne, nouliks sigbaar met die blote oog; buitenste soom geslip, slippe onreëlmatig in vorm; tussen die slippe donker bloed-rooi kolle en lyne, wat nouliks sigbaar is; binneste soom effens getand of byna reguit. Blomme onbekend.

Suidwes-Afrika: M. Otzen. (Fig. 68.)

Lithops marginata, Nel sp. nov. Corpuscularia turbiniformia; folia subaequalia, subconvexa; fenestra magna et bene visa, pellucida, atro-olivaeeo-viridis, rugulosa; punctis et liniis, atro-rubris, vix conspicuis notata; margine exteriore irregulariter laciniata; margine interiore subplana vel subdenticulata; insulae multae, punctis albidis, multis punctatae. Flores ignoti. (Fig. 68.)

S.W.A.: M. Otzen.

30. LITHOPS MARMORATA

Lithops Marmorata. (Plate 25.) Growths solitary or forming clumps of 2 or more; top of lobe slightly convex, smooth; sides coloured light green-yellow, with upper edge slightly purple; window large grey-green, mottled with pale-grey or creamy-green; outer margin very irregular, consisting of a number of

FIGURE 69 . LITHOPS MARMORATA N.E. BR.

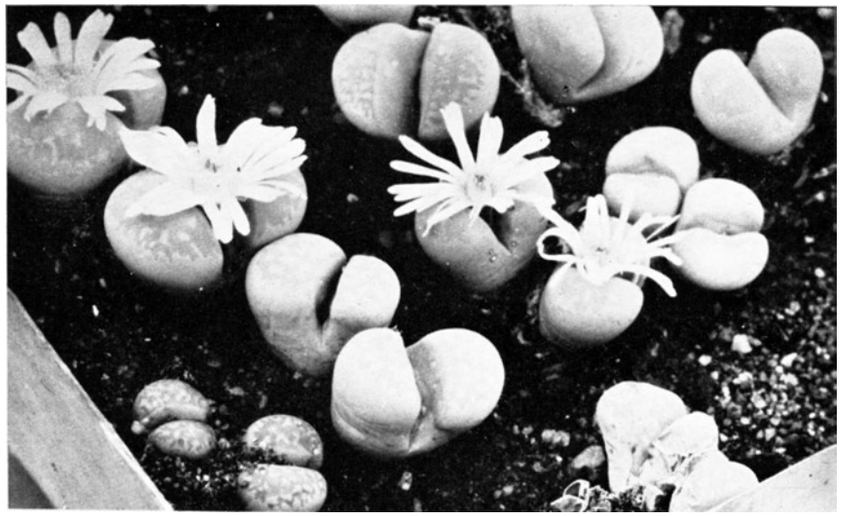


FIGURE 70 . LITHOPS MARGINATA NEL

jagged fine projections into the window, others being short toothlike: these projections become separated from the margin and form islands (irregular) in the window; inner margins straight or toothed; the texture of the mottled part of the lobe is very fine, giving the whole window a fine misty appearance like fine cobweb; number of fine white dots in the 'window. Flowers white. (Fig. 69-72.)

Namaqualand: Umdaus; Port Nolloth.

Fig. 69 is a photo of the three plants sent by N. E. Brown as being plants of the original *L. marmorata* as described by him.

Lithops marmorata. (Plaat 25.) Plante enkel of vorm klompe van 2 of meer; boonste vlak effens konveks; kante liggroengeel gekleurd, met die boonste rand effens pers; venster groot, grysgroen gespikkeld met liggrys of roomagtig-grys; buitenste soom baie onreëlmatig, bestaande uit 'n aantal gekartelde, fyn projeksies in die venster in, ander weer kort en tandvormig; hierdie projeksies raak los van die soom en vorm onreëlmatige eilande in die venster; die binneste soom reguit en gespikkeld; die tekstuur van die gespikkelde deel van die venster is baie fyn, en dit gee die venster 'n delikate mistige voorkome SOOS die van fyn spinnerak, 'n aantal wit kolle in die venster. Blomme wit. (Fig. 69-72.)

Namakwaland: Umdaus, Port Nolloth.

Fig. 69 is 'n portret van die drie plante wat deur N. E. Brown gestuur

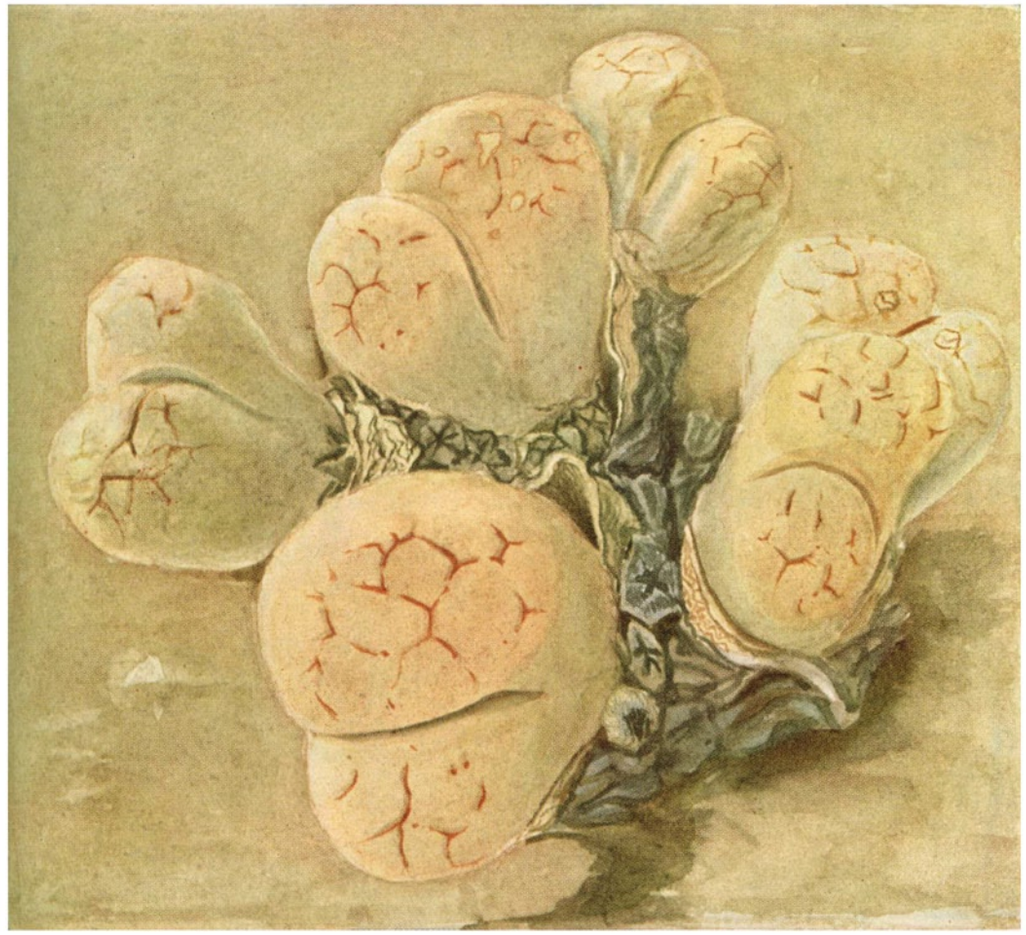


PLATE 24 . 1. LITHOPS LINEATA NEL
2. LITHOPS MARGINATA NEL

is. Hierdie drie plante was deel van die plante van *L. marmorata* soos deur hom oorspronklik beskrywe.

***Lithops marmorata.** Growths solitary or few in a clump, increasing very slowly, up to $1\frac{1}{3}$ in. high, $1\frac{1}{4}$ in. broad, and $\frac{3}{4}$ in. thick, with the top of the lobes slightly convex, grey-green, mottled with pale grey or creamy grey. Calyx 6-lobed, lobes 2–3 lines long, and about 2 lines broad, ovate or oblong, obtuse. Corolla about $1\frac{1}{4}$ in. in diam., expanding after midday in full sunshine and closing at dusk, scented. Petals about 40, of about 2 closely overlapping series, 6–7 lines long and 1–$1\frac{1}{2}$ lines broad, obtuse, pure white on both sides, very shining. Column of stamens + in. long, white with yellow anthers. Top of ovary flat; style very short; stigmas 6, finally about 5 lines long, at first erect, but when the petals fade they spread widely from the base, pushing the stamens away so that the latter form a sort of ring around them, and they are revolute at the tips.

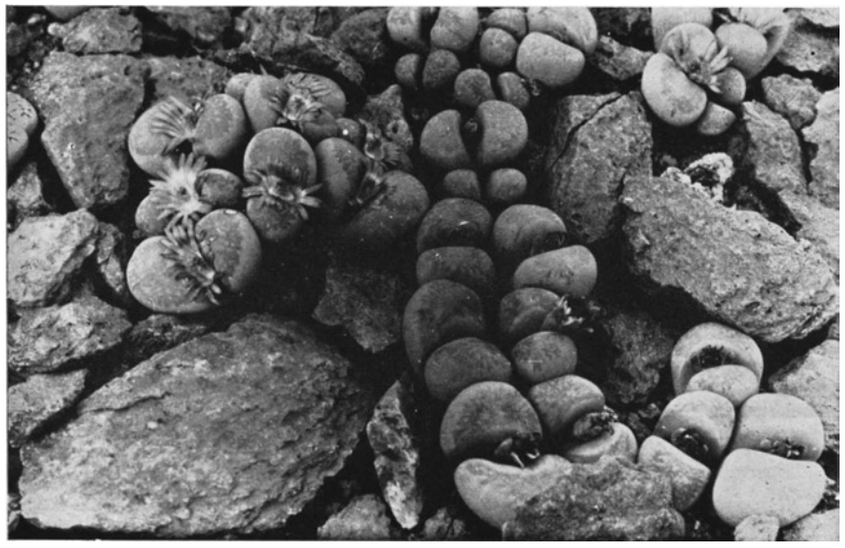
M. marmoratum N. E. Br. in *Journ. Linn. Soc. Bot.*, V. 45, p. 68.

South Africa: locality unknown (Pillans).

31. LITHOPS MARTHAE

Lithops Marthae. (Plate 26.) Growths solitary forming a lump of 4–6; top of lobe very slightly convex; sides grey with a purplish tint; upper surface with

FIGURE 71 . LITHOPS MARMORATA N.E. BR.



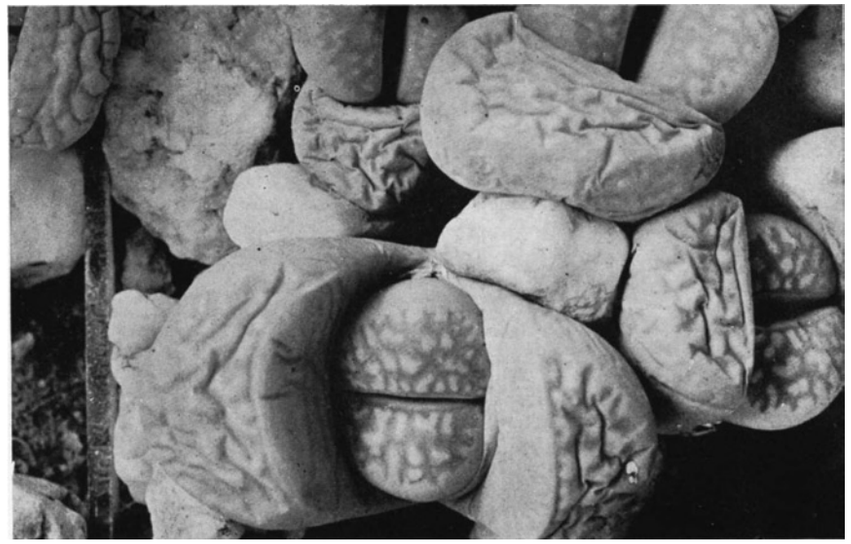


FIGURE 72 . LITHOPS MARMORATA N.E. BR.

round dots or very short linear depressions; sometimes linear depressions start from the fissure; these depressions give the top of the lobe a wavy (hilly) appearance and are coloured blood-red. Flowers yellow.

South-West Africa: near Pockenbank; south of Pockenbank; 70 miles south of Aus in desert limestone.

Fig. 73 is a photo of the plants fresh from the field.

Lithops Marthae. (Plaat 26.) Plante enkel of vorm klompe van 4-6; boonste vlak effens konveks, mantel grys met 'n purper tint; boonste vlak grys-geel of ligbruin met ronde kolle of baie kort lynvormige duike, die lynvormige duike begin gewoonlik naby die spleet; hierdie duike gee die boonste vlak 'n effens gerimpelde voorkome en is bloedrooi gekleurd. Blomme geel.

Suidwes-Afrika: naby Pockenbank; suid van Pockenbank; 70 my! suid van Aus in woestynkalk.

Fig. 73 is 'n portret van 'n aantal plante vars uit die veld.

***Lithops Marthae.** Corpuscula 2–3 cm. alta, 2–2·5 cm. lata, obconica, apice leviter convexa, griseo ochracea, vel pallide brunnea, supra fenestrata, saepe lineis rubris notata. Fissura 2–4 mm. alta. Sepala 5, long 8 mm. Petala 35–40, 2-seriata, ad 2·5 mm. lata, 1·2–1·4 cm. longa, aurea; filamenta aurea 7–8 mm. longa, antheris aureis. Stigmata 5, 1·3–1·5 cm. longa.

PLATE 25 . LITHOPS MARMORATA N.E. BR.

PLATE 26 . LITHOPS MARTHAE LOESCH ET TISCH.

Groot Namaqualand: prope Pockenbank (Erni) suedlich Pockenbank (Triebner); etwa 70 Meilen suedlich Aus, mi Wuestenkalk (Triebner).

Plantenlichaam 2–3 c.m. hoog, aan den hovenkant 2–2·5 c.m. in diameter, verkeerd kegelvormig. Het bovenvlak is licht gewelfd, glad, zonder groeven kaal. Kleur plantenlichaam muisgrauw, soms iets okerkleurig overwaasd. Op de bovenzyde der lobben bevindt zich een mat venster waarin uitgaande van de spleet, meestal eenige meer of minder duidelyke, gedeeltelyk vertakte, korte lyntjes van bloedroode kleur, aanwezig zyn. Spleet 2–3 m.m. hoog, doorloopend. Kelkslippen 5, slippen 8 m.m. lang, grauw bruinachtig, daarvan 3 iets breeder en 2 meer gepunt. Bloem 2·5 c.m. in diameter, kelkvormig, op den namiddag ongeveer 3 uur by zonneschyn geopend, en zich sluitend by zonsondergang. Niet geurend. Bloemkroonblaadjes in twee kransen, 35–40 in getal, de buitenste iets breeder, tot 2·5 m.m. breed, spatelvormig, stomp gepunt, 1·2–1·4 c.m. lang, de binneste bier en daar iets korter, bovenzyde goudgeel, de andere zyde witachtig, naar boven gebogen, waardoor de bloem eenigzins op een kelk gelykt. Meeldraden talryk, klein, 7-8 m.m. lang. Helmdraden en helmknoppen goudgeel, aan den bovenkant zich iets naar buiten terugbuigend. Stempels 5, ongeveer 1·2 c.m. lang, draadvormig, boven den meeldraden uitstekend, naar buiten iets opgerold, geel, naar beneden toe witachtig, Doosvrucht 5 bokkig.

Wy ontvingen deze mooie Lithops van den Heer F. Erni, de plant in 1931 in een klein aantal exemplaren in den nabyheid van Witputz en by Pockenbank gevonden beeft. Op byzonder verlangen van de Heer Erni geven we aan deze Lithops den naam van zyn vrouw Martha Erni. Door bet venster-

FIGURE 73 . LITHOPS MARTHAE LOESCH ET TISCH.

FIGURE 74 . LITHOPS MENNELII L. BOL.

oppervlak en de dikwyls zeer mooie bloedroode teekening in het venster is de plant zeer opvallend en tevens goed te onderscheiden van andere *Lihtops*-soorten. Als geelbloeier staat ze misschien in de nabyheid van *L. Schwantesii* Dtr.

32. LITHOPS MENNELLII

Lithops Mennellii. (Plate 27.) Growths up to 8 in a clump; subconvex; top surface slightly greyish-buff-coloured; window opaque, rugose, between the slightly buff-coloured wrinkles in the depressions dark blood-red lines and dots, not connected with one another, giving the whole upper surface the appearance of Hebrew script; these depressions ending in bifurcations in the outer margin; inner margin more or less straight. Flowers yellow. (Fig. 74, 75.)

Louisvale, near Upington.

Lithops Mennellii. (Plaat 27.) Planteliggaam tot 8 in 'n klomp; boonste vlak ondeursigtig effens grysgeel gekleurd, gerimpeld; tussen die effens geelgekleurde plooie is daar donker bloedrooi lyne en kolle in die weefsel waardeur die geheel 'n voorkoms van Hebreeuse skrif by; die duike tussen die plooie eindig in die vurke van die buitenste soom; binneste soom mm of meer reguit. Blomme geel. (Fig. 74, 75.)

Louisvale, naby Upington.

✱**Lithops Mennellii.** Corpusculum 1·7–2 cm. longum, fissura 3 mm. longa, 1·5–1·8 cm. latum, ante anthesin ad 2·4 em. diam., fenestra translucenta

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PLATE 27 . 1. LITHOPS MENNELLII L. BOL.
2. LITHOPS MEYERI L. BOL.

nulla, supra leviter convexum, roseo-brunneum, bullatum, lineis impressis conspicuis, atro brunnesi, 4–6, e margine interiore ad marginem exteriorem radiantibus, subreticulate ramosis, finibus liberis in marginem exteriorem terminantibus (more *L. mickbergensis*, Dinter); receptaculum 4 mm. longum, ad 8 mm. diam.; sepala 5, 6–7 mm. longa, basi 2–4 mm. lata, 3 membranaceo marginata; petala 3-seriata apice obtusa vel rotundata, e supra medium inferne gradatim angustata, aurea, 1–1·4 cm. longa, ad 2 mm. lata; filameata superne aurea, ad 8 mm. longa, autheris pollineque pallidis; discus conspicuus; ovarium supra leviter convexum vel planum, medium versus leviter elevatum; stigmata 5, gracilia, 1·1 cm. longa.

In dit. Gordonia; Louisvale, prope Upington, "on low quartz slopes between the road and the Orange River," Apr. 1934, Brian T. Mennell (N.B.G., 645/34). Fl. Apr. 1935.

In the form of the body and in the apical marking this is very like *L. mickbergensis*, Dinter, a species described without flowers. Dr. J. Lückhoff, however, who has grown and flowered both *L. Mennellii* and *L. mickbergensis*, states that the flowers of the latter are white and that in his opinion the two plants are quite distinct.

Mr. Mennell writes: "At its best this *Lithops* (*L. Mennellii*) is nearly as light as *L. Fulleri*, but has well-defined 'Hebrew script' in black. Most have now flowered (Apr. 1934), yellow, and have shrunk to crinkly pink, exactly like the stones, and most difficult to find."

FIGURE 75 . LITHOPS MENNELLII L. BOL.

FIGURE 76 . LITHOPS MEYERI L. BOL.

33. LITHOPS MEYERI

Lithops Meyeri. (Plate 27, 28.) Growths solitary or forming clumps of 3-4; sides and margin of top a dove-grey or a violaceous tint; lobes more or less unequal, divergent; top of lobes oblique; window scarcely visible, opaque or consisting of a number of dark-green more or less inter-connected slight depressions or window large, transparent, very light olive-green, with a more or less irregular margin; top of lobes with few to many dark-green dots; minute miniature windows. Flowers yellow.

Namaqualand; Brakfontein. (Fig. 76, 77.)

Lithops Meyeri. (Plaat 27, 28.) Plante enkel of vorm klompe van 3–4; mantel en rand van boonste vlak 'n duifgrys met effens persagtige tint; die twee blare ongelyk, van mekaar wegstaande; boonste vlak skuins; venster nouliks sigbaar of bestaan uit 'n aantal donkergroen mm of meer klein duike met mekaar verbind of die venster is groot, deursigtig, baie lig olyfgroen met 'n mm of meer onreëlmatige soom; die boonste vlak met 'n paar tot baie donker groen kolle; klein miniatuurvensters. Blomme geel. (Fig. 76, 77.)

Namakwaland: Brakfontein, Richtersveld.

✱**Lithops Meyeri.** Folia paris saepe inaequalia majora 3·5–4·5 cm. l., ad 1·5–2 cm. lata, apice ad 1 cm. diam., vagina 2–3 cm. l., mox divergentia, margine altero obliquo, glance olivacea, fenestra inconspicua grisea, obscure saturateque marmorata; receptaculum valde compressum, 7 mm. l., 5 mm.

PLATE 28 . LITHOPS MEYERI L. BOL.

PLATE 29 . LITHOPS NELII SCHWANT.

FIGURE 77 . LITHOPS MEYERII L. BOL.

et 10 mm. diam.; sepala 5, subaequalia 7 mm. longa, basi 3–5 mm. lata; petala 4 seriata, acuta vel denticulata, aurea, ad 1·7 cm. longa, 2 mm. lata; stamina ad 9 mm. longa; discus inconspicuus, crenulatus; ovarium supra fere planum vel medium versus levissime elevatum, lobis vix visis; stigmata 5, 1–2 cm. longa.

Namaqualand; Richtersveld, Brakfontein, Oct. 1931, Jan. 1932, G. Meyer (S.U.G. 9698) Fl. Mart. 1932.

34. LITHOPS NELII

Lithops Nelii. (Plate 29.) Plant growths forming clumps of 2 or more (6–8) turbinate; top surface convex or rounded at the top with a slight tendency to form an apex; window opaque, white, grey-green, white-grey to a grey with a yellowish tint, with no lines or dots on the surface, smooth; fissure very slight; diam. of flower 1·4–1·8 cm., sepals 5 mm. long 2 mm. broad, linear, acute, outer sides pellucid; petals 7–8 mm. long, 1 mm. broad, linear, rotund, yellow; stamens 4 mm.; filaments white; disc convex; petals 1-series; capsule quinquelocular.

South-West Africa: near Swakopmund. (Fig. 78, 79.)

Lithops Nelii. (Plaat 29.) Plante vorm klompe van 2 to 8; verkeerd keëlvormig, mantel glad, effens wit maar soms persagtig tot rooi; boonste vlak konveks of rond met 'n neiging om soms 'n punt te ontwikkel, glad en sonder enige

FIGURE 78 . LITHOPS NELII SCHWANT.

lyne of kolle, of duike; venster ondeursigtig, wit, gryswit tot 'n geel-grys, met soms 'n effens rooi tint. Blomme geel. (Fig. 78, 79).

Suidwes-Afrika; In die omgewing van Swakopmund.

Lithops Nelii, Schwantes Mss. Corpuscularia turbinata, convexa vel rotunda, vel apicis lobis convexis, glabra, alba, albo-griseo, vel griseo-lutea, fenestra opaca, fissura minuta. Sepala linearia, acuta, ectus pellucida; petala linearia, rotunda, 1-seriata, lutea; antherae luteae, filamenta alba; discus convexus; capsula quinquelocularis. (Fig. 78, 79.)

South-West Africa: near Swakopmund.

This species is obviously related to *L. Ruschiorum*, but it differs from it in its size, and also there are no markings on the upper surface, which are a common feature of *L. Ruschiorum*.

35. LITHOPS OLIVACEA

Lithops olivacea. (Plate 30.) Growths usually forming clumps of 2 or more; top of surface flat or in the older stage convex; window usually large, olive-green, transparent, sometimes light-green with few white islands in it; the outer margin usually denticulate or rarely quite plain; the inner margin straight and plain; in the older stage a number of blue-green dots appear on the margins of the window. Flowers yellow.

Kenhardt, near Kakamas.

PLATE 30 . LITHOPS OLIVACEA L. BOL.

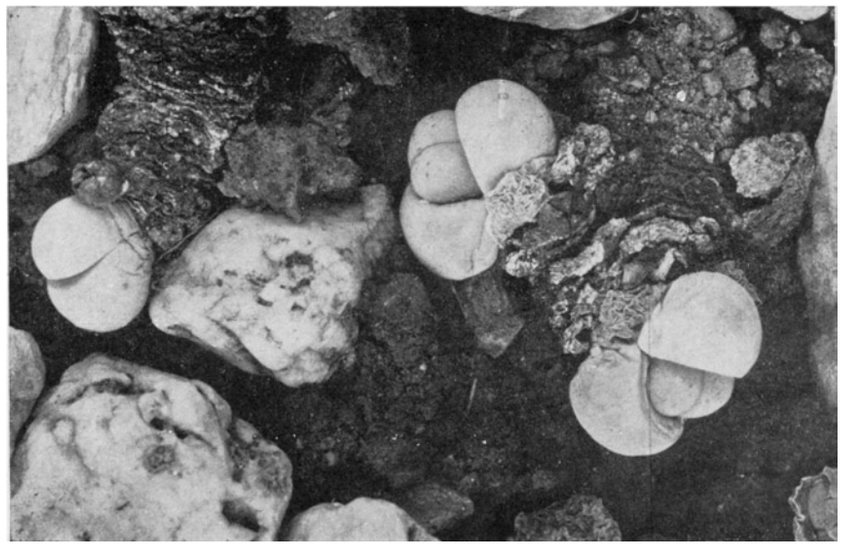

FIGURE 79 . LITHOPS NELII SCHWANT.

FIGURE 80 . LITHOPS OLIVACEA L. BOL.

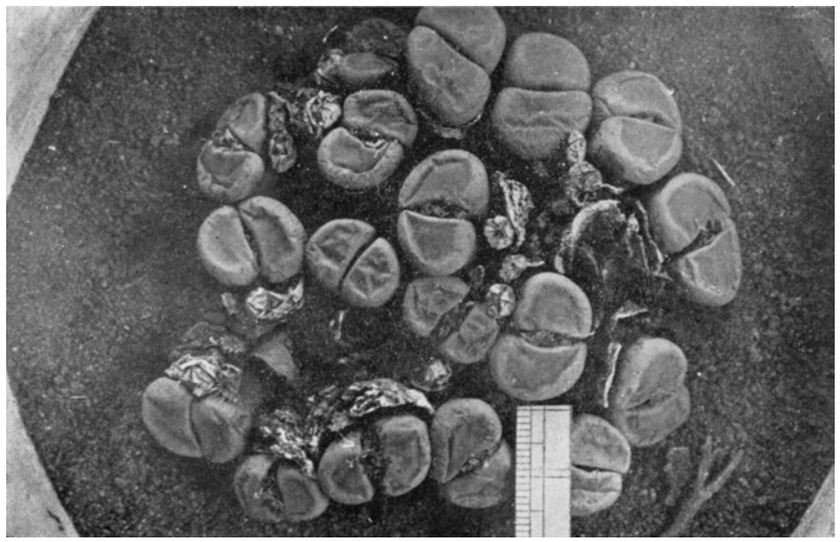

Fig. 80 is a photo of a group of plants fresh from the field, whereas Fig. 81 shows plants which have been in cultivation for some time.

Lithops olivacea. (Plaat 30.) Plante vorm klompe van 2 of meer; boonste vlak plat of in die ouere stadia effens konveks; venster gewoonlik groot, deursigtig, olyfgroen soms liggroen met 'n paar eilande; buitenste soom gewoonlik fyn getand of selde reguit; die binneste soom reguit en eenvoudig; in die ouere stadia 'n aantal blou-groen kolle op die grens tussen die soom en die venster. Blomme geel.

Kenhardt, naby Kakamas.

Die groep plante in Fig. 80, is vars van die veld en die in Fig. 81 is alreeds 'n tydlank in tuin gekweek.

✱**Lithops olivacea.** Corpuscula olivacea, 1·5 cm. longa, 1·1 cm. lata, 1·8 cm. diam., fissura ad 8 mm. alta, apice convexa levissima, "fenestra" sordide saturateque olivaceo-viridis, pallide olivaceo-marginata, notataque, margine interiore linea integerrima, sat conspicua, onusta, margine exteriore irregulariter incisa cincta, notis intus margines sparsis, varie formatis, nullis, tamen punctiformibus; fibres haud visi.

Peduncle much compressed and up to 1·1 cm. in diameter, sometimes nearly equalling the width of the leaf. The 5 sepals (sometimes partly the receptacle as well) rise beyond the top of the body. They are nearly equal and up to 6 mm. long and 5 mm. broad, inconspicuously tuberculate and reddish

FIGURE 81 . LITHOPS OLIVACEA L. BOL.

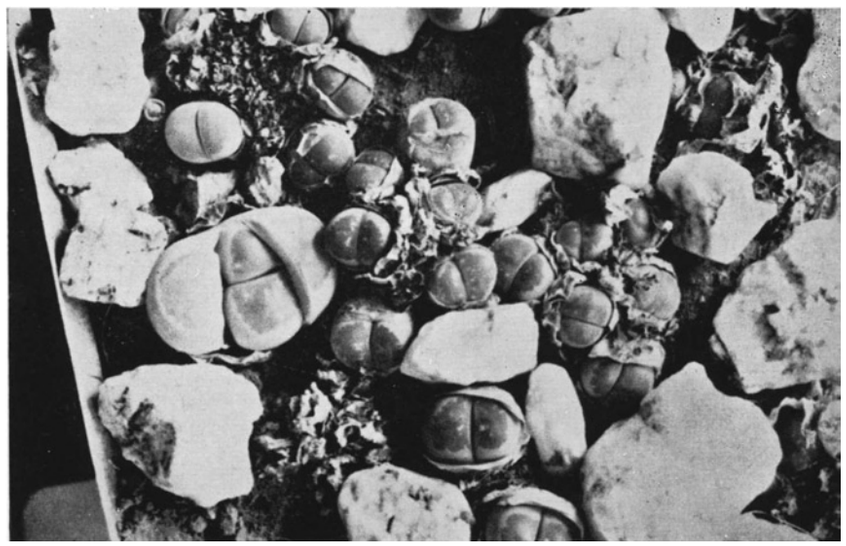

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PLATE 31 . 1. LITHOPS OPTICA (MARL.) N.E. BR.
2. LITHOPS OPTICA VAR. RUBRA TISCH.

PLATE 32 . LITHOPS OTZENIANA NEL

FIGURE 82 . LITHOPS OPTICA (MARL.) N.E. BR.

towards the apex, obtuse, or the oilier ones keeled and somewhat acute; petals obtuse, a clear and rather bright yellow, white at the base, laxly placed in 1-2 series and nearly equal in length, in the finest flowers seen (which are opened for several successive days) 2 cm. long, and to 3 nun. broad; filaments up to 8 mm. long, white, slightly papillate at the base or a little above, anthers yellow; nectary crenulate; ovary lobed towards the middle, the lobes compressed: stigmas about 1 cm. long, well overtopping the stamens; capsule of the previous year semi-globose, slightly raised on the top towards the middle, with the lobes a little compressed, about 4 mm. long and 6 mm. or expanded 9 mm. in diameter.

Cape Province; in dit. Kenhardt, prope Kakamas, E. H. Fuller (N.B.G. 1725/28) Fl. May.

36. LITHOPS OPTICA

Lithops optica. (Plate 31.) Growths forming clumps of 4–15, even 20–30; top of body obliquely convex, sometimes tapering to a point; sides coloured pale grey; window large, open, transparent, with here and there a few small islands, greenish-white or pale greyish-white; inner margin curved, very minutely denticulate or without teeth; outer margin denticulate, whitish; both margins often tinged a suffused red tinge; at the two points where inner and outer margin meet, narrow transparent sharp triangular indentation pointing downwards with the apex into the grey sides. Flowers red-white. (Fig. 82.)

South-West Africa; growing in sand fissures of gneiss-rocks near Prince of Wales Bay, Lüderitzbucht.

L. optica var. rubra (Plate 31, Fig. 83.) Window reddish to reddish purple.

Lithops optica. (Plaat 31.) Planteliggaam vorm klompe van 4–15, selfs 20–30; boonste vlak skuins-konveks soms in 'n punt uitlopend; mantel liggrys gekleurd; venster groot, oop, deursigtig, met hier en daar 'n paar klein eilande, groenwit of liggrys wit; binneste soom gebuig, baie fyn getand of sonder tande; buitenste soom getand, witagtig; dikwels some dikwels met 'n onderdrukte rooi kleur; waar die binne-en buitesome mekaar ontmoet, is daar 'n non, skerp, byna driehoekige deursigtige inham, wat met sy skerpste punt na onder gerig is in die grysmantel in. Blomine rooiwit. (Fig. 82.)

Suidwes-Afrika; groei in sandbedekte splete van gneissrotse naby Lüderitzbucht.

L. optica var. rubra. (Plaat 31, Fig. 83). Venster rooiagtig tot rooi-pers.

***Lithops optica.** Planta acaulis, ramosa, pulvinum depressum formans. Corpuscula truncata, glauca, non-punctata sunt, sed facies terminalis margine fauceque albido-marginata est. Ovarium inclusum, compressum; calyx exsertus, sepalis 5, ovalibus, fuscis, hyalino-marginatis. Petala numerosa, roseo-alba, linearia, libera, sepalis duplo longiora. Styli 5, filiformes. Capsula turbiniformis, stipiata, corpuscula haud superans.

FIGURE 83 . LITHOPS OPTICA (MARL.) N.E. BR. VAR. RUBRA TISCH

PLATE 33 . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

FIGURE 84 . LITHOPS OTZENIANA NEL

FIGURE 85 . LITHOPS OTZENIANA NEL

FIGURE 86 . LITHOPS OTZENIANA NEL

L. optica var. rubra, Tisch. Deutsche Kakteenkunde (1925/1926).

Gr. Namaqualand; growing in sand-covered fissures of gneiss-rocks near Prince of Wales Bay. Fl. April 1909, alt. 50 m. Marloth 4675.

37. LITHOPS OTZENIANA

Lithops Otzeniana. (Plate 32.) Growths forming clumps up to 20, turbinate; sides slightly mauve-grey; upper surface flat or convex; window large, transparent, or semi-transparent, occupies practically the whole upper surface; colour of window varies from greenish, olive-green to a somewhat violet tint; window surrounded by a light grey to yellow-grey border; the outer margin laciniated, consisting of 10–12 laciniae; inner margin 4–6 laciniae; laciniae irregular, triangular, broadly oblong, obtuse to pointed, about as broad as long. Flowers yellow.

Cape Province: Brakfontein, Loeriesfontein.

The photos (Fig. 84-88) reproduced here were taken at the time this species was discovered in the field. They show (i) the nature of the habitat, (ii) the characteristic features of the window, and (iii) inner and outer margins. Fig. 88 grew amongst the plants shown in the other photos and yet it seems to differ considerably from them. The margins seem to have disappeared, and if one had found this plant by itself, you would have been tempted to create a new species, but in reality it is nothing else but *L. Otzeniana*.

PLATE 33A . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

Lithops Otzeniana. (Plaat 32.) Plante vorm soms klompe van by die 20, verkeerd keëlvormig; kante effens persgrys; boonste vlak plat of konveks; deel van venster vaal tot vaalgrys gekleurd; venster groot, deursigtig of half deursigtig, heslaan feitlik die hele oppervlakte; venster groenerig, olyfgroen en soms effens violet gekleurd venster omgewe deur 'n liggrys tot geelgrys soom; die buitenste soom 10–12 slippig, die binneste soom 4–6 delig; slippe of onreëlmatig, driehoekig, breed langwerpig, stomp of toegespits, omtrent so breed as lank. Blomme gee!.

Kaapland: Brakfontein, Loeriesfontein.

Die portrette (Fig. 84–88) is in die veld geneem toe hierdie nuwe soort ontdek is en toon aan (i) die aard van die woonplek, (ii) die venster, en (iii) die binneste en buitenste some. Hierdie some is tipies van hierdie plant en stel ons in staat om die plant te herken. Fig. 88 is 'n portret van 'n groep plante vat in die onmiddellike nabyheid van die ander plante gegroei het en tog verskil dit blykbaar heelwat van hulle. Het 'n mens die groep plante alleen gevind dan son 'n mens geneig wees om dit as 'n nuwe soort te beskrywe en in werklikheid is dit niks anders nie as *L. Otzeniana*.

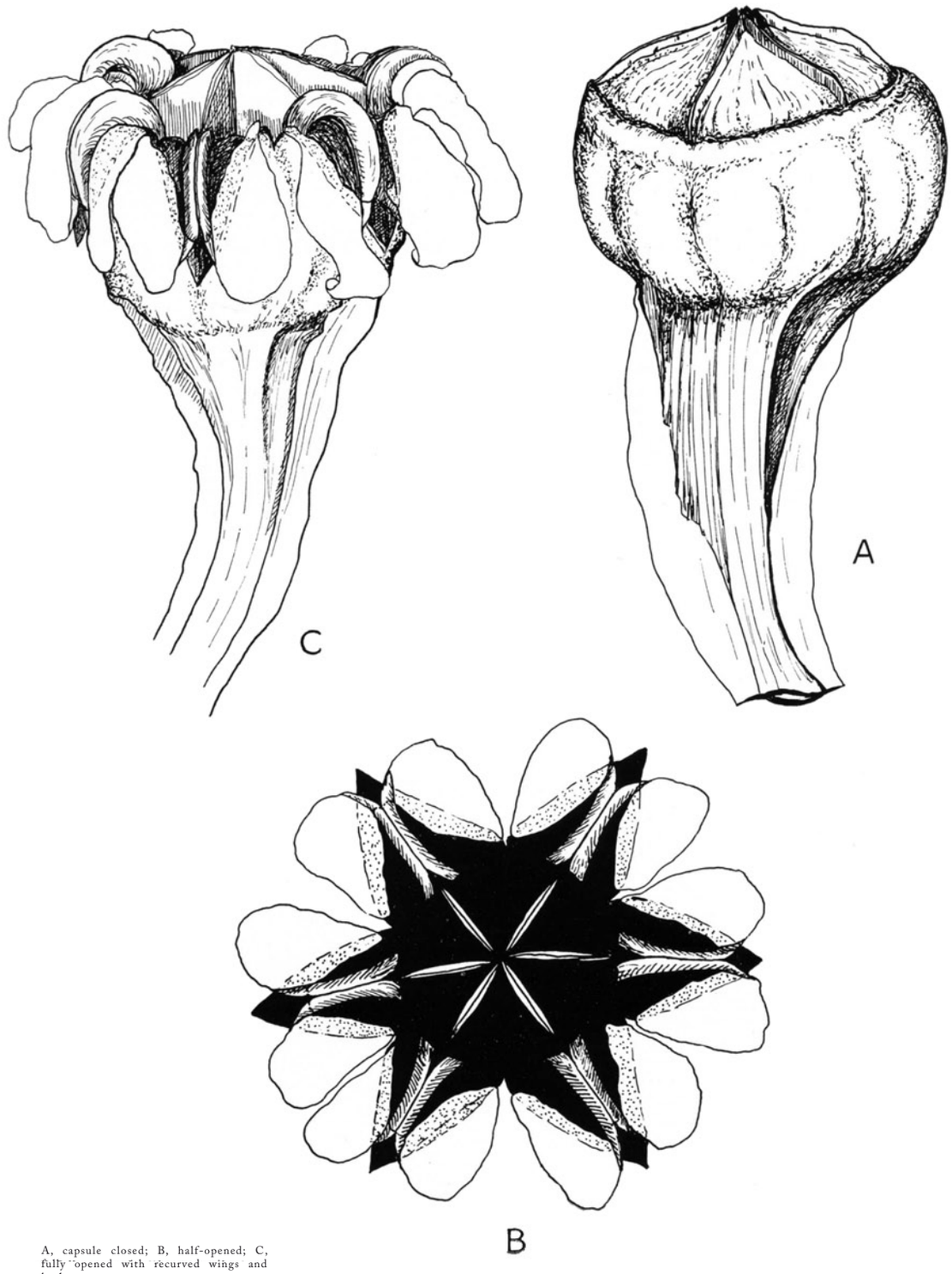
✱**Lithops Otzeniana.** Corpuscularia turbiniformia; folia aequalia vel subaequalia, plana, superne cinerea; fenestra magna et bene visa, subpellucida, virida vel olivacea, margine exteriore multo diviso (10–12 partita) et margine interiore prope fissuram diviso (4–6 partita), laciniae obtusae vel acutae; sepala ovato-linearia, obtusa, apicem versus granulata; petala linearia obtusa, 2-seriatim, aequalia, aurea; discus conspicuus, crenulatus; stamina longa, antherae anreae, filamenta alba, glabra vel in medio papillata; ovarium obscure lobatum, planum, lobi vix visi, stylus filiformis, stigmata 5, aurea; capsula 5-partita. Semina globoso-pyriformia, minuta, nigra.

Die Körperchen, manchmal bis zu 20 in einem Klumpen vereinigt, sind 2·2–5 cm. lang, 1·5–3 cm. breit, verkehrt kegelförmig. Spalt 1·1–2 cm. lang, im Ruhezustand 2 mm. breit, im blühenden Zustand etwa 1 cm. breit, die Seitenflächen grau mit einem Stich ins Violette. Die Fenster an den Endflächen der Loben sind gross, halbdurchlässig und nehmen fast die ganze Oberfläche ein. Die Farbe des Fensters wechselt von grünlich, olivengrün oder auch etwas ins violette. Die Fenster sind umgeben von einem hellgrau gefärbten Saum. Der äussere Rand dieses Saumes (nach aussen zu) ist vielzipfelig (10- bis 12-teilig), während er in der Nähe des Spaltes nur 4- bis 6-teilig ist. Die einzelnen Zipfel sind entweder unregelmässig, dreieckig, breit länglich, stumpf bis scharf zugespitzt. Die Zipfel sind 2-3 mm. lang, etwa ebenso breit. Sepalen eiförmiglänglich, stumpf, nach der Spitze zu etwas granuliert, 5 mm. lang, 3 mm. breit. Durchmesser der Blüte 1·2 cm. Petalen länglich, stumpf, zweireihig, goldgelb, 9 mm. lang, 1·5 mm. breit. Stamina 2–6 mm. lang, Antheren gelb, Filamente weiss. Fruchtknoten flach, undeutlich gelappt, fünfteilig. Kapsel 7 mm. breit, geschlossen. Quellenleisten, einander berührend. Samen sehr klein, kugel-birnförmig, schwarz.

FIGURE 87 . LITHOPS OTZENIANA NEL

Boesmanland: Brakfontein, 30 Meilen von Loeriesfontein, im verwitterten Granit, unter Büschen und an offenen Stellen zwischen Steinen. Blühend 30 April 1937, leg. G. C. Nel.

Ich benenne diese Art zu Ehren des Herrn M. Otzen aus Kapstadt, der mich einlud, ihn auf einer botanischen Sammelreise zu begleiten, auf der ich nun diese Art zufälligerweise entdeckte. Wir waren drei zusammen und hatten auf einem kleinen Gebiet von etwa 2 ha botanisiert. Wir hatten schon verschiedene Sukkulenten gefunden, z.B. gab es dort viele Hoodien, und wollten gerade diese Stelle verlassen, um irgendwo anders zu suchen. Ich ging langsam voraus zu unserem Auto bin, da sah ich plötzlich diese wundervolle Pflanze unter einem Busch etwa wie in Abbildung 87. Ware ich nur etwa ein Meter mehr nach links gegangen, dann hatte ich diese hübsche Art nicht gefunden. Natürlich suchten wir nun die ganze Gegend intensiv ab und fanden dann noch ungefähr 10 bis 15 Klumpen. Diese Art kommt vorn Rande des Buschmannlandes in jenem Übergangsgebiet zwischen Winter- und Sommerregen vor. Geht man nur etwas weiter nach Norden, dann kommt man ins Grasland, wo es nur noch Sommerregen gibt. *L. Otzeniana* ist ja gelbblühend und gehört ihrem Aussehen nach in die Gruppe *L. marmorata*, welche weiss blüht. Sie unterscheidet sich von *L. olivacea*, dem einzigen gelbblühenden jener Gegend, durch den gezipfelten Saum um das Fenster, welches ja bei dieser Art fast fleckenlos ist. Die spezifischen Merkmale unserer neuen *Lithops* sind: erstens das sehr grosse Fenster und zweitens der ausgeprägte Saum, der die Fenster umgibt. Dieser Saum ist, wie aus den Abbildungen ersichtlich, gezipfelt, und der äussere Rand hat viel mehr Zipfel als der innere, in der



A, capsule closed; B, half-opened; C, fully opened with recurved wings and keel.

FIG. 92 . CAPSULE OF LITHOPS PSEUDOTRUNCATELLA (HAW.) N.E. BR., A.

unmittelbaren Nähe des Spaltes befindliche. Im Jugendzustand sind die Zipfel des inneren Saumes mit der Kante der Endflächen verwachsen. Nachher, je älter die Pflanze wird, sieht man, wie die Zipfel sich loslösen, und schliesslich findet man nur noch einen dünnen Streifen zwischen den nun freien Zipfeln und der Kante. Sie sind nun zu Flecken auf dem Fenster geworden.

Abbildung 86 zeigt einen groszen Klumpen, wie es deren viele gibt.

38. LITHOPS PSEUDOTRUNCATELLA

Lithops pseudotruncatella. (Plates 33, 33A, 33B.) Growths solitary or many in a clump; top of lobe flat or slightly convex; sides grey with a tinge of purple; top of lobe varying from pale grey to brownish-grey with a slight pinkish tinge sometimes; windows numerous, consisting of round green dots (miniature windows); top of lobe divided into many irregular areas by branching lines or dendritic markings, which are more or less confluent, forming grooves, coloured rust-brown, brownish-red with a touch of purple-blue along the edges of the grooves; top of lobes slightly rugulose (uneven); in areas a very large number of very minute white dots. The miniature windows either small, round to irregular shaped, or windows confluent from larger windows, which now and then occupy the whole upper surface and in that case the miniature windows on the margin. Flowers yellow. (Fig. 89, 90, 91.)

South-West Africa: Auas mountains near Windhoek, Lichtenstein; Khomas Plateau; and to Ondekaremba; Friedenau; Witvlei; Friedental, to Blumental; Onazuhetter at foot of Waterberg mountains.

FIGURE 88 . LITHOPS OTZENIANA NEL
Loeriesfontein This photo shows the above species with so to say no margin

FIGURE 89 . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

FIGURE 90 . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

PLATE 33B . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

PLATE 34 . LITHOPS RUSCHIORUM (DTR. ET SCHWANT.) N.E. BR.

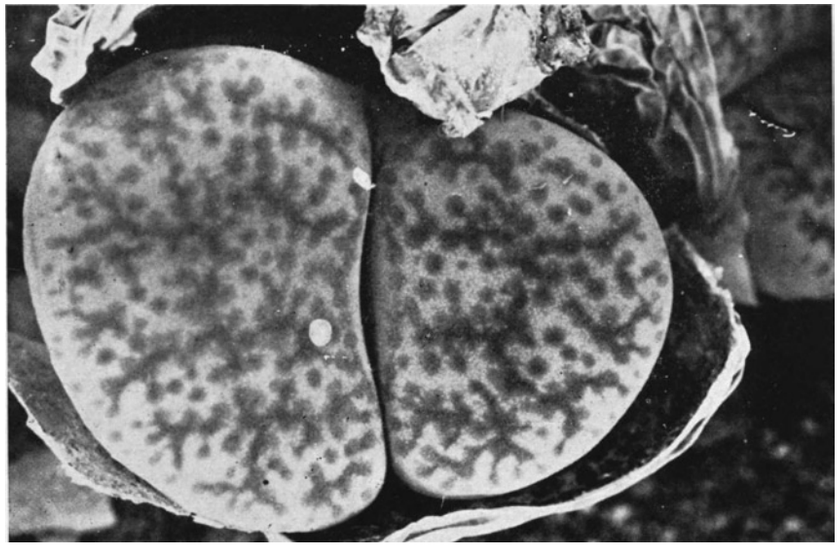


FIGURE 91 . LITHOPS PSEUDOTRUNCATELLA (BGR.) N.E. BR.

Fig. 91 shows the upper surface magnified so as to show the miniature windows. Fig. 92 is a drawing of the capsule of this species.

Lithops pseudotruncatella. (Plate 33, 33A, 33B) Planteliggaam enkel of baie in klomp; mantel grys, effens pers getint; boonste vlak varieer van liggrys tot bruingrys met soms 'n effens ligrooi tint; venster ondeursigtig en daarin baie ronde groen, deursigtige venstertjies (miniatuur-vensters); boonste vlak verdeel in baie onreëlmatige areas deur vertakte lyne of dendritiese merke wat mm of meer inmekaar vloei en met groewe wat roesbruin, rooibruin gekleurd is en die kante van die groewe is effens purperblou: boonste vlak effens gerimpeld; in die bovermelde areas 'n groot aantal wit stippeltjies; die miniatuur-vensters of klein, rond tot onreëlmatig of vensters vloei in mekaar en vorm grotere vensters, wat af en toe die hele oppervlakte beslaan en in daardie geval is die miniatuur-vensters op die some. Blomme geel. (Fig. 89, 90, 91.)

Suidwes-Afrika; Auas berge naby Windhoek; Lichtenstein; Khomas plateau; ens tot Ondekaremba; Friedenau; Witvlei; Friedental tot Blumental; Onazuhetter tot voet van Waterberg.

Fig. 91 toon die oppervlakte vergroot aan om die miniatuur-vensters te wys. Fig. 92 is 'n tekening van die doosvrug van hierdie soort.

***Lithops pseudotruncatella.** Körperchen allmählich durch Teilung rasenbildend; stark niedergedrückt, und gestutzt, ca, 2 cm. hoch, blass bräunlich grau, auf der rundlichen oder querlänglichen, sehwach konvexen Oberseite 2-3 cm. breit, daselbst mit netzartiger Aderung und dazwischen liegenden

FIGURE 93 . LITHOPS RUSCHIORUM (DTR. ET SCHWANT.) N.E. BR.

Punkten braun verwaschen und marmoriert; Teilspalte ziemlich lang, kahl. Blüten gross, über Mittag offen, 4 cm. breit. Fruchtknoten etwas hervorragend und die lanzettlichen, stumpfen Kelchzipfel ausgebreitet, bräunlich. Blumenblatter zahlreich, schmal linealspatelig, goldgelb, rückseits blasser. Staubfäden zahlreich, weisslich, nach oben gelb. Griffel fadenförmig, gelb, so lang wie die Staubfaden.

Aus Damaraland, Gross-Namaland.

39. LITHOPS RUSCHIORUM

Lithops Ruschiorum. (Plates 34, 35.) Growths solitary or in clumps of 5-6; turbinate prominently convex in the young stage and somewhat elliptic in outline viewed from above; older stage flat, glabrous; top of lobe in young stage milky pearl-grey, yellowish or yellowish-ochre; older stage milky pearl-grey to greenish-grey; lobes in young stage with minute round irregularly shaped dots or linear depressions. Very often these depressions are branched or interconnected with one another by delicate grooves, the depressions whether dot or line remaining the dominant feature; the dots or depressions coloured prominently dark-red, the connections very faintly coloured; in some cases the lines are absent. Flowers yellow. (Fig. 93, 93A.)

South-West Africa: Near Khan Mine, 10 km. west of Roessing and the old State Railway.

PLATE 35 . 1. LITHOPS RUSCHIORUM (DTR. ET SCHWANT.) N.E. BR.
2. LITHOPS SALICOLA L. BOL.

Lithops Ruschiorum. (Plate 34. 35.) Plante enkel of klompe van 5–6: bepaald konveks in die jong stadium en effens ellipties van bo af gesien: in die ouere stadium plat, glad: boonste vlak in die jong stadium Melkerig parel-grys, geelagtig of geeloker: ouere stadium melkerig parelgrys tot groeneriggrys; blare in die jong stadium met fin ronde, onreëlmatige kolle of lynvormige duike. Dikwels is hierdie duike vertak en met mekaar verbind deur sierlike groewe, die duike of dit non kolle of lyne is bly die prominente of uitstaande kenmerk: die kolle of duike sterk donkerrooi gekleurd; die verbindinge baie effens gekleurd: in sommige gevalle is die lyne afwesig. Blomme geel. (Fig. 93.)

Suidwes-Afrika: Naby Khan-Myn, 10 km. es van Roessing en die ou Staats-Spoorweg.

✱**Lithops Ruschiorum.** Corpuscula 2–4. cm. longa, $1\frac{1}{2}$–4 cm. lata, obconica, fissura transversa 5–20 mm. alta, biloba, apice lobis convexis, glabra, pallide griseo-amethystino-ochracea vel lactea, fere scrobiculis minutissimi et liniis saepe ramosis rubicundis, notata. Flores parvi, 2–$2\frac{1}{2}$ cm. lati, lutei. Capsula quinque locularis, expansa ca 8 cm. lata, seminibus paucis magnis.

Körperchen 2–$4\frac{1}{2}$ cm. lang, $1\frac{1}{2}$–4 cm. breit, kegelförmig, Spalt 5-20 mm. tief. Infolge dieses ausserordentlichen tiefen Spaltes und der oft stark konvexen Blattenden die ab und zu sogar noch deutlich gekielt sind, treten die beiden zusammengewachsenen Blätter bei dieser Art viel deutlicher hervor als bei irgend anderen bisher bekannten *Lithops*. Die Färbung wechselt von milchfarbenem Perlgrau zu mehr gelblichen bis rötlichen ockerfarbenen

FIGURE 93A . LITHOPS RUSCHIORUM (DTR. ET SCHWANT.) N.E. BR.

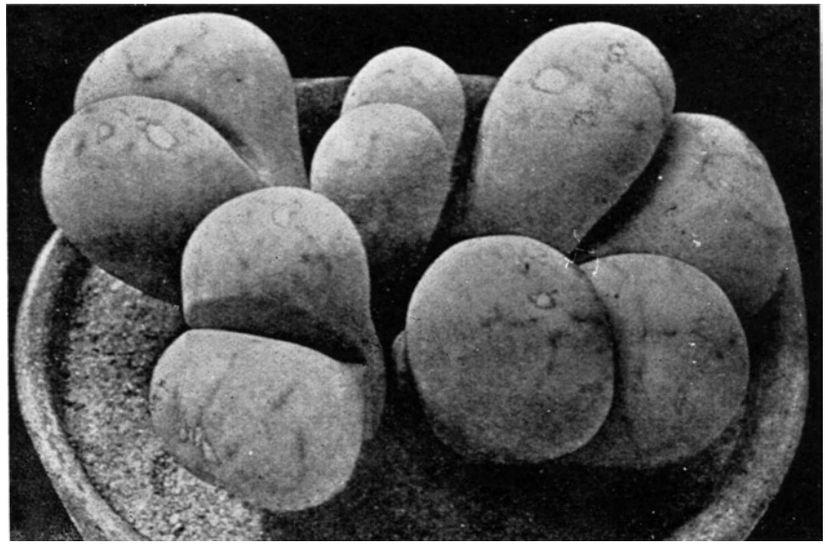


FIGURE 94 . LITHOPS SALICOLA L. BOL.
In habitat. Lückhoff

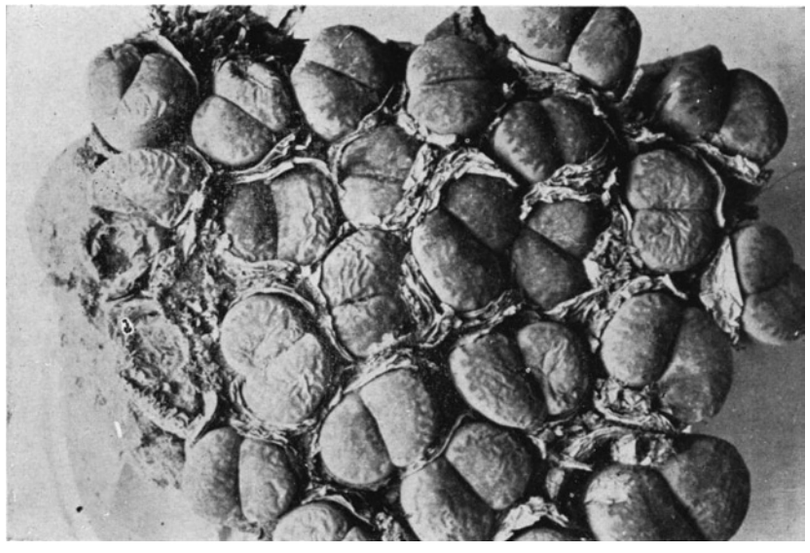
Tönen; besonders die Seiten sind oft amethystfarben überhaucht. Die Blattenden zeigen sehr oft nur ganz wenige, wegen ihrer geringen Grösse kaum wahrnehmbare, rundliche oder spitzzipfelig ausgezogene Grübchen, die ähnlich denen des *Mes. Karasmontanum* sind, wenn auch viel kleiner. Vielfach haben die Grübchen aus den Zipfeln heraus lineare Fortsetzungen in Gestalt sehr schmale Rinnen, die auch von Grube zu Grube verlaufen können, oft mehrere derselben verbindend. Bei manchen Körperchen treten diese Linien den Gruben gegenüber stark hervor, lassen immer aber noch Grübchen als primäres Element in ihrem Verlauf erkennen. Ab und zu erscheinen Körperchen oder Individuen ohne jede Andeutung einer Zeichnung. Die Grübchen und Linien scheinen gelblich-rötlich durch, Blüten verhältnismassig klein 2–2½ cm. breit, gelb. Kapsel funffächerig, ausgebreitet etwa 8 mm. breit, mit verhältnismässig wenigen Samen, die für eine *Lithops* gross zu nennen sind.

S.W.A.: in der Nähe der Khan-Kupfergrube, 10 Km. w. zwischen Rössing und der alten Staatsbahn.

Mes. Ruschii gehört zu den interessantesten *Lithopsen*, die bisher gefunden sind. Nicht nur, weil sie eine schon gefärbte und infolge ihrer absoluten Kieselstein- oder Kalksteinähnlichkeit äusserst merkwürdige Pflanze ist, sondern auch weil sie uns m.E. Züge von Vorfahren-Stadien der Gruppe in unerwarteter Fülle erhalten hat: oberflächliches, nicht halb unterirdisches Wachstum, verhältnismässig geringe Verwachsung der Blattpaare, gerundetes, ab und zu sogar noch deutliches Ende d. Blätter, Anfänge einer fensterartigen Durchbrechung der äusserst stark kalkinkrustierten Epidermis, Chlorophyll-

FIGURE 95 . LITHOPS SALICOLA L. BOL.

FIGURE 96 . LITHOPS SALICOLA L. BOL.



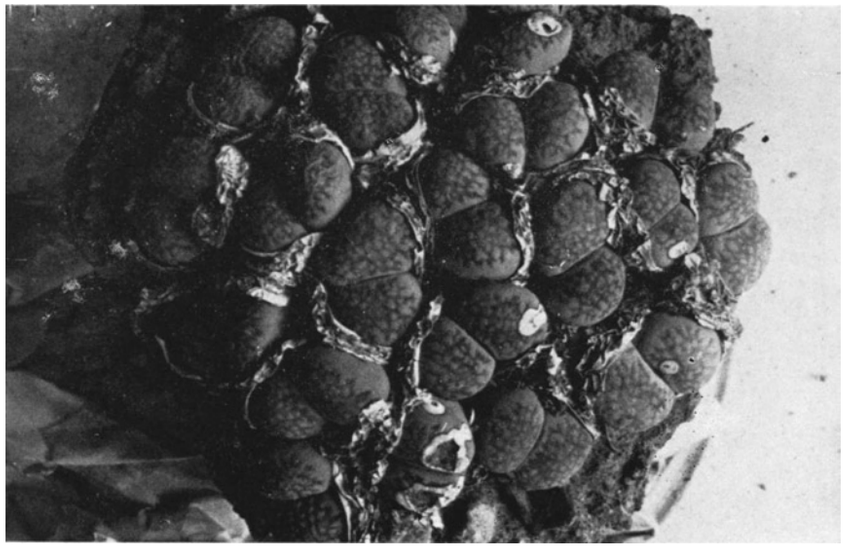


FIGURE 97 . LITHOPS SALICOLA L. BOL.

zellenschicht auch unter der Oberhaut der gewölbten Blattenden und dort nur unterhalb der lichtdurchlassenden Vertiefungen aussetzend, die wohl nur in äusserst seltenen Fallen, nur einmal von Dinter beobachtet, eine Ausdehnung bis zu 1 cm. erreichen können.

40. LITHOPS SALICOLA

Lithops salicola. (Plates 35, 35A.) Growths solitary or forming clumps of many (20); top of lobe flat or slightly convex; sides coloured grey; window large, transparent to semi-transparent, olive-green, unbroken or window grey-green, dark-green reddish to pinkish, divided into a large number of confluent areas by small white islands, reduced to a few patches here and there; these islands raised slightly above level of window, thereby giving it a slight rugose appearance; outer and inner margins wavy or slightly toothed with a slightly white border. Flowers white.

Lückhoff, O.F.S.: partly submerged in rainy season; on dry limestone, Lückhoff.

Fig. 94 is a photo of this species in its habitat in the pan. The plants are embedded in the soil and there are thousands of them in a small area of $\frac{1}{2}$–1 morgen (100 × 100 yds.), as is clear from these photos (see Fig. 6–7). Fig. 95–97 show the variability of the upper surface, and Fig. 98 is a photo of the plant in flower.

1

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1

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PLATE 35A . 1. LITHOPS SALICOLA L. BOL.
2. LITHOPS SCHWANTESII DTR.

Lithops salicola. (Plate 35, 35A.) Plante enkel of baie in 'n klomp (20) boonste vlak plat of effens konveks; mantel effens grys gekleurd; venster groot, deursigtig, olyfgroen, oop of venster grysgroen, donkergroen, rooi of vleiskleur, onderverdeel deur klein witagtige eilande in 'n groot aantal in mekaar vloeiende areas, soms net 'n paar areas; soms net 'n paar wit stippels hier en daar; eilande effens hoer as die oppervlakte van die venster en daardeur kry die venster 'n effens gerimpelde voorkoms; binneste en buitenste soom effens gegolfd of getand met 'n wit rand voorsien. Blomme wit.

Lückhoff, O.V.S.: in 'n pan wat periodies in die reënseisoen onder water staan; in droë kalkgrond naby Lückhoff.

Fig. 94 is 'n portret van hierdie soort in sy natuurlike woonpiek in die pan wat periodiek onder water staan. Op 'n klein oppervlakte ($\frac{1}{2}$–1 morgen) is daar letterlik duisende van hierdie plante in die grond ingesink en dit is haas onmoontlik om te loop sonder om op plante te trap (sien Fig. 6–7). Fig. 95–97 toon die geaardheid van die boonste vlak aan en Fig. 98 is 'n portret van die plant in Mom.

✱**Lithops sailcola.** Corpuscula superne olivacea, fenestra leviter convexa, in feris sordide lilacina, in cultis pallide olivaceo viridi, margine omni crebre breviter subregulariter lobulato, intra marginem maculis inconspicuis, nunc sat crebris, nunc subnullis, ornata, maculis lobulisque vix prominentibus, 2–2·5 cm. longa cum fissura 2–3 mm., ad 1·6 cm. lata, 2–2·7 cm. diam. sine fissura per anthesin ad 4 mm. divergente; receptaculum leviter, cum aetate fere omnino, exsertum, valde compressum, 6 mm. longum, ad 9 mm. diam.; sepala

FIGURE 98 . LITHOPS SALICOLA L. BOL.

5, lateralia 2 diu erecta dum petala expansa sunt, 5·5–6 mm. longa, basi 3–5 mm. lata; petala 2–3-seriata, exteriora subaequilonga, obtusa vel saepius rotundata, e supra medium inferne angustata, nivea nitentia (sicca subatrata), 0·9–1·3 cm. longa, 1·5–2·25 mm. lata; stamina in columnam compressam, basi ad 6 mm., apice 3 mm., diam., disposita, filamentis niveis, ad 7 mm. longis, antheris pollineque luteis; discus crebre denticulatus, ad 7 mm. diam.; ovarium gradatim ad 0·75 mm. elevatum, lobis leviter compressis; stigmata 5, lutea, 8 mm. longa.

Orange Free State: in dit. Fauresmith, "on the farm Rose Marie," in planitie salsa ("in brak pan"), Oct. 1935, I. C. Verdoorn, 1622.

Fl. hort. Feb. (Pretoria), Apr. (Cape Town) 1936, floribus apud me in sole pleno a horis 4 ad 6 horas late expansis.

41. LITHOPS SCHWANTESII

Lithops Schwantesii. (Plate 35A.) Growths usually 2 in a clump; top of lobe convex; sides mauve-grey; window opaque; top of lobes grey-green, yellowish-brown, yellow-reddish, all with a greenish tint or hue; in the young stage slightly rugulose which tends to disappear in the older stage; in the slight depressions fairly broad dark-red lines and isolated dots of same colour, the lines being the dominant feature, both with a slightly mauve-green border, giving the whole upper surface a suffused greenish tint; on the inner margin very often 5-6 red dots; isolated few to many green to light-green miniature

FIGURE 99 . LITHOPS SCHWANTESII DTR.

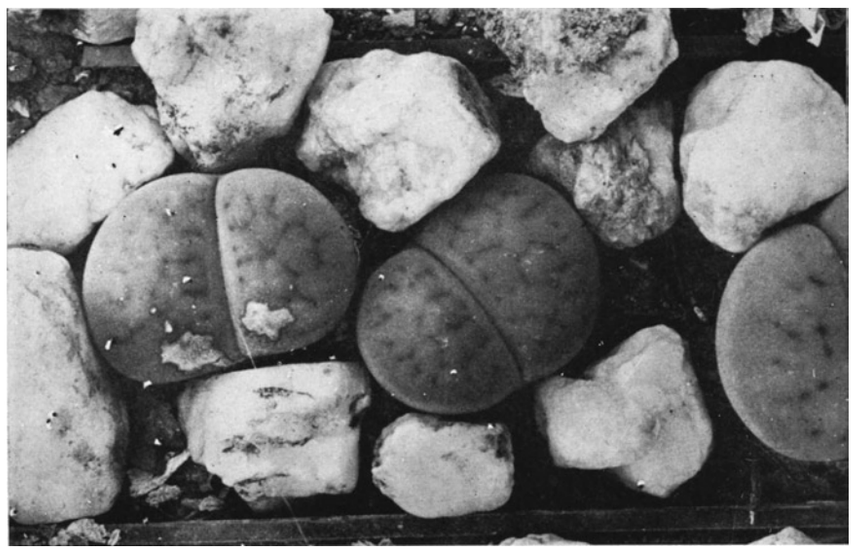


PLATE 36 . LITHOPS TERRICOLOR N.E. BR.

PLATE 36A . LITHOPS TERRICOLOR N.E. BR.

FIGURE 100 . LITHOPS TERRICOLOR N.E. BR.
In habitat. Laingsburg

windows; numerous minute white dots; the whole top with a light-brown border on the inner and outer margin; no definite inner and outer margins. Flowers yellow. (Fig. 99.)

South-West Africa: Barbi; Krügers Püts.

Lithops Schwantesii. (Plaat 35A.) Planteliggaam gewoonlik 2 in 'n klomp; venster ondeursigtig; mantel pers-grys; boonste vlak grys-groen, geelbruin, geel-rooi, almal met 'n groenerige tint; in jong stadium effens geplooid, wat in ouere stadium verdwyn; in die sagte duike taamlike breë donker-rooi lyne en geisoleerde kolle, die lyne die dominerende kenmerk, lyne en kolle met persgroen rand, waardeur die boonste vlak 'n soort van deurskynende groen kleur verkry; op die binneste soom dikwels 5-6 rooi kolle; miniatuur-vensters enkel tot baie, geïsoleer, groen tot lig-groen, baie klein fyn wit stippeltjies; die hele boonste vlak omsoom deur 'n ligte bruin rand of band. Blom geel. (Fig. 99.)

Suidwes-Afrika: Barbi; Krüger se Put.

***Lithops Schwantesii.** Die glatten mattglanzenden, ziemlich stark, gewölbten, rötlich grauen, schwach durchscheinenden Fenster zeigen eine sehr unregelmässige Zeichnung in Form zerstreuter blutroter Punkte und Striche und sind umrandet von einem 2–2½ mm. breiten hellrostgelben Bande. Spalt etwa 3-4 mm. tief. Bei Barbi auf Kalk; dort auf Kalk, bei Krügers Püts, E. Rusch., 1926.

42. LITHOPS TERRICOLOR

Lithops terricolor. (Plates 36, 36A.) Growths very seldom solitary, usually forming clumps of 6–10 plants; top of lobe flat or slightly convex; colour of top of lobes varying from a dark-green, light-green, light-pink to a light yellowish-green tinge; lobes either with one large window with numerous dark-green dots in it, or window forming smaller areas with dark-green dots or covered only with numerous dark-green separate or confluent dots; separate dots on the margin and sides; sometimes numerous ±20 black dots distributed more or less evenly over both lobes, or a few only on one lobe or absent altogether; surface smooth glabrous. Flowers yellow.

Cape Province; Laingsburg; near Prince Albert; near Beaufort West; 25 miles from Willowmore near road to Aberdeen; Miller Station; Steytlerville; Springbok Vlakte, near Uitenhage, Cape.

Fig. 100–102 are reproductions of photos to show the nature of the habitat of the plant near Laingsburg and also the miniature windows in the upper surface.

Lithops terricolor. (Plate 36, 36A.) Plante selde enkel, gewoonlik vorm hulle klompe van 6-10; boonste vlak plat of effens konveks; kleur van boonste vlak varieer van donkergroen, liggroen, ligrooi tot 'n ligte geelgroen tint; blare of met een groot venster met 'n groot aantal donkergroen kolle daarin Of venster bestaan uit kleinere areas met donkergroen kolle of die boonste vlak is bedek met 'n groot aantal donkergroen geïsoleerde of saamvloeiende kolle (miniatuur-

FIGURE 101 . LITHOPS TERRICOLOR N.E. BR.
In habitat. Laingsburg

PLATE 37 . LITHOPS TRIEBNERI L. BOL.

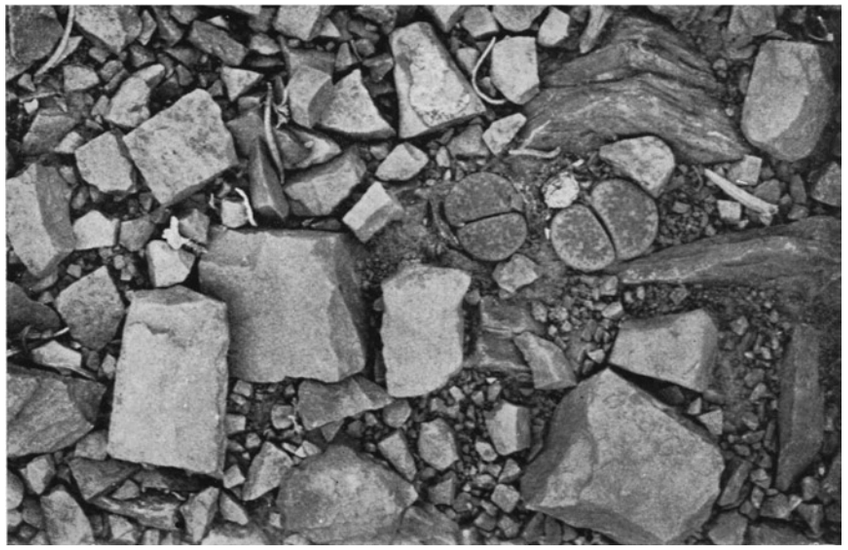


FIGURE 102 . LITHOPS TERRICOLOR N.E. BR.
In habitat. Laingsburg

vensters); los kolle op die some en kante; soms 'n groot aantal ± 20 swart kolle mm of meer eweredig versprei oor die boonste oppervlakte of soms net 'n paar op die een vlak of some geheel en al afwesig; oppervlakte glad, kaal. Blomme gee!.

Kaapland; Laingsburg; naby Prins Albert; naby Beaufort Wes; op pad na Aberdeen van Willowmore; Millerstasie; Steytlerville; Springbok Vlakte, naby Uitenhage.

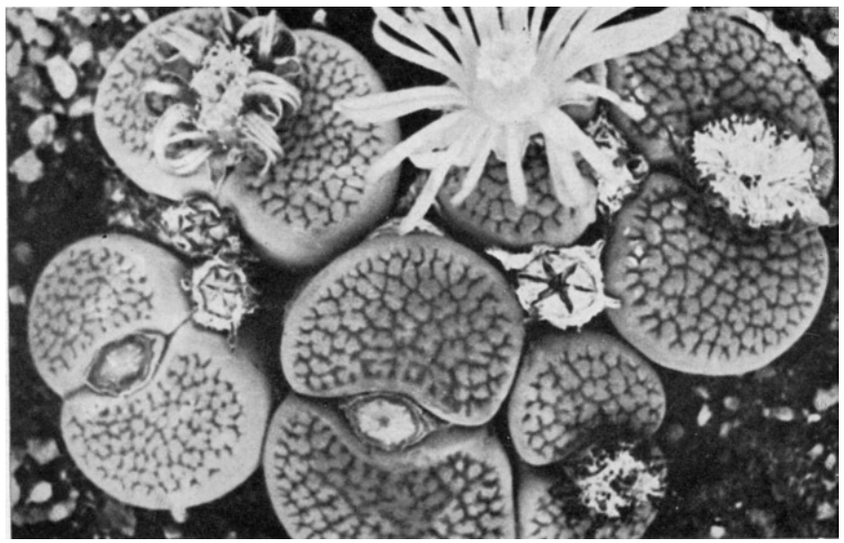
Hierdie portrette (Fig. 100–102) toon die plant in sy natuurlike woonplek in die nabyheid van Laingsburg en ook die baie miniatuur-vensters van die boonste vlak.

✱**Lithops terricolor.** (Plates 36, 36A.) Growths solitary or few to a plant, two only of the four of the plants seen, $\frac{3}{4}$–1 in. high, 8–11 lines broad and 6–8 lines thick, with the top of the lobes convex and rounded into the sides, of the colour of dried earth, or grey-brown, marked with dark fuscous dots all over or the central area with a dark fuscous patch composed of crowded or confluent dots, and some separate dots on the marginal part. Calyx 5-lobed, lobes about $2\frac{1}{2}$ lines long, ovate, obtuse. Corolla about $\frac{3}{4}$ in. in diameter, not seen in a fresh state. Stamens about $\frac{1}{4}$ in. long, style very short, stigmas 5, overtopping the stamens, filiform, bright yellow.

Laingsburg Division: Grootfontein (Frith). Living plants of this species were kindly sent to me by Mr. Frith, who informs me that the plant

FIGURE 103 . LITHOPS TRIEBNERI L. BOL.

FIGURE 104 . LITHOPS TURBINIFORMIS (HAW.) N.E. BR.



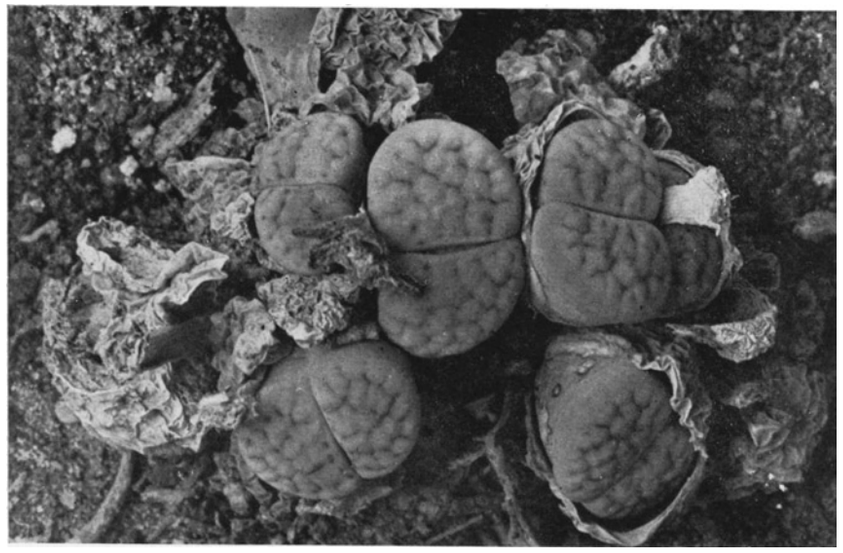


FIGURE 105 . LITHOPS URIKOSENSIS DTR.

grows on black shale and on gravelly ground, and is very difficult to find. I have only seen withered flowers that were upon the plants upon arrival.—*N. E. Brown*.

✱**Lithops terricolor.** (Plates 36, 36A.) N. E. Brown. In the *Gardeners' Chronicle*, 1926, Vol. LXXIX, p. 117, and 1922, Vol. LXXII, p. 65. The following complete description of this plant, taken from living flowers and fruit. Calyx compressed, $3\frac{1}{2}$–$4\frac{1}{2}$ lines broad, 5-lobed, glabrous purplish-green; lobes 4–$5\frac{1}{2}$ lines long, ovate, obtuse, with membranous edges. Corolla 10–13 lines in diam., expanding in the afternoon, slightly scented; petals about 30 in series, 4–6 lines long, $\frac{1}{2}$–$\frac{3}{4}$ lines broad, linear, entire and obtuse at the apex clear bright yellow. Stamens numerous erect, collected into a cone, unequal, $2\frac{1}{2}$–$4\frac{1}{2}$ lines long; filaments white, ciliate at the base; anthers pale yellow. Stigmas 5, overtopping the stamens, 3–5 lines long, light yellowish. Capsule 4–$4\frac{1}{2}$ lines in diam., obconic, 2 edges at the lower part, flattish or slightly convex at the top, whitish with 5 valves and cells, and when expanded 5–7 lines in diam. valves 1–$1\frac{1}{2}$ line long and as much in breadth, triangular in outline, pallid; expanding-keels about as long as the valve, closely contiguous nearly to their tips, where they diverge and are furnished with broad, obtuse membranous, marginal wings; cells open without cell-wings. Placentas on the floor of the cells, seeds numerous in each cell, minute, about $\frac{1}{4}$ line long, subglobose, smooth, pallid, with a brownish nipple.

Laingsburg Division: near Grootfontein (Frith); Willowmore Division, near Miller (Frith).

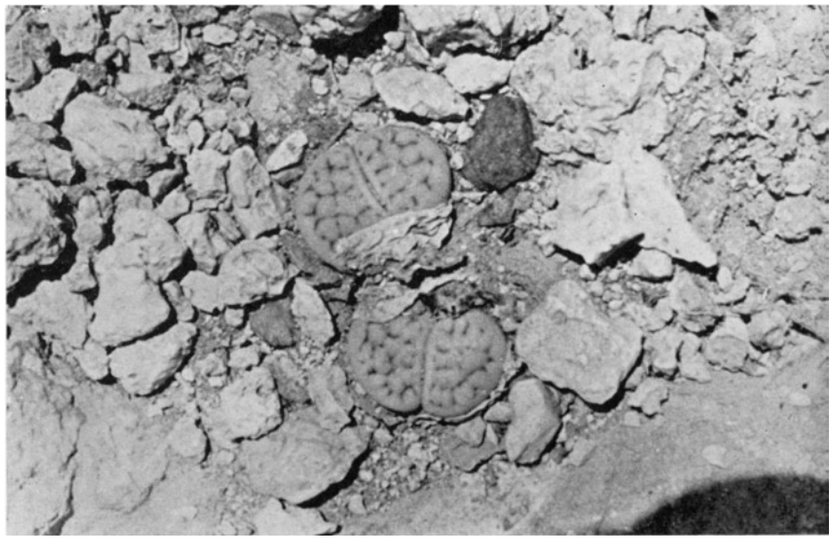


FIGURE 106 . LITHOPS URIKOSENSIS DTR.
In habitat. Urikos, S.W.A.

FIGURE 107 . LITHOPS VALLIS-MARIAE (DTR. ET SCHWANT.) N.E. BR.

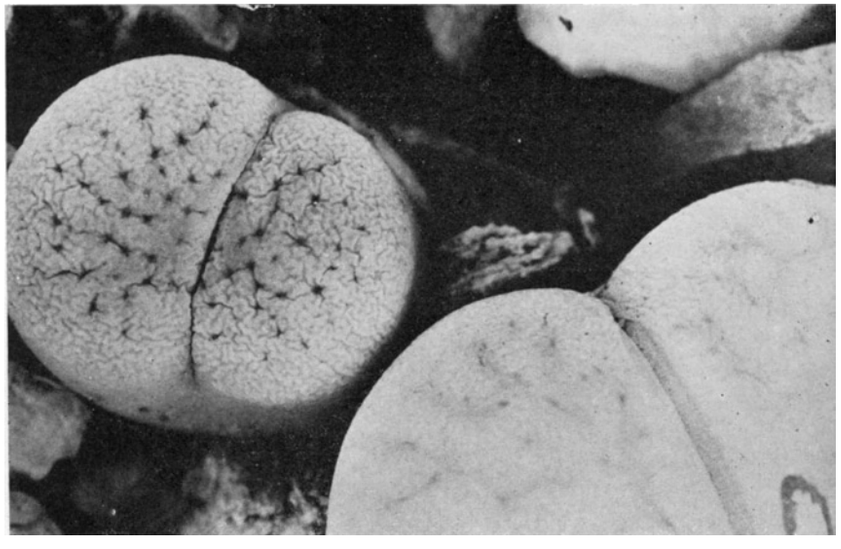


PLATE 38 . LITHOPS TURBINIFORMIS (HAW.) N.E. BR.

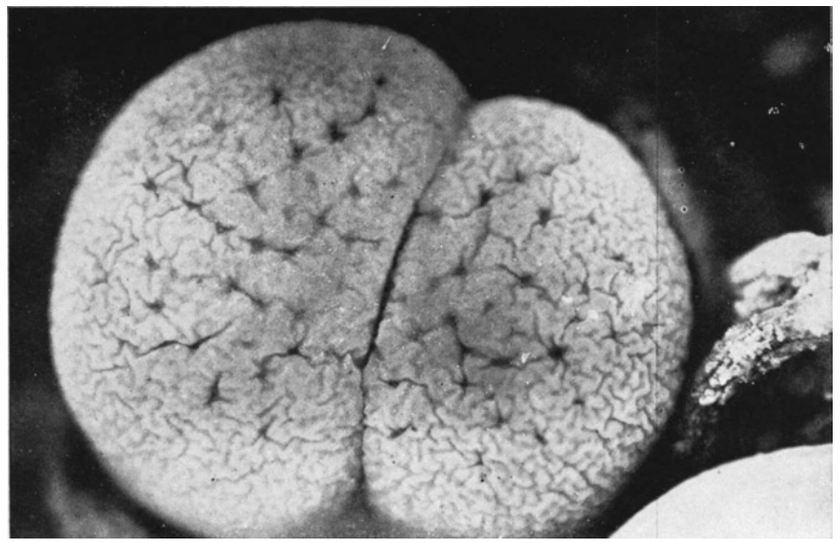


FIGURE 108 . LITHOPS VALLIS-MARIAZ (DTR. ET SCHWANT.) N.E. BR.

43. LITHOPS TRIEBNERI

Lithops Triebneri. (Plate 37.) Growths solitary or clumps of 2–3; top of lobe flat or slightly convex; colour of sides light grey; top yellowish-brown or yellowish-brown with a distinct greenish tinge, smooth or slightly rugulose with a varying number of isolated blood-red dots in the gentle depressions or a few dots connected by short blood-red lines, the dots remaining the dominant feature of the line; window opaque with a large number of round, dark-green miniature windows with a suffused bluish tinge; outer and inner margins a broad band more prominently buff-coloured than the rest of the top; in texture of margins numerous minute white dots. Flower yellow. (Fig. 103.)

South-West Africa: Namib, Tirasberge.

I am not quite so sure that this species is not identical with *L. Schwantesii*. This matter can only be solved by an examination of these two species in their natural habitat. Should they be identical then *L. Triebneri* would have to disappear as *L. Schwantesii* is the older species.

Lithops Triebneri. (Plaat 37.) Planteliggaam enkel of 2–3 in 'n klomp; boonste vlak plat of effens konveks; mantel ligte pers-grys; boonste vlak geel-bruin of geel-bruin met 'n duidelike groenerige tint, glad of effens gerimpeld met 'n aantal geisoleerde bloed-rooi kolle in die sagte duike of 'n paar van die kolle met mekaar verbind deur kort bloed-rooi lyne, die kolle bly egter die prominente deel van die lyn; venster ondeursigtig met 'n groot aantal ronde, donker-groen miniatuur-vensters met 'n deurskynende blouag-

FIGURE 109 . LITHOPS VAN ZYLII L. BOL.

FIGURE 110 . LITHOPS VAN ZYLII L. BOL.

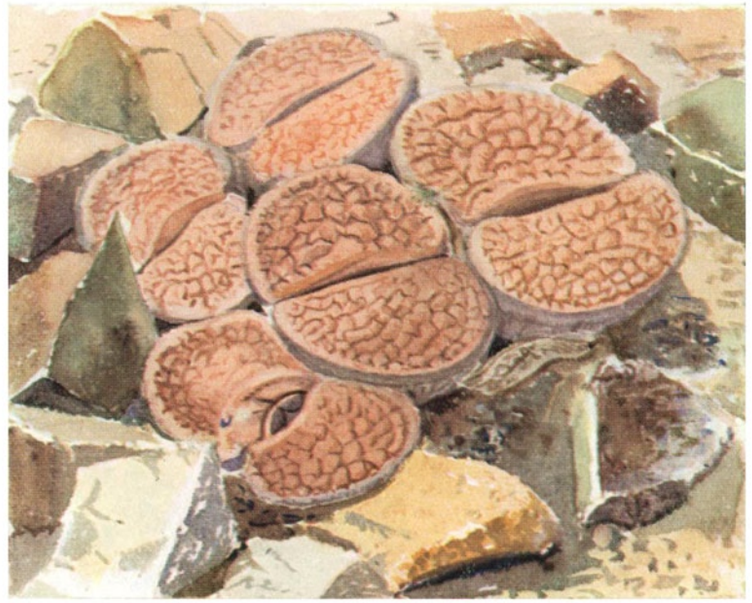


PLATE 38A . LITHOPS TURBINIFORMIS (HAW.) N.E. BR.

PLATE 39 . LITHOPS URIKOSENSIS DTR.

tige tint; buitenste en binneste soom 'n band vat sterker „buff" gekleurd is as die orige deel van die boonste vlak; in die band baie fyn wit stippels. Blomme geel. (Fig. 103.)

Suidwes-Afrika: Tirasberge in die Namib.

Ek is nie geheel en al seker nie dat hierdie soort nie identiek is nie met *L. Schwantesii*. Dit is egter 'n saak wat slegs kan uitgemaak word as die twee soorte in hulle natuurlike woonplekke ondersoek word. Blyk dit dat hulle identiek is dan sou *L. Triebneri* moet verdwyn, want *L. Schwantesii* is die ouere soort.

✱**Lithops Triebneri.** Corpusculum obconicum, 1·5 cm. longum, 2·5 cm. diam., vel florens 2 cm. longum, ad 2 cm. latum, 2·5–3·5 cm. diam. cum fissura vix divergente sed potius elliptica, medio 4 mm. diam. ad 2 mm. longa, superne colore columbino, apice planum vel convexulum, interdum brunneo griseum, fenstera haud vix visa, rugis subnullis, lineis gracilibus, brunneo rubris, interdum in notam orbicularem inconspicuam terminantibus vel interdum in formam obscure reticulatum dispositis, ornatum; flos pomeridianus, 3·30 expansus; receptaculum in corpusculo fere omnino inclusum, leviter compressum, circa 4 mm. longum, 5 mm. et 8 mm. diam., vel in flore majore ad 1 cm. diam., sepala obtusa, in flore altero 5, subaequilonga, 7–8 mm., basi 3–5·5 mm. lata, latiora marginata, in flore altero 6, 0·8–1 cm. longa, basi ad 4 mm. lata; petala 3-seriata 1·1–1·6 cm., vel in flore majore ad 19 cm. longa, saepius ad 2 mm. lata, obtusa vel emarginata, inferne angustata, aurea, apicem versus demum aurantiaca; filamenta alba, parte infima

FIGURE 111 . LITHOPS VENTERI NEL

per 1·5 mm. papillata, ad 7 mm. longa, antheris luteis; discus conspicuus crenulatus, basi fossis 6, lobos ovarii termimantibus, praeditus; ovarium circa marginem concavum, medium versus leviter elevatum vel ibi in flore altero altitudinem disci excedeus; stigmata in floribus ambolus 6, 8, vel 1·1 cm. longa.

South-West Africa: Namib.

44. LITHOPS TURBINIFORMIS

***Lithops turbiniformis.** (Plates 38, 38A, Fig. 104.) Growths solitary or 2-4 in a clump up to about 1 in. high, 13 in. broad, and 1 in. thick, flat at the top, which is either distinctly tuberculate or marked with a sort of network of slight furrows varying from light rusty-ochreous to a dark ironstone colour with the furrows of a darker tint, not spotted. Calyx unequally 8-lobed, stout, compressed; lobes 8–10 mm. long, 4–5 mm. broad, oblong or ovate-oblong, obtuse, green with reddish tips. Corolla about $1\frac{1}{4}$ in. in diameter; petals 50-60 in about 2 closely overlapping series, widely spreading, 6–8 lines long, about 1 line broad, linear, tapering towards the base bright yellow on the inner face, whitish on the back. Stamens collected into a column about 4 lines long; filaments yellow, fading into a white at the base; anthers orange-yellow; ovary slightly convex at the top; stigmas usually 6–7 (sometimes 5), finally 6–7 lines long and exceeding, and curving over the stamens, filiform, yellowish, capsule somewhat compressed, $4\frac{1}{2}$ to 6 lines in diameter, 6–7-valved. Seeds smooth, brown.

Prieska Division, at Zand Vlei, Burchell; Pole Evans. This species was the first that was discovered of these very remarkable mimicry and windowed plants, but as I have already given some account of its discovery and rediscovery on page 250, Vol. LXX, I need only add here that the above description was made from the living plants that were so generously sent to me by Dr. I. B. Pole Evans, and the figure is reproduced from a photograph kindly sent to me by Mr. T. N. Leslie. This figure represents the tuberculate form, but I also have other forms that are very much smoother with only a coarse network of slightly impressed lines upon the top of the plant. (Fig. 1.)

In his very interesting account of plant mimicry, Dr. Marloth (Trans. S. Afr. Phil. Soc., Vol. 15, p. 99), remarks that Burchell, "in his travels through the Karroo found a species of *Mesm*. which he named *M. turbiniforme*, thinking it to be undescrihed". As a matter of fact it was found by Thunberg, who had named it *M. truncatum* from the shape of its leaves. Dr. Marloth has in this been misled by Sonder's union of these two species in the Flora Capensis. For not only are they two utterly different species, but one is a *Lithops* and the other a *Conophytum*, and grow about 200 miles away from each other.

(NOTE: *M. truncatum* is *Conophytum truncatum*, discovered by Thunberg, who never visited Prieska, where *M. turbiniforme*, as already mentioned, was discovered by Burchell.—G.C.N.)

1

2

1, in turgid condition; 2 normal plant.

PLATE 40 . LITHOPS VALLIS-MARIAE (DTR. ET SCHWANT.) N.E. BR.

FIGURE 112 . LITHOPS VENTERI NEL

I have included *L. aurantiaca* L. Bol. in *L. turbiniformis*, as there does not appear to be any difference between these two species. *L. aurantiaca* was sent to the Botanical Garden, University, Stellenbosch, by Triebner in 1930 In April 1932 it flowered and was then described by I.. Bolus. In the description she states "crebre impressa rugosaque fere in more *L. turbiniformis*" but unfortunately she does not state in what specific point or points these two species are supposed to differ from one another. The original plants front which the description was made of *L. aurantiaca* were painted under the impression that *L. aurantiaca* was a distinct species. Plate 38a is the one referred to. When the question, however, of making a key came up, it was impossible to find any difference between *L. turbiniformis* and *L. aurantiaca* L. Bol. to warrant the upholding of the latter.

It is true that if reference be made to the photograph of *L. turbiniformis*, reproduced in *Gard. Chron.*, Feb. 4, 1922, p. 55, Fig. 28, it appears that the tubercles are very prominent and definite; but my own experience of this species both in the field and in cultivation, is that one cannot attach too much importance to the degree of rugosity. The leaves, especially in the young stage, show a very prominent tuberculation, but towards the end of their life, the upper surface becomes smoother, the depressions (furrows) shallower until one has just more or less an indication of a more deeply coloured line.

At first I was at a loss to account for the appearance of *L. turbiniformis* in the Klinghardt Mts., hundreds of miles from Prieska, the nearest point, where this plant occurs, to the above mountains. Apart from this, the climatic conditions on the West Coast of South West-Africa are en-

tirely different to those where the plant normally grows (Prieska, Britstown, Kraankuil). One of two explanations is possible: (i) If it does really grow in the Klinghardt Mts., then it is the only ease, where a species of this genus has so to say jumped hundreds of miles, and that is something quite unusual in this genus; (ii) the more plausible one is that W. Triebner must have made a mistake in the habitat of the plant he is supposed to have sent to the University of Stellenbosch. I am strengthened in this latter view by the fact that Herr Eberlanz, Lüderitzbucht, who knows that part of the country very well, wrote to me as follows: „Ich kenne den Fundort von *L. aurantiaca* nicht, glaube aber nicht, dass diese Art aus dem Klinghardtgebirge stammt. Nach Professor Dinter, welcher 1923 dort sammelte, ist wohl kein Sammler dort gewesen. Da die Consolidated Diamond Co., dieses Gebiet hermetisch verschlossen hielt, besteht keine Möglichkeit dorthin zu gelangen."

It appears that the plant No. 9180, which is time type, was sent by Max Schlechter, Port Nolloth, to Pastor Meyer. Steinkopf, who passed it on the University of Stellenbosch. That W. Triebner collected it seems to he a mistake. From the above it is quite clear that *L. aurantiaca* L. Bol. is identical with *L. turbiniformis*.

Lithops turbiniformis. (Plate 38, 38A, Fig. 104.) Plante vorm klompe van 1, 2 en meer; boonste top vlak, ondeursigtig, met baie rimpels, die rimpels van 'n roesbruin tot 'n geelbruin kleur, die duike self effens donkerder gekleurd; some afwesig; bloom geel.

Prieska; Britstown; Strydenburg; Kraammkuil.

Tussen *L. aurantiaca* L. Bol. en *L. turbiniformis* is daar m.i. geen verskil nie en daarom het ek eersgenoemde opgeneem in laasgenoemde. *L. aurantiaca* is deur Triebner in 1930 aan die Botaniese-tuin, Universiteit, Stellenbosch gestuur. Dit het toe in April 1932 geblom en is toe deur L. Bolus beskrywe. In haar beskrywing beweer sy „crebre impressa rugosaque fere in more *L. turbiniformis*", maar ongelukkig sê sy nie in watter spesifieke opsig of opsigte hierdie twee soorte veronderstel is om van mekaar te verskil nie. Die oorspronklike plante waarvan die beskrywing van *L. aurantiaca* gemaak is, was toe geskilder onder die indruk dat *L. aurantiaca* 'n aparte soort is. Plaat 38 is die een waarna verwys word. Toe die vraag egter opkom om 'n sleutel vir die soorte te maak, was dit onmoontlik om enige verskil tussen *L. turbiniformis* en *L. aurantiaca* te vind waardeur laasgenoemde as 'n soort kon behou word.

Dit is waar dat as 'n mens die portret van *L. turbiniformis* vat in *Gard. Chron*. Feb. 4, 1922, p. 55, Fig. 28, verskyn nader ondersoek, clan is dit duidelik dat die rimpels baie prominent en duidelik is. My eie ondervinding, egter, van hierdie soort beide in die veld en in die broeikas is dat 'n mens nie te veel waarde kan heg nie aan die graad van gerimpeldheid. Die blare vernaam-

lik in die jong stadium toon 'n bate prominente gerimpeldheid aan, maar na die einde van hul lewe word die boonste vlak gladder, die duike (groewe) vlakker. totdat 'n mens later min of meer net 'n aanduiding van 'n effens diepere gekleurde lyn kry.

In die begin kon ek nie 'n verklaring kry nie vir die verskyning van *L. turbiniformis* in die Klinghardt Berge, honderde myle van Prieska, die naaste punt waar die plant groei. Afgesien hiervan verskil die klimaat van die Weskus van Suidwes-Afrika geheel en al van die plekke (Britstown. Prieska, Kraankuil) waar die plant normalerwyse groei. Daar is twee moontlike verklarings: (i) As die plant werklik in die Klinghardt Berge voorkom, dan is dit die enigste geval waar 'n soort van hierdie geslag so te sê honderde myle oorspring het. Dit is iets geheel en al ongewoons vir hierdie geslag. (ii) Die meer aanneenilike is dat W. Triebner hom vergis het in die woonplek van die plant wat hy veronderstel het om aan die Universiteit van Stellenbosch te gestuur het. Hierdie opvatting word versterk deur die feit dat Herr Eberlanz, *Lüderitzbucht*, wat hierdie deel van die land goed ken, as volg aan my geskrywe het. "Ich kenne den Fundort von *L. aurantiaca* nicht, glaube aber nicht, dass diese Art aus dem Klinghardtgebirge stammt. Nach Professor Dinter, welcher 1923 dort sammelte, ist wohl kein Sammler dort gewesen. Da die Consolidated Diamond Co., dieses Gebiet hermetisch verschlossen hielt, besteht keine Möglichkeit dorthin zu gelangen."

Dit blyk dat plant No. 9180, vat die tipe is, deur Max Schlechter, Port Nolloth, aan Pastor Meyer Steinkopf vat dit toe aan die Universiteit van Stellenbosch oorhandig het. gestuur is. Dat W. Triebner dit versamel het blyk foutief te wees. Uit bovermelde feite is dit duidelik dat *L. aurantiaca* L. Bol. identies is met *L. turbiniformis* en moet dus as soort verdwyn.

45. LITHOPS URIKOSENSIS

Lithops urikosensis. (Plate 39.) Growths solitary or 2 or more in a clump; window opaque; top of lobe rugose, the top surface of the wrinkles coloured pale yellowish-grey, in the depressions dark-brown dots, a few sometimes inter-connected forming short lines of the same colour; dots and lines with a distinct dark mauve-grey border; in the older stage top of wrinkles assumes a more pronounced yellowish tint; the dots disappear and only darker coloured dendritic lines prominent. Flowers yellow. (Fig. 105.)

South-West Afrika: Urikos in limestone.

Fig. 106 is a photo of the plant in its habitat near the farm Urikos. This photo was taken by Prof. Walter. Stuttgart, and kindly lent me by Frau Goltze, Urikos, S.W.A.

Lithops urikosensis. (Plaat 39.) Planteliggaam enkel of vorm klompe van 2 of meer; boonste vlak effens konveks; mantel lig groen-grys gekleurd; venster

ondeursigtig; in die jong stadium is die top effens geplooid; die boonste oppervlakte van die plooie lig groengeel; in die duike donkerbruin kolle, sommige waarvan met mekaar verbind is en vorm kort lyne van dieselfde kleur; net rondom die kolle en aan beide kante van die lyne 'n duidelike effens persgrys rand; in die ouer stadium neem die boonste vlakdeel van die plooie 'u meer uitgesproke geel kleur of tint, die kolle verdwyn en slegs die donker gekleurde dendritiese lyne is nog te sien. Blomme geel.

Suidwes-Afrika: Urikos.

Hierdie portret (Fig. 106) is geneem deur Prof. Walter, Stuttgart, en is goedgunstiglik aan my afgestaan deur Frau Goltze, Urikos, wat die plant oorspronklik ontdek het op haar plaas Urikos.

✱**Lithops urikosensis.** Körperchen ziemlich schmächtig, graugrünlich (etwa cementfarbig). Fenster schwach gewölbt, flachgebuckelt, die Zeichnung aufgelöst in etwa 18 bis 23 braune Punkte und Strichel. Fenster ganz junger Blätter milchteebräunlich mit scharfer markierter Zeichnung. Spalt schon an jungen Blattpaaren 6 mm., an alten 8 bis 9 mm. tief. Im vollen Sonnenlicht sind Fenster etwas durchscheinend. Urikos im Bastardlende, E. Rusch. 1926.

46. LITHOPS VALLIS-MARIAE

Lithops Vallis-Mariae. (Plate 40.) Growths forming clumps of 2 or more; slightly convex; top with many depressions, giving the appearance of a large number of dots or points or minutely wrinkled. The ridges vermiform, window opaque, yellowish-white to bluish-white. Flowers yellow.

FIGURE 113 . LITHOPS VENTERI NEL

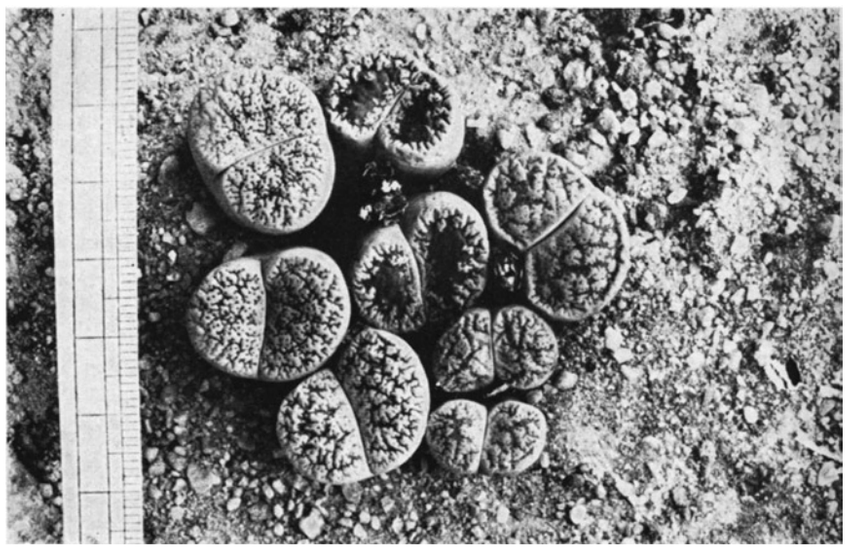


PLATE 41 . LITHOPS VAN ZYLII L. BOL.

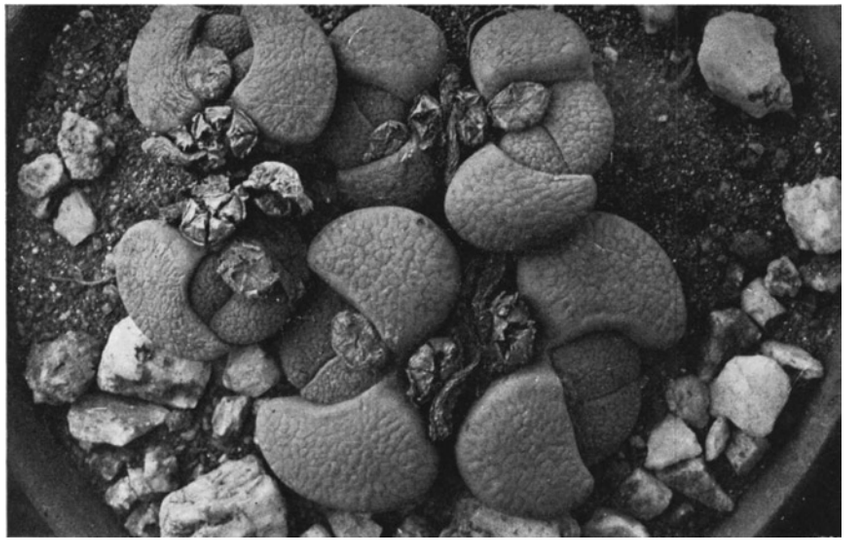


FIGURE 114 . LITHOPS VERRUCULOSA NEL

South-West Africa: Mariental. (Fig. 107, 108).

This species is characterised by the peculiar vermiform ridges only found in this species. These ridges have the appearance of fine sintered limestone.

Lithops Vallis-Mariae. (Plaat 40.) Planteliggaam 2 of meer in 'n klomp; boonste vlak effens konveks, met baie ronde duike wat dit dan die voorkoms van baie kolle of punte gee of effens fyn gerimpeld; die ruë wurmagtig; venster ondeursigtig, geelagtig wit of blouagtig wit. Blomme geel.

Suidwes-Afrika: Mariental.

Die eienaardige wurmagtige ruë wat soms die voorkoms van fyn gebluste kalk het is die tipiese kenmerk van hierdie soort en is nie sover by enige andere soort waargeneem nie. Hierdie voorkoms is maklik met 'n vergrootglas waarneembaar. (Fig. 107, 108.)

✱**Lithops Vallis-Mariae.** Corpuscula 2–4 cm. alta. $1\frac{1}{2}$–5 cm. lata, obconica, plus minus orbicularia vel lunata, fissura transversa, 3 mm. (vel magis?) alta, apice lobis leviter convexis, fere punctis minutissimis distinctis, notata, minutissime rugosa, tuberculata vel exesa, lactea, lateribus purpureis. Corolla $2\frac{1}{2}$–$3\frac{1}{2}$ cm. diametro, petala lutea.

Körperchen 2–4 cm. hoch, $1\frac{1}{2}$–5 cm. breit, kegelförmig, mit ± kreisförmiger oder halbmondförmiger Endfläche, Spalt 3 mm. tief (oder mehr?), Loben der Endfläche schwach konvex, gewöhnlich mit sehr kleinen punktar-

tig erseheinenden Grübchen von ± rundlichen Umriss übersät, die aber oft fehlen. Die gelblich oder bläulich milchfarbene Oberfläche der Loben ist von sehr eigenartiger Struktur, wie ich sie von keiner anderen *Lithops* noch sonst einem *Mesembrianthemum* kenne. Sie zeigt sehr feine wurmförmig gekrümmte runzelartige oder hockerartige Erhebungen, die der Epidermis täuschend in Aussehen von bryozoenhaltigen oder sinterigen oberflächlich verwittertem und fein porösem gelblich oder bläulich weissem Kalk geben. Die Seiten der Körperchen sind purpurn überhaucht. Blumenkrone $2\frac{1}{2}$–$3\frac{1}{2}$ cm. in Durchmesser. Kronblätter gelb (nach Frau Beetz) Entdeckt von Frau Dr. Beetz auf der Farm ihres Vaters zu Mariental.

47. LITHOPS VAN ZYLII

Lithops van Zylii. (Plates 41, 41A.) Growths forming clumps of 2 or more; upper surface flat, semi-circular shallow fissure; window opaque; top whitish grey-brown, with many fine depressions in which markings of irregular dark-brown to purple dots or lines occur. Flower yellow. (Fig. 109.)

Bushmanland: near Pofadder.

Fig. 110 is a reproduction of a very good photo of this species, kindly lent me by Mr. C. L. Harders, Holland.

Lithops van Zylii. (Plate 41, 41A.) Planteliggaam enkel of 2 of meer in 'n klomp; boonste vlak gelyk; half-sirkelvormige spleet baie vlak; venster on-

FIGURE 115 . LITHOPS VERRUCULOSA NEL

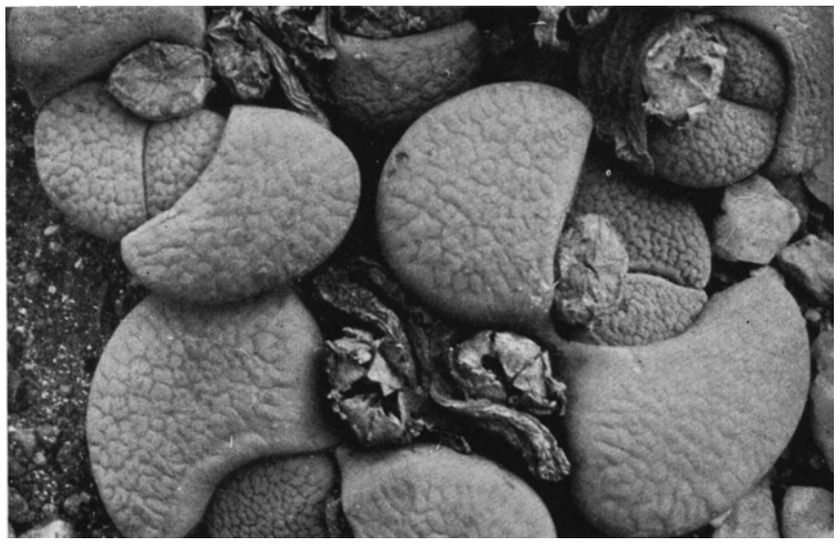


PLATE 41A . LITHOPS VAN ZYLII L. BOL.

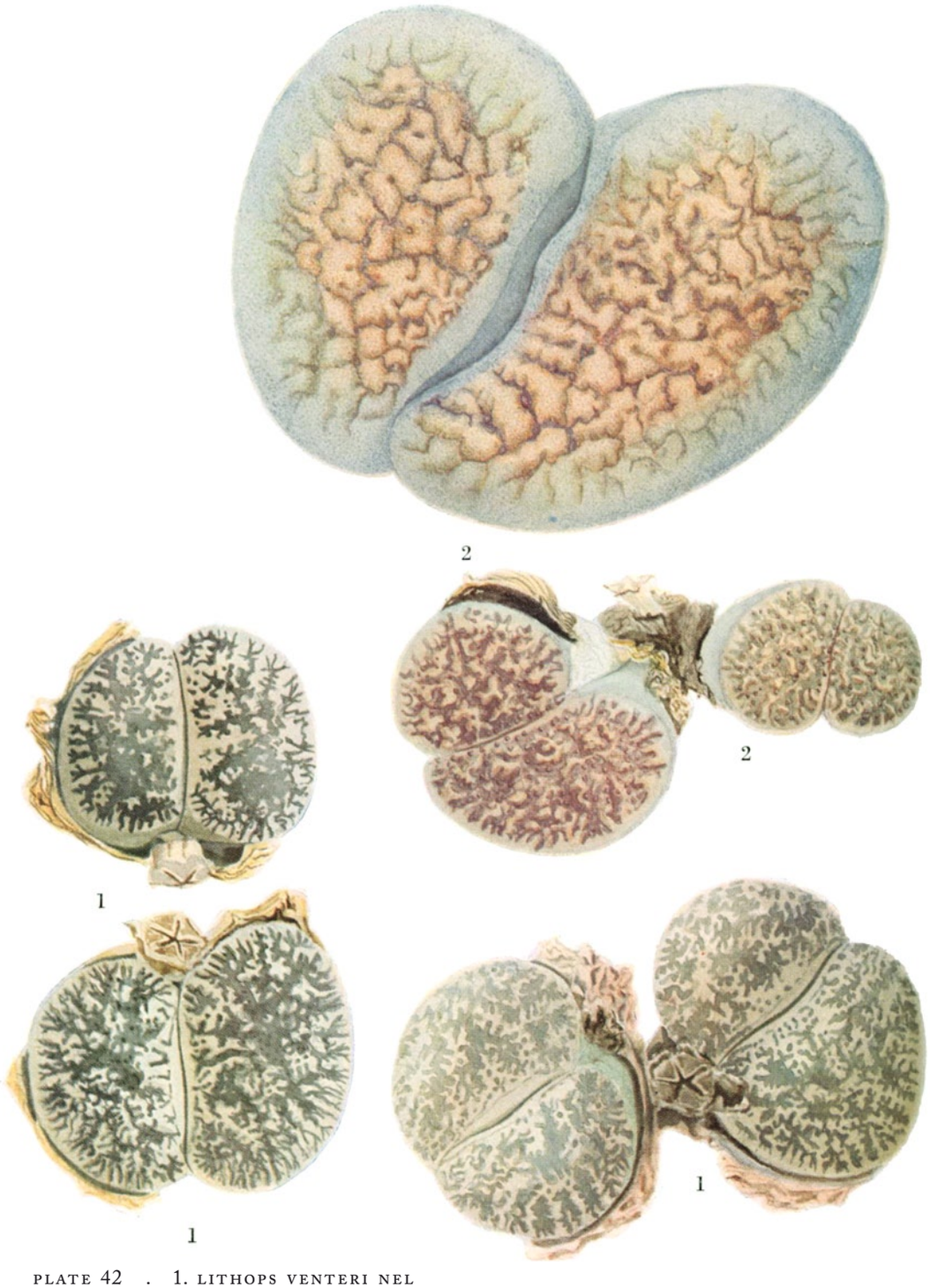


PLATE 42 . 1. LITHOPS VENTERI NEL
2. LITHOPS VERRUCULOSA NEL

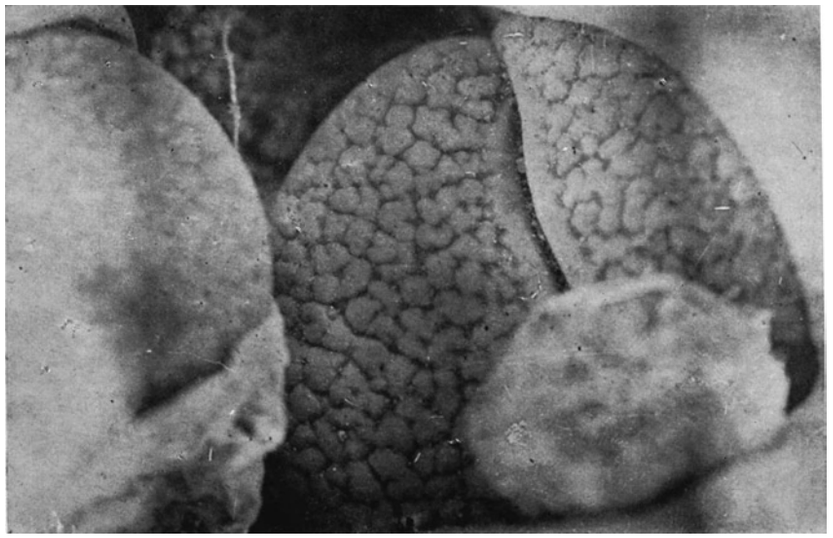


FIGURE 116 . LITHOPS VERRUCULOSA NEL

deursigtig; boonste vlak wit grys-bruin met baie fyn duike, waarin daar merke van donkerbruin tot purper kolle of lyne onreëlmatige voorkom. Blomme geel.

Boesmanland: naby Pofadder.

Hierdie mooi portret (Fig. 110) is geneem deur Mnr. C. L. Harders en goedgunstiglik aan my afgestaan. Hierdie portret toon a! die kenmerke van die soort.

✱**Lithops van Zylii.** Folia parvis subaequalia, 2·5–4 cm. longa, vagina ad 25 cm. longa, 2–4·4 cm. lata, ad 2·5 cm. diam., inferne roseate grisea, superne pallide glauca, fenestra nulla, cuticula apicali pergamentacea, punctis lineisque angustis lilacinis ornata; recept. ad 1·4 cm. diam., sepala 8, 9–12mm. longa, basi 7–9 mm. lata; petula lutea; capsula visa 10 loc., 1·4 cm., expansa 2 cm., diam. alis tecti pro genere sat latis.

Bushmanland prope Madder, Oct. 1931, G. H. van Zyl (Fuller, 139; N.B.G. 2197/31 Fl. Apr. 1932); Pella, Keimoes et Kakamas.

48. LITHOPS VENTERI

Lithops Venteri. (Plate 42.) Growths up to many in a clump; top surface slightly convex, slightly rough to the touch or smooth; large transparent window, coloured light brownish red, and in which numerous small islands occur, and in these islands dark-green miniature openings or windows, or the window is irregular in shape, light-green, and sometimes with a light-grey

FIGURE 117 . LITHOPS WEBERI NEL
In habitat. Calvinia, Karoo

covering. In this covering a number of small round openings, whereby the transparent window becomes visible. In the irregular window a large number of large, grey-coloured islands of irregular shape. In these islands here and there a small number of round openings. Outer margin denticulate or consisting of a large number of irregularly-shaped laciniae connected to the islands. Inner margin irregular. Both margins coloured grey. Capsule 5-locular. Flowers unknown. (Fig. 111–113.)

Griqualand West: Boetsap in limestone.

This species occupies an isolated position as far as the grey colour is concerned, but it is definitely related to *L. Lesliei*. It differs from the latter species in that the grey islands are raised above the level of the window and thereby giving the whole a rough appearance. The dominant colour of *L. Lesliei* is rust-brown to a greenish, and the network of *L. Lesliei* is much more delicate than that of *L. Venteri*. The characteristic common to both is the minute circular openings in the islands or the covering of the window. Presumably the colour of the flower is yellow.

***Lithops Venteri.** (Plate 42.) Corpuscularia turbiniformia; folia aequalia vel subaequalia; fenestra magna et bene visa, pellucida, brunneo-rubra vel fenestra irregulariter pellucida, griseo-lurido-viridis, insulis griseis; margine exteriore irregulariter inciso-crenata, laciniae obtusae vel irregulariter; margine interiore prope fissuram diviso, laciniae irregulariter. Capsula quinquelocularis.

Griqualand West: Boetsap in kalk; Major Venter, Sept. 1939.

PLATE 43 · LITHOPS WEBERI NEL

Die planteliggaam is 1·5–2 cm, breed, die lengte van die spleet is 1–1·6 cm. Die boonste vlak is lig gewelfd, effens grof of soms glad, met of 'n groot deursigtige lig-bruin rooi venster, waarin daar baie klein eilandjies voorkom met 'n aantal donker groen miniatuur vensters of die vensters is van onreëlmatige vorm, liggroen gekleurd en soms oortrek met 'n dun effens grys gekleurde vlies. In hierdie vlies is daar 'n aantal klein ronde openinge, waardeur die deursigtige venster sigbaar is. In die onreëlmatige venster is daar 'n aantal vrywel groot, grys gekleurde eilande van onreëlmatige vorm. In hierdie eilande is daar hier en daar 'n klein aantal ronde openinge. Die buitenste rand is of getand Of bestaan uit 'n groot aantal onreëlmatige lobbe wat soms met die eilande verbind is. Die binneste rand is onreëlmatig. Beide rande is grys gekleurd. Die doosvrug is 5-delig. (Fig. 111-113.)

Hierdie soort is na Majoor Venter, Kimberley genoem. Hy was so welwillend om die plant aan my te besorg.

Hierdie nuwe soort wat in 'n seker sin alleen staat wat die kleuring betref is tog in seker opsigte na verwant aan *L. Lesliei*. Pit verskil egter van *L. Lesliei* deur die duidelike grys eilande wat effens ho die vlak verhewe is en daardeur vir die oog die boonste vlak 'n growwe voorkome gee. *L. Lesliei* het 'n duidelike roes-bruin tot groen kleur en die netwerk van laasgenoemde soort is baie fyner as dié van *L. Venteri*. Altwee soorte het dit met mekaar ooreen dat daar die klein ronde openinge in die eilande voorkom, soos duidelik uit die foto te sien is.

FIGURE 118 . LITHOPS WEBERI NEL
In habitat. Calvinia, Karoo.

FIGURE 119 . LITHOPS WEBERI NEL

49. LITHOPS VERRUCULOSA

Lithops verruculosa. (Plate 42.) Growths up to 6 in a body; lobes subequal; upper surface opaque, irregularly divided by a number of confluent depressions, giving the whole a wrinkled or tuberculate appearance, like that of L. turbiniformis, bluish-grey; in the depressions a very large number of minute dark-grey warts; outer and inner margins with lines. Flower not seen. (Fig. 114.)

North West Cape.

This is undoubtedly a distinct species related to L. turbiniformis. It differs from the latter: (i) this species is of a bluish-grey colour, whereas L. turbiniformis is rust-brown or at least of a reddish tint colouration; (ii) in between the tubercles or wrinkles are depressions and here are found minute dark-grey warts, a feature not observed so far in any other *Lithops* species, and characteristic of this species. These minute warts are distinctly visible under a 10 × lens or very slightly with the naked eye. Fig. 115 gives an idea of the wrinkles and the colour of the plant.

Fig. 116 is a photograph of one of the lobes of this species, and was taken with a Leitz Panphot, using an objective Millar 100 mm. This shows the convolutions quite clearly, and in these depressions the small warts are visible at some points.

Lithops verruculosa. (Plaat 42.) Planteliggaam tot 6 in 'u klomp; boonste vlak ondeursigtig; ongelyk verdeel deur 'n aantal saamvloeiende duike, waardeur die geheel 'n gerimpelde voorkome kry, soos die van *L. turbiniformis*, blou-grys in die duike 'n groot aantal baie klein donker-grys vratte; buite en binne some met lyne. Blom onbekend. (Fig. 114.)

Noordwes-Kaap.

Hierdie soort is baie na verwant aan *L. turbiniformis*, maar cut verskil daarvan in die volgende opsigte: (i) Dit is blou-grys, terwyl *L. turbiniformis* roesbruin of altans effens rota getint is en (ii) tussen die ruë is daar klein donkergrys vratte, iets at sover onbekend is by die *Lithops*-soorte. Hierdie laasgenoemde kenmerk is eie aan hierdie soort. Hierdie klein vratte is maklik sigbaar onder 'n 10 × lens en net effens wet die blote oog.

Fig. 115 gee ons 'n idee van die voue en die kleur van die plant.

Fig. 116 is 'n portret van een van die lobbe van *L. verruculosa* en dit is met 'n Leitz Panphot geneem en met 'n Millar-objektief 100 mm. Dit toon die voue heel duidelik aan en in die voue die vratte.

***Lithops verruculosa.** Corpuscularia turbiniformia; folia aequalia vel subaequalia, subplana vel leviter convexa; fenestra nihil; superne rugosa, coeruleogrisea, inter rugas multis, minutis atro-griseis verrucis notata; margo exterior et interior liniis notatae capsula quinquelocularis.

North-West Cape: Dr. van der Westhuizen, September, 1939.

FIGURE 120 . LITHOPS WEBERI NEL

50. LITHOPS WEBERI

Lithops Weberi. (Plate 43.) Growths of 2 or forming clumps tip to 10 plants; top of lobes slightly cons ex or flat; window large, open, transparent: light green, grey-green or even slightly purple green: in window a number of mauve, mauve-grey islands of different form, shape and size, or islands may be absent, then there is one large window: islands raised slightly above surface of window with result that transparent part of window is limited to a number of narrow strips between the islands and these strips are inter-connected and confluent; this transparent part forms a kind of interwoven network over the upper surface; outer margin denticulate, lobes obtuse and of irregular shape: inner margin straight or slightly denticulate. Flowers yellow.

Ceres Karroo: In limestone.

Fig. 117–118 are photos of the plants in their natural habitat. The plants grow in pockets in the limestone. Fig. 119–120 are photos to indicate the range of variation of the upper surface.

***Lithops Weberi.** (Plate 43.) Corpuscularia turbiniformis; folia aequalia vel subaequalia, convexa vel subplana; fenestra magna et bene visa, pellucida, viridis vel griseo-viridis vel purpureo-viridis, insulis elevatis paucis vel multis notata; margine exteriore multo diviso, laciniae irregulariter; margine interiore prope fissuram plana vel multo diviso. Capsula quinquelocularis.

Die planteliggaam is 1·5–2 cm. breed en die lengte van die spleet is circa 1 5 cm. Die boonste vlak is effens gewelfd of soms byna plat met 'n groot deursigtige venster Mat of liggroen, grysgroen. grys òf selfs purpergroen gekleurd kan wees. In die venster is daar 'n aantal eilande van verskillende vorm en grootte of soms ontbreek die eilande byna geheel en al. Hierdie eilande is effens verhewe bokant die oppervlakte van die venster. Die gevolg is dat in hierdie geval is die deursigtige deel van die venster beperk tot 'n aantal non strepe Mat in mekaar vloei. Die buitenste rand is sterk getand. die lobbe is van onreëlmatige vorm; die binneste rand is óf reguit óf effens getand. Doosvrug 5-delig. Blomme geel.

Calvinia-Ceres Karroo: in verweringsopeninge in kalkbanke, Nel. Sept. 1939.

Hierdie soort is na Mnr. Weber van Calvinia genoem aan wie ek die plant te danke het. Hierdie soort is na verwant aan *L. Otzeniana* aan die een kant en aan die ander kant aan *L. Comptonii*. Van die eerste soort verskil dit deur (i) die verhewe eilande in die venster wat nie by *L. Otzeniana* voorkom nie, en (ii) deur die fynere rand wat in die geval van *L. Otzeniana* baie growwer is. Van *L. Comptonii* verskil dit deurdat die genoemde eilande vat in die geval van *L. Comptonii* meer 'n soort van netwerk vorm en dan is die venster van *L. Comptonii* ook baie groter en oop.

Hierdie twee portrette (Fig. 117–118) toon die geaardheid van die woonpiek van die plant in die Ceres Karroo. Die plante groei in kleine holtes, wat deur die verwering van die kalkklip ontstaan het. As dit reën, versamel daar water in hierdie klein holtes. Fig. 119–120 dui wat die graad van variasie van die boonste vlak is.

Henrici gives the following interesting description about the transpiration of *Lithops salicola*: "*Lithops salicola*, on the other hand, showed, as was expected, a very low daily rate of transpiration which, however, did not consist of a number of very small values, but apparently of a large number of 'nil' values with an occasional good transpiration value."

"*Lithops salicola* needs special mention. In 1938 the plant was fully saturated (see Table 5). In this ease, too, the transpiration was munch higher than during the drought of 1937, did not consist of a number of small values, but of three large ones, two of them having been obtained during two successive hours showed nil values."

"The succulent *Mesembryanthemum floribundum* and *Lithops salicola* show the smallest hourly average, the smallest hourly maximum and smallest daily value. . ."

"Compressing Table 1 and recalculating in minutes, the following average values for transpiration per gram of fresh matter per minute would be arrived at (only values up to 1937 are included).

Mesembryanthemum floribundum ...	·5 to 1·5 mg.
Lithops salicola	·002 mg.

Henrici gives the following figures

TRANSPIRATION RATE OF *Lithops salicola* PER 1 GM. FRESH MATTER

11/8/37 - - -	·00	·02	·02
2/3/38 - - -	·04	·40	.59

M. Henrici: "The Transpiration Rate of different Plant Associations in South Africa" (1940). Dept. of Agric. and Forestry (Plant Industry Series No. 39). Science Bulletin 185, pp. 17–18 and p. 27.

FIGURE 121

LITHOPS WEBERI NEL
in habitat, Calvinia district

FIGURE 122

LITHOPS VERRUCULOSA NEL
in habitat, Namaqualand, Sept 1946.

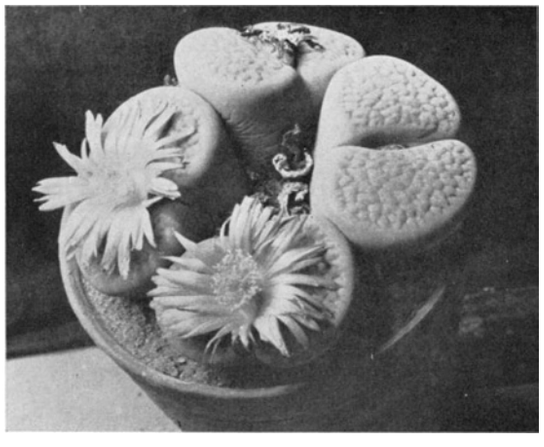


FIGURE 123

LITHOPS TURBINIFORMIS (HAW.) N.E. BR.
The above plant was the type of *L. aurantiaca L. Bol.* The photo was made under the impression that it was a new species. As already explained in the texte, *L. aurantiaca L. Bol.* is nothing else but the old species *L. turbiniformis (Haw.) N.E. Br.* This photo confirms this view.

KEY TO SPECIES

I. AFENESTRATAE

Upper surface apparently opaque, with no definite transparent window.

A. Upper surface plain, more or less uniform in colour.

(a) Upper surface obconical.

(i) Upper surface creamy white or grey white.

x. Body large, upper surface with, if any, very gentle depressions . . . . . *L. Ruschiorum*

xx. Body small, no depressions present . . . . . *L. Nelii*

(ii) Body and top ochre coloured, with definite impressed branched lines in the surface. . . . . *L. lineata*

(b) Upper surface oblique convex, plain, grey white . . . . . *L. Meyeri*

B. Top definitely rugose or slightly so, with elevations and depressions to many convolutions, depressions variously coloured, isolated coloured lines and dots not present.

(a) Warts present in the depressions . . . . . *L. verruculosa*

(b) No warts present in the depressions.

(i) Top more or less uniform in colour.

x. Ridges plain, very convolute, top surface rustbrown or slightly yellowish-brown . . . . . *L. turbiniformis*

xx. Ridges vermiform, top surface chalk white . . . . . *L. Vallis-Mariae*

(ii) Depressions usually differently coloured from the ridges.

x. Body greenish white, depressions very slight, usually slightly lighter in colour than the ridges . . . . . *L. Eberlanzii.*

xx. Top creamy yellowish-white to orange-yellow or slightly brownish.

o. No margins present . . . . . *L. gracilidelineata*

oo. Margins bifurcated . . . . . *L. dendritica*

xxx. Body dove-grey, brown-yellow to grey-white.

o. Depressions very slightly coloured or slightly darker or very darker than ridges, body sometimes reddish, no rust-brown lines . . . . . *L. karasmontana*

oo. Rust brown lines at right angles to the main depressions. . . . . *L. Erniana*

C. Top surface plain or rugose, with isolated red to dark-red lines and dots, or purple lines and dots, no reticulation of markings on the top.

1. Body plain or very minutely furrowed.

(a) Body creamy white with purple to red markings in the slight furrows . . . . . *L. van Zylii*

(b) Top greyish green, with short branched red lines near the fissure *L. Marthae*

2. Tap more or less rugose.

(a) Top surface very rugose, slightly grey-white with 18–23 dark blood-red dots and lines. . . . . *L. urikosensis*

(b) Top surface very slightly rugose, depressions very slight.

(i) Window bordered by a pale rust-brown band. . . . . *L. Schwantesii*

(ii) Band round window absent.

x. Top surface whitish to grey-red yellowish.

o. Top surface with minute blood-red dots or many short lines . . . . . *L. Gulielmi*

oo. Top surface grey-red yellowish, with brown-red dots and lines. . . . . *L. kunjasensis*

xx. Top surface predominantly green-bluish to brown-bluish. . . . . *L. kuibisensis*

xxx. Top surface slightly buff coloured . . . . . *L. Triebneri*

SLEUTEL VIR DIE SOORTE

I. AFENESTRATAE

Boonste vlak skynbaar ondeursigtig, met geen bepaalde deursigtige venster nie.

A. Boonste vlak nie gerimpeld nie, min of meer eenvormig van kleur.

(a) Boonste vlak obkonies.

(i) Planteliggaam romerig wit tot gryswit.

x. Planteliggaam groot, boonste vlak met so te sé geen duike nie en diè baie effens, indien teenwoordig . . . . . *L. Ruschiorum*

xx. Planteliggaam klein, geen duike nie . . . . . *L. Nelii*

(ii) Planteliggaam oker (geelrooi) gekleurd met duidelike vertakte ingedrukte duike . . . . . *L. lineata*

(b) Boonste vlak skuinskonveks, geen duike nie, gryswit . . . . . *L. Meyeri*

B. Boonste vlak duidelik of effens gerimpeld. met rimpels en duike tot baie voue, geen gekleurde geïsoleerde lyne of kolle nie.

(a) Vratte in die duike . . . . . *L. verruculosa*

(b) Geen vratte in die duike nie.

(i) Boonste vlak min of meer eenvormig in kleur.

x. Rimpels eenvoudig. baie gevou, boonste vlak roesbruin of geelbruin . . . . . *L. turbiniformis*

xx. Rimpels wurmagtig. boonste vlak kalkwitagtig . . . . . *L. Vallis-Mariae*

(ii) Duike gewoonlik anders gekleurd as die rimpels.

x. Planteliggaam groenerigwit, duike baie effens, effens ligter gekleurd as die rimpels . . . . . *L. Eberlanzii*

xx. Planteliggaam liggeel. witagtig tot oranjegeel of effens bruinerig.

o. Geen some nie om venster . . . . . *L. Gracilidelineata*

oo. Soom gevurk . . . . . *L. dendritica*

xxx. Planteliggaam duifgrys, bruingeel tot gryswit.

o. Duike effens (soms baie min) donker tot baie donkerder gekleurd as die rimpels. soom effens rooiagtig, geen roes-bruin lijne nie . . . . . *L. karasmontana*

oo. Roesbruin lyn staan reghoekig op die hooflyne . . . *L. Erniana*

C. Boonste vlak eenvoudig of gerimpeld, met geïsoleerde, rooi tot donkerrooi kolle of lyne of persagtige lyne en kolle, lyne vorm me, netwerk nie.

1. Boonste vlak eenvoudig of baie effens gerimpeld niet sagte duike.

(a) Boonste vlak romerigwit met pers tot rooi merke of kort lyntjies in die effense duike . . . . . *L. van Zylii*

(b) Boonste vlak gryseriggroen, met kort vertakte bloedrooi lyne naby die spleet . . . . . *L. Marthae*

2. Boonste vlak min of meer gerimpeld.

(a) Boonste vlak sterk gerimpeld, effens gryswit, met 18–23 bloedrooi kolle of lyne. . . . . *L. urikosensis*

(b) Boonste vlak baie effens gerimpeld, met effense duike.

(i) Venster omsoom deur 'n ligte geel band . . . . . *L. Schwantesii*

(ii) Band om venster afwesig.

x. Boonste vlak witagtig tot gryswit geelagtig.

o. Boonste vlak met klein bloedrooi kolle of baie kort bloedrooi lyne. . . . . *L. Gulielmi*

oo. Boonste vlak grysrooi- geelagtig met bruinrooi kolk en lyne. . . . . *L. kunjasensis*

xx. Boonste vlak hoofsaaklik groenblou tot bruinblou *L. kuibisensis*

xxx. Boonste vlak geelbruin (buff) gekleurd. . . . . *L. Triebneri*

II. FENESTRATAE

Upper surface either wholly transparent window or provided with numerous miniature windows or with openings in the opaque epidermis or the depressions transparent and the ridges opaque.

A. Rubro-Coloratae. Window with red to dark-red dots or lines or with pink depressions with rust-brown or reddish depressions confined to the margins.

1. Main body of upper surface free of coloured dots or lines, the latter confined mainly to the margins.
   (a) Body and top grey-white (silvery-grey), dendritic markings between laciniae rust-brown. . . . . *L. Fulleri*
   (b) Body and top rust-brown, reddish-brown or greenish, bifurcations between laciniae red to light-red. . . . . *L. Aucampiae*
2. Main body of upper surface marked with isolated red dots, or few isolated red dots and lines or coloured (pink) by lines forming reticulations.
   (a) Miniature windows prominent, raised above level of window surface, no transparent window, upper surface rust-brown. . *L. fulviceps*
   (b) Miniature windows absent.
      (i) Window with red dots only.
         x. Red dots raised above level of window. . . . . *L. Inae*
         xx. Red dots embedded in surface of transparent window and level with it.
            o. 10–15 fulgent red dots. . . . . *L. Dinteri*
            oo. Few (3–5) dull red dots. . . . . *L. brevis*
      (ii) Upper surface with few to many red impressed lines, or lines interconnected to form reticulation, dots so to say absent.
         x. Upper surface rugose, transparent part confined to impressions between ridges.
            o. Upper surface slightly rust-brown, window olive-green, top part of surface slightly rugulose *L. marginata*
            oo. Upper surface greyish-white or yellow-brown, with transparent part dark light-green to dark-green impressed lines.
               p. Depressions light to dark-green, at intersections dark-red spots. . . . . *L. chrysocephala*
               pp. Depressions with impressed dark-red lines, top surface resembling Hebrew script. . . . . *L. Mennellii*
            ooo. Window with pink reticulate impressions, sometimes slightly whitish. . . . . *L. Julii*
         xx. Upper surface plain or bullate, window transparent.
            o. Transparent window without ridges.
               p. Window buff coloured, lines bifurcate into window. . . . . *L. Dorotheae*
               pp. Window dark-green, short lines and dots unevenly distributed. . . . . *L. insularis*
            oo. Window bullate with opaque, yellowish ridges *L. Bromfieldii*

II. FENESTRATAE

Boonste vlak geheel en al ’n deursigtige venster of voorsien van baie miniatuur-vensters of met ronde openings in die ondeursigtige bedekking of die duike deursigtig en die rimpels ondeursigtig.

A. Rubro-Coloaatae. Venster met rooi tot donkerrooi kolle of lyne of met ligterooi (pink) duike of met roesbruin of rooiagtige duike vernaamlik by die some.

1. Hoofdeel van boonste vlak vry van gekleurde kolle of lyne, laasgenoemde hoofsaaklik beperk tot die some.
   (a) Liggaam en boonste vlak gryswit, roesbruin dendritiese merke tussen die slippe. . . . . *L. Fulleri*
   (b) Boonste vlak roesbruin, rooibruin of groen, tussen slippe rooi tot ligrooi gevurkte lyne. . . . . *L. Aucampiae*
2. Hoofdeel van boonste vlak met geisoleerde rooi kolle of min rooi kolle en lyne of deur netvormige ligrooi vertakte lyne gemerk.
   (a) Miniatuur-vensters prominent, steek bokant vensteroppervlakte uit, geen deursigtige venster nie, boonste vlak roesbruin. . . *L. fulviceps*
   (b) Miniatuur-vensters afwesig.
      (i) Rooi kolle enigste kenmerk van venster.
         x. Rooi kolle steek bokant oppervlakte van venster uit. . . *L. Inae*
         xx. Rooi kolle ingebed in die deursigtige vensteropper vlakte en gelyk daarmee.
            o. 10–15 Glinsterende rooi kolle. . . . . *L. Dinteri*
            oo. Baie klein getal (3–5) dowwe rooi kolle. . . . *L. brevis*
      (ii) Boonste vlak met min tot baie ingedrukte lyne of lyne met mekaar verbind om netvormige voorkoms te gee, kolle so te sê afwesig.
         x. Boonste vlak gerimpeld, deursigtige deel beperk tot duike tussen die rimpels.
            o. Boonste vlak effens roesbruin, deursigtige deel olyfgroen, boonste vlak effens gerimpeld. . *L. marginata*
            oo. Boonste vlak gryswit of geelbruin met deursigtige deel donker, liggroen of donkergroen ingedrukte duike.
               p. Duike lig tot donkergroen, ingedrukte donkerrooi kolle by kruispunte van duike *L. chrysocephala*
               pp. Duike met diep donkerrooi ingedrukte lyne, boonste vlak soos hebreeuse skrif *L. Mennellii*
            ooo. Venster met ligrooi netvormige duike (soms effens witagtig). . . . . *L. Julii*
         xx. Boonste vlak eenvoudig (gelyk) of opgeblaas, venster deursigtig.
            o. Deursigtige venster sonder rimpels.
               p. Venster buff (oranjegeel) gekleurd, gevurkte lyne tussen die slippe. . . *L. Dorotheae.*
               pp. Venster donkergroen, kort lyne en kolle oneweredig versprei. . . . . *L. insularis*
            oo. Venster opgeblaas met geelagtige, ondeursigtige rimpels. . . . . *L. Bromfieldii*

B. Arubrae. Window without red dots or lines.

1. Miniature windows present, embedded in window and level with window surface.
   (a) Upper surface with many blue, purple to brown dendritic markings *L. pseudotruncatella*
   (b) Upper surface with no dendritic markings . . . . . *L. terricolor*

2. Miniature windows absent.
   (a) Corner of window near the fissure triangular.
      (i) Window open, clear, obconic . . . . . *L. optica*
      (ii) Window with islands, oblique-convex. . . . . *L. Helmuti*
   (b) Window more or less round, flat convex, no triangle near fissure.
      (i) Window covered by an opaque covering and in this covering small circular openings, whereby the underlying transparent window is visible.
         x. Upper surface definitely convex, body relatively small. . . . . *L. Franciscii*
         xx. Upper surface flat, body relatively large.
            o. Upper surface rust-brown . . . . . *L. Lesliei*
            oo. Upper surface grey-white. . . . . *L. Venteri*
      (ii) Window without circular openings, window open or slightly covered or transparent part between islands visible.
         x. Transparent window green or greenish, never otherwise coloured.
            o. Window always open, inner margin straight, not denticulate . . . . . *L. olivacea*
            oo. Window mostly with islands or with reticulation, sometimes open, inner margin denticulated.
               p. Window covered by delicate misty covering.
                  s. Window flat, in later stage oblique convex, body relatively small, flower yellow . . . . . *L. divergens*
                  ss. Window convex or slightly so, body large, flower white . . . . . *L. marmorata*
               pp. Window with many islands or rough reticulation (fine sometimes *L. Herrei*) or sometimes open.
                  s. Window with irregular, rough, laciniated, elevated islands . . . . . *L. bella*
                  ss. Window with delicate reticulation or islands practically level with surface or window open.
                     v. Window with delicate reticulation or open, body large, flower not as big as body. . *L. Herrei*
                     vv. Window with small islands, small body, flower much bigger than body . . . . . *L. Geyeri*

B. Arubrae. Venster sonder rooi kolle of lyne.

1. Miniatuur-vensters teenwoordig, ingebed in die boonste vlak.
   (a) Boonste vlak met baie, bloupers tot bruin dendritiese merke *L. pseudotruncatella*
   (b) Boonste vlak met geen dendritiese merke nie. . . . . *L. terricolor*

2. Miniatuur-vensters afwesig.
   (a) Hoek van venster naby spleet driehoekig.
      (i) Venster skoon, oop, obkonies . . . . . *L. optica*
      (ii) Venster met eilande, skuins konveks . . . . . *L. Helmuti*
   (b) Venster min of meer rond, plat of konveks, geen driehoek by spleet nie.
      (i) Venster deur 'n ondeursigtige bedeksel bedek en in hierdie bedeksel klein ronde openinge, waardeur die onderliggende deursigtige vensterdele sigbaar word.
         x. Boonste vlak bepaald konveks, liggaam betreklik klein . . . . . *L. Franciscii*
         xx. Boonste vlak plat (gelyk), liggaam betreklik groot.
            o. Boonste vlak roesbruin . . . . . *L. Lesliei*
            oo. Boonste vlak gryswit. . . . . *L. Venteri*
      (ii) Venster sonder ronde openinge, venster oop of effens bedek of deursigtige deel tussen eilande sigbaar.
         x. Deursigtige venster altyd groen gekleurd of groenerig, nooit anders gekleurd nie.
            o. Venster altyd oop, binneste soom reguit, nie getand nie . . . . . *L. olivacea*
            oo. Venster meestal met eilande of met netwerk, soms nop, binneste soom getand.
               p. Venster met fyn mistige bedekking bedek.
                  s. Venster plat, in latere stadium skuinskonveks, liggaam betreklik klein, blom geel . . . . . *L. divergens*
                  ss. Venster konveks of effens so, liggaam betreklik groot, blom wit *L. marmorata*
               pp. Venster met baie eilande of growwe netwerk (soms fyn, L. Herrei) of soms oop.
                  s. Venster met onreëlmatig geslipte eilande, wat bokant oppervlakte van venster uitstaan . . . . . *L. bella*
                  ss. Venster met fyn netwerk of eilande feitlik gelyk met venster-oppervlakte of oop.
                     v. Venster met Rn netwerk of oop, liggaam groot, blom nie so groot as liggaam . . . . . *L. Herrei*
                     vv. Venster met klein eilande, sonder netwerk, liggaam klein, blom baie groter as liggaam . . . . . *L. Geyeri*

xx. Window coloured (reddish, mauve, purple) or green or sometimes partly opaque (*L. Weberi*) or with delicate reticulation (*L. Comptonii*).

o. Laciniae of margin prominent (1–2 mm. long) more or less regular round the window . . . *L. Otzeniana*

oo. Laciniae not prominent, irregular or seldom margin absent (*L. salicola, L. Weberi*).

p. Window open, light greenish or purple, with or without reticulation over window.

s. Margin delicately denticulate, dark-purple, reticulation, if present, very delicate . . . . . *L. Comptonii*

ss. Margin roughly denticulate, window light-purple, reticulation, if present, rough. . . . . *L. Weberi*

pp. Window greenish (dark to light) reddish to light reddish purple (mauve) purple, reticulation, if present, yellowish . . . *L. salicola*

xx. Venster gekleurd rooiagtig, persagtig, of groen of soms gedeeltelik ondeursigtig (*L. Weberi*) of met fyn netwerk (*L. Comptonii*).

o. Tande van soom prominent (1–2 mm. lank) min of meer reëlmatig om die venster . . . . . *L. Otzeniana*

oo. Tande van soom onaansienlik, onreëlmatig of selde geen soom nie (*L. salicola, L. Weberi*).

p. Venster oop, liggroenerig of pers, met of sonder netwerk oor venster.

s. Soom fyn getand, donkerpers venster, netwerk, indien teenwoordig, baie fyn . . . . . *L. Comptonii*

ss. Soom grof getand, venster ligpers, netwerk, indien teenwoordig, grof *L. Weberi*

pp. Venster oop, groenerig tot donkergroen, rooiagtig tot ligrooi pers, netwerk, indien teenwoordig, geelagtig . . . . . *L. salicola*

ABBREVIATIONS OF LITERATURE ON FOLLOWING PAGES.

A.	= F. Pax und K. Hoffmann. Die natürlichen Pflanzenfamilien, Rd. 16 e, 1934, p. 195-221.
B.Mag.	= Botanical Magazine, Curtis, London.
B.M.J.	= Kew Bulletin. Royal Bot. Gardens, Kew.
C.J.	= The Cactus Journal, London.
D.B.F.	= K. Dinter, Beiträge Z. Fl. Südwest-Afrika. Berlin, 1923.
D.K.G.	= Deutsche Kakteen-Gesellschaft, Berlin.
F.R.	= Fedde, Repertorium specierum novarum regni vegetabilis, Berlin.
G.C.	= The Gardeners' Chronicle, London.
G.S.L.	= K. Dinter, Südwestafrikanische Lithops-Arten. Verz. B. Graessner, Perleberg. 1928.
J.S.	= B. Jacobsen, Die Sukkulenten, Berlin, 1928.
J.S.P.	= B. Jacobsen, Succulent Plants, London, 1935.
L.B. I	= L. Bolus, Notes on Mesembryanthemum and sonic allied genera. Vol. I, Wynberg, Cape.
L.B. II and III	= L. Bolus, Notes on Mesembryanthemum and allied genera, Cape Town.
K.Kd.	= Kakteenkunde, Verlag J. Neumann-Neudamm.
M.	= Labarre, Mesembryanthema L. Reeve and Co. Ltd., Kent, England.
M.D.G.Ztg.	= Möllers Deutsche Gärtner-Zeitung, Erfurt.
M.Fl.Pl. I	= J. Burtt Davy, A Manual of the Flowering Plants and Ferns of the Transvaal with Swaziland, South Africa, Part I, London, 1926.
N.E.Br. M.	= N. E. Brown, New and Old Species of Mesembryanthemum with critical notes. Journal of she Linnean Society—Botany. Vol. XLV, July, 1920, London.
P.G.S.A.P.	= E. P. Phillips, The Genera of South African Flowering Plants, Cape Town, 1926.
v.P.M.	= Dr. K. von Poellnitz, Die Aufteilung der Gattung Mesembryanthemum. —Fedde: Repertorium specierum novarum regni vegetabilis XXXII, Berlin, 1923.
S.	= Succulenta, Leeuwarden (Holland).
S.G.	= South African Gardening and Country Life. Wynberg.
Tr.R.S.	= Transactions of the Royal Society of South Africa, Cape Town.
Z. für S.	= D.K.G.

Lithops N.E. Br. in G.C. (1922, I) 44; D.K.G. Bd. II p. 117; P.G.S.A.P. 242; M.Fl.Pl. I. 163; G.C. (1926, I) 80; S. (1927) 37; Z. für S. Bd. III p. 220; v. Poellnitz, Die Aufteilung d. Gattung *Mesembryanthemum*, Berlin, 1933; F. Pox u. K. Hoffmann in Englers Natürl. Fam. Bd. 16c, 1934, p. 195-221; Z. für S. (1932) p. 228.

Lithops alpina Dtr. Moellers Deutsche Gärtn. Z. (1927) p. 123; Z. für S. Bd. III p. 220 S. (1927) p. 125. = L. pseudotruncatella. This species is simply a dwarf form of L. pseudotruncatella, which occurs at heights round about 1,750 metres in the mountains on the farm Lichtenstein near Windhoek.

Lithops Aucampiae L. Bol. S.G. (1932) p. 306, t. Postmasburg; Danielskuil; on road between Kuruman and Buchuberg; on road between Kuruman and Vryburg.

Lithops aurantiaca L. Bol. in L.B. II p. 344; Z. für S. (1934) p. 49. = L. turbiniformis.

Lithops Bella N.E. Br. in G.C. (1922) p. 80; *Mes. bellum* Dtr. Beitr. z. Fl. v. S.W.A. Berlin 1923. p. 122; G.C. (1927) 84; S. (1927) 62; Z. für S. Bd. III p. 220; Labarre, Mes. p. 242; Gr. Namaland; Berge von Aus und Gubub; bei Garub; Gr. Karasberge. Triebner writes as follows about the occurrence of this beautiful species: "Standort in den Granitbergen von Aus-Kubub, insofern interessant, als die Pflanze nur an den sanft geneigten Haengen zu finden ist, nicht am Fusse der Berge und auch nicht auf den Kuppen."

Lithops brevis L. Bol. in L.B. II (1932) p. 344. Namaqualand, Hillock 5 miles southeast of Viool's Drift, Orange R. A very difficult species to find in the dry or dormant stage.

Lithops Bromfieldii L. Bol. in L.B. II p. 452. Keimoes. Mnr. Roux van Keimoes skryf omtrent die woonplek van hierdie soort as volg: „Groei in hoë koppe of heuwels met loodblou klipriwwe, taamlik rof. Grond vas en hard met klein klippies versprei oor die oppervlakte. Grondkleur rooi, kop baie rof."

Lithops commoda Dtr. nomen nudum = L. karasmontana.

Lithops chrysocephala Nel in Annals of the Univ. Stellenbosch Vol. XXI. Section A No. I (1943) p. 7 t. Upington: Geelkop.

Lithops Comptonii L. Bol. in S.A. Gard. and Country Life (1930) pp. 212-211. Kakteenkunde (1931) p. 48. Ceres Karroo: on road to Laingsburg from Karroo Poort; on road to Calvinia from Karroo Poort. Found on hillocks in sandy loam. Very difficult to find in dormant stage.

Lithops damarana N.E. Br. Journal of Linn. Soc. (Bot.) 1920 p. 67; G.C. (1922 I) 80. = L. karasmontana.

Lithops dendritica Nel sp. nov. S.W.A.

Lithops Dinteri Schwant. in Z. für Suk. Bd. III p. 97 t. S.W.A.: Wittsand, south of Warmbad in quartz.

Lithops diutina L. Bol. in L.B. II 315; Kakteenkunde (1934) p. 48. = Lithops marmorata N.E. Br.

Lithops divergens L. Bol. in L.B. II 541 ; Kakteenkunde (1934) p. 48. Namaqualand: on road to Nuwe Rus. 30 miles from Van Rhynsdorp; near Nuwefontein: on road from Bitterfontein to Garies.

Lithops Dorotheae Nel in S. 21e Jaargang No. 7 p. I. t. Buslmanland: Pella.

Lithops Eberlanzii (Dtr. et Schwant.) N.E. Br.; in Z. für S. Bd. II p. 25; G.C. (1926, I) 80; Moell. Gärtn. Ztg. (1926) 343: Z. für S. Bol. III p. 220; Kakteenk. (1937) 27. S.W.A.: Kovisberge 30 km. N.E. of Lüderitzbucht in quartz pebbles: Kuckaus—Pockenbank Plains; Rote Kuppe (Halenherg).

Lithops Eksteeniae L. Bol. Notes on Mesembryanthemum and Allied Gen. Part III July. 1939. p. 163. = L. Dorotheae Nel.

Lithops Edithae N.E. Br. Cactus Journal (London) Vol. II p. 70. This species comes from a locality so far unlocated and consequently one has not been able to determine whether it is a known species or not. Presumably from Namaqualand.

Lithops elevata L. Bol. in L.B. II 345. = L. Herrei.

Lithops Elisabethae Dtr. in Kakteenkunde (1933) 50; S. 1938. 2. = L. Pseudotruncatella.

Lithops Erniana Loesch et Tisch. in S. (1936) p. 76: Kakteenk. (1934) p. 49. This species is first mentioned by Herre under the above name in the Kakteenkunde in 1934, but was only described by Loesch and Tischer in 1936. Pockenbank. 50 miles south of Aus in granite.

Lithops farinosa Dtr. nomen nudum. = L. pseudotruncatella.

Lithops Framesii L. Bol. in S.A. Gard. and Country Life (1930) p. 182, t. Namaqualand: on road 20 miles E. of Springbok to Pofadder; between Jakkalswater and Springbok; 10 miles E. of Sendlingsdrift, Orange R.; Umdaus—Steinkopf. = L. marmorata.

Lithops Franciscii (Dtr. et Schwant.) N.E. Br. in Zeit. f. Sük. Bd. II p. 19. t.; G.C. (1926. I) 102: Zeit. f. Sük. Bd. III p. 220: Kakteenk. (1937) p. 27. S.W.A.: Halenberg, 53 km. E. of lüderitzbucht in quartz pebbles.

Lithops Friederichiae N.E. Br. = *Ophtalmophyllum Friedrichiae*.

Lithops Fulleri N.E. Br. in G.C. (1927. I) 70: Zeit. f. Suk. Bd. III p. 220; Kakteenk. (1931) 268: Labarre, p. 246: L. Fulleri var. Tapscottii L. Bol. S.A. Gard. (1929) 182. Bushmanland: Kakamas; Keimoes; Kenhardt; Hopetown Distr.

Lithops fulviceps N.E. Br. B. Mag. 144. Tab. 8776 A.. G.C. (1922, I) 55; G.C. (1926, I) 102: Moell. Deutsche Gärtn. Ztg. (1926) 308; S. (1927) 50; Zeit. f. Suk. Bd. III 220; Labarre 246. S.W.A.; Gr. Karas Mts., in sandy plains: Farm Grünau, Garius, Narudas, S., grows in desert limestone covered by sand.

Lithops Geyeri Nel in Ann. of' Univ. of Stellenbosch, Vol. XXI, Sect. A., No. I (1943) p. 11, t. Namaqualand: Katberg.

Lithops gracilidelineata Dtr. in Graessner, Südwestafrikanische Lithopsarten, Perleberg, 1928. p. 18 t.; S. (1936) 77. S.W.A.: between Uis and Neineis, Brandberg Mts.; South of Franzfontein on road to Outjo near Wittklip; Arandis; in quartz pebbles near Pforte, 90 miles N.W. of Swakopmund.

Lithops Gulielmi L. Bol. in L.B. III. 100. S.W.A.: Aisis, Fish River, 110 miles S. of Klein Karas. in quartz on top of mountains; in quartz on farm Florida, Kl. Karasberge.

Lithops halenbergense Tisch. Kakteenkunde (1932) p. 281. = L. Franciscii.

Lithops Helmuti L. Bol. S. Afr. Gard. (1933) 218; Kakteenkunde (1934) p. 49. Namaqualand: Steinkopf—Kinderle.

Lithops Herrei L. Bol. in L.B. II. 346; South Afric. Gard. (1932) 221; Kakteenk. (1934) 46; S. (1938) 2. Namakwaland: Swartwater.

Lithops Herrei var. plena Bol. = L. Herrei.

Lithops Hookeri (Bgr.) Schwant. in Mesembryanthemum u. Portulacaceen (1908) p. 283 t.; G.C. (1922. I) 55; Moell. Deutsche Gärtn. Ztg. (1928) 46. Berger in his original description states that this plant grows in the Eastern Karroo, Somerset East Dist. N. E. Brown placed this species under L. turbiniformis, which to my mind is not correct, as the latter species has not been found so far East yet. Schwantes is also of this opinion. My own view is, that if the information supplied to Berger is correct, then L. *Hookeri* is nothing else but L. terricolor, which occurs on the borders of the Somerset East district at Springbokvlakte.

Lithops Inae Nel in Ann. Univ. of Stellenbosch, Vol. XXI. Sect. A. No. I (1943) t. North West Cape Province.

Lithops insularis L. Bol. in L.B. III. 75. Gordonia District: Keinmoes. Orange R. Mnr. Roux van Keimoes skryf as volg oor die voorkome van hierdie soort: „Groei op 'n hoe langwerpige kop of heuwel niet 'n wit vuurkliprif heel oor die kop. Rif baie rof, al op die rif is dit besaai. met klein wit klippies. Weerskante van die rif is die grond heelwat sagter met groter klippe, vaal en wit, versprei oor die grond. Die *Lithops* in die sagter grond is baie mooier, het groot koppe en koeke. Dié wat in die harde rif groei is kleiner. Hierdie soort is baie lief om onder bossies of struike en *Aaluyne* te groei wat baie teen die kop groei. Grondkleur is rooi, op die kop waar L. Bromfieldii groei is baie min bosse en L. Bromfieldii groei ook nie onder bosse nie."

Lithops Jacobseniana Schwant. nomen nudum. probably L. karasmontana.

Lithops Julii (Dtr. et Schwant.) N. E. Br.; Zeit. f. Suk. Bd. II 26, t.; G.C. (1926, 1) 102; Zeit. f. Suk. Bd. III. 220; Kakteenk. (1937) 27. S.W.A.: Vahldoorn; Warmbad, in quartz pebbles in desert limestone.

Lithops Julii var. pallida Tisch. = L. Julii.

Lithops Julii var. reticulata (Dtr. et Schwant.) N.E. Br. = L. Julii.

Lithops karasmontana (Dtr. et Schwant.) N.E. Br.; Monatsschrift f. Kakt. (1920) 26; Jour. of Linn. Soc. Vol. XLV. (1920) 67; G.C. (1922, I) 80: Z. f. Kakteenk. Bd. II p. 152; G.C. (1926. I) 102; Moell. D. Gärtn. Ztg. (1926) 257; Moell. D. Gärtn. Ztg. (1927) 102; S, (1927) 63; Z. f. Suk. Bd. II 221; Labarre 247; Kakteenk. (1937) 163 (*L. commoda*); Fedde Rep. XLIII 227 (*L. comnmada*).

Lithops Kuibisensis Dtr., ex Jacobsen. Die Sukkulenten. p. 117 (1933); Ann. Univ. Stellenbosch, XXI, Section A, No. 1 (1943) p. 14 t. S.W.A.: Kalkfontein. 15 Km. S. of Kuibis.

Lithops Kunjasensis Dtr. Graessner, Südwestafr. Lithopsarten, Perleberg (1928) p. 14. t. S.W.A.: Kunjas, W. of Bethanien.

Lithops lactea Schick et Tisch. Kakteenkunde (1933) p. 49 t. = L. Julii. According to Triebner there is no limestone in the vicinity of Ramansdrift and it appears that this is just another form of L. Julii.

Lithops lateritia Dtr. Graessn. Südwesafr. Lithopsarten, Perleberg (1928) p. 16, t. = L. karasmontana.

Lithops Lericheana Dtr. et Schwant. Zeit. f. Suk. Bd. II p. 25. 132, t. = Lithops bella.

Lithops Lesliei N.E. Br. Trans. R. Soc. S.A. II p. 369; Monats. f. Suk. (1920) 129; G.C. (1922, I) 65; Zeit. f. Suk. Bd. I 94; Burtt Davy, Manual Flow. Plants and Ferns

of Transvaal, London. 1926. I p. 163; G.C. (1926. I) 102; Moell. D. Gärtn. Ztg. (1927) 38; S. (1927, 4); Z. für Suk. Bd. II 221: Labarre 248; Kakteenk. (1937) p. 163; Fedde Rep. XLIII p. 226. Transvaal: Pretoria; Klerksdorp; Fourteen Streams. O.F.S.: Bethlehem, between grass; Senekal; near Lindley; Verkeerde Vlei; Koster.

Lithops lineata Nel sp. nov. S.W.A.: between Walfisch Bay and Omaruru River.

Lithops localis (N.E. Br.) Schwant. Journ. Linn. Soc. (1920) p. 68. = Lithops terricolor.

Lithops Lydiae L. Bol. nomen nudum.

Lithops Marlothii N.E. Br. = *Conophytum pellucidum* Schwant.

Lithops marmorata N.E. Br. Journ. Linn. Soc. (1920) p. 68; G.C. (1922. I) 80; G.C. (1925. I) 116: S. (1927) 61; Labarre 250.

Lithops marginata Nel sp. nov. S.W.A.: locality unknown.

Lithops Marthae Loesch et Tisch. S. (1936) 74, t.; Kakteenk. (1937) 163; Fedde Rep. XLIII 228. S.W.A.: South of Pockenbank; S. of Aus.

Lithops Maughanii N.E. Br. = Lithops Fulleri.

Lithops Mennellii L. Bol. in L.B. III p. 76. Louisvale near Upington. Mnr. Roux gee die volgende besonderhede omtrent die woonplek van hierdie soort: „Groei op 'n lae rand met saai blouswart klip. Riwwe wat wit gespikkel is. riwwe is rof, maar die grond is taamlik gelyk. hard en as, ook besaai met klein klippies. Kloutjies (L. Mennellii) groei ook in die nate van die klippe. Grondkleur vaat. groei nie onder bossie nie."

Lithops Meyeri L. Bol. S. Afric. Gard. (132, 1932) 102; Kakteenk. (1934) 46. Namaqualand: Brakfontein.

Lithops mickbergensis Dtr. Graessn. Südwestafr. Lithopsarten. Perleberg (1928) p. 16. t. = Lithops karasmontana.

Lithops Mundtii Tisch. = L. pseudotruncatella.

Lithops Nelii. Schwantes Mss.; Cape Cross.

Lithops olivacea L. Bol. in L.B. II 84; Labarre 251; Kakteenk. (1932) 131; S. (1938) 33. Bushmanland: Kenhardt; Kakamas; Pofadder.

Lithops opalina Dtr. in Moell. D. Gärt. Ztg. (1927) 139. t. = Lithops karasmontana.

Lithops optica (Marl.) N.E. Br. Trans. Roy. Soc. S.A. I 405; G.C. (1922, I) 80; Moell. D. G. Ztg. (1926) 336; Z. für Suk. Bd. II 221; S. (1927) 78; Labarre 252. S.W.A.: Prince of Wales Bay, Lüderitzbucht.

Lithops optica var. rubra Tisch. Z. für Suk. Bd. II 65; G.C. (1926, I) 116; Z. für Suk. Bd. III 221: Kakteenkunde (1929) 43. S.W.A.: Prince of Wales Bay, Lüderitzbucht.

Lithops Otzeniana Nel. Kakteenk. (1937) p. 123. t. Bushmanland: Brakfontein. 30 miles from Loeriesfontein, in granite.

Lithops Peersii L. Bol. in L.B. II p. 84. = Lithops terricolor.

Lithops Pillansii L. Bol. in L.B. II 81. = Lithops Ruschiorum.

Lithops Pseudotruncatella (Bgr.) N.E. Br. in Mesembrianthemum u. Portulacaceen (1908) p. 289; Monatsschrift f. Kakteenk. (1920) 117; G.C. (1922, 1) 65; L.B. I 53; Z. f. Suk. Bd. III 221; S. (1927) 38; South Afr. Gard. (1928) 125; Labarre 253; Kakteenk. (1937) 163; Fedde Rep. XLIII 227; *L. pseudotruncatella var. alta* Tisch. Moell. D. Gärt. Ztg. (1926) 331; G.C. (1927, I) 84; Z. f. Suk. Bd. III 221; *Lithops pseudotruncatella var. Mundtii* Moell. D. Gärt. Ztg. (1926) 330; Z. f. Suk. Bd. III 221; G.C. (1927, I) 84. *L. pseudotruncatella var. pulmonuncula* Dtr. = L. pseudotruncatella.

Lithops pulmonuncula Dtr. in Jacobsen. Die Sukkulenten p. 150. = *L. pseudotruncatella*.

Lithops rubra N.E. Br. = Lithops optica var. rubra.

Lithops rugosa Dtr. Graes. Südwestafr. Lithopsarten, Perleberg (1928) 15. = *L. karasmontana*.

Lithops Ruschiana N.E. Br. = L. Ruschiorum.

Lithops Ruschiorum (Dtr. et Schwant.) N.E. Br. Zeit. f. Suk. Bd. II 21, t.; G.C. (1926, I) 116, 194; Zeit. f. Suk. Bd. III 221; S. (1936) 76. S.W.A.: 30 Km. from Swakopmund near Arandis; Spitzkuppe; Roessing; S. of Cape Cross; between Arandis and Khan River

Lithops salicola L. Bol. in L.B. III 33. O.F.S.: in a pan near Lückhoff; Rose Marie, Lückhoff; on a gentle limestone slope, Lückhoff, O.F.S.

Lithops Schiekiana nomen nudum.

Lithops Schwantesii Dtr. Graessner Südwestafr. Lithopsarten. Perleberg (1928) p. 14; S. (1936) 77. S.W.A.: near Barby, about 80 Km. W. of Bethanien.

Lithops summitatum Dtr. Moell. D. Gärtn. Ztg. (1927) 101; Z. f. Suk. Bd. III p. 221. = Lithops karasmontana.

Lithops terricolor N.E. Br. G.C. (1922. I) 65; G.C. (1926, I) 117: S. (1927) 47; Z. f. Suk. Bd. III 221. Laingsburg; Prince Albert; 15 miles S. of Beaufort West; on road from Willomore to Aberdeen; near Steytlerville; Springbokvlakte, Cockscomb near Port Elizabeth.

Lithops translucens L. Bol. in L.B. II 347. = L. Herrei.

Lithops Triebneri L. Bol. in L.B. II 391; South Afric. Gard. (1934) p. 100. S.W.A.: Tirasberge in granite. 2,040 metres above sea-level.

Lithops turbiniformis (Haw.) N.E. Br., Haw. Rev. p. 84 (1821): Burchell Travels, Vol. 1, p. 310; D.C. Prodr., Vol. 3, p. 417; Don, Gen. Syst., Vol. 3, p. 216: Berger Mesem., p. 291 Bot. Mag. t. 6077; G. C. (1922, I) 55, t.; S. (1927) 48; Z. f. Suk. Bd. III 221; Labarre 256. Cape Province: near Prieska; near Britstown; near Strydenburg; near Kraankuil in open and under bushes; Zandylei, Prieska.

Lithops umdausensis L. Bol. in L.B. II 347; Kakteenk. (1934) 47. = Lithops marmorata.

Lithops urikosensis Dtr. Graes. Südwestafr. Lithopsarten, p. 15, t.; S. (1938) 2. S.W.A.: Urikos, 90 Km. W. of Maltahoehe, in limestone.

Lithops Ursulae nomen nudum = *Lithops Jacobseniana*.

Lithops Vallis-Mariae (Dtr. et Schwant.) N.E. Br., Z. f. Suk. Bd. II p. 22 t.; G.C. (1926, I) 117; Z. f. Suk. Bd. III p. 221. S.W.A.: in limestone near Marienthal, very difficult to find as it is very often covered by a light lime dust.

Lithops Venteri Nel in Succulenta (1940) p. 11 t. Griqualand West: Boetsap in limestone.

Lithops Van Zylii L. Bol. in South Gard. (1932) p. 177: Kakteenk. (1934) 48; S. (1936) 94, 113; L.B. III 74, t. Bushmanland: Pofadder.

Lithops verruculosa Nel in Ann. Univ. Stellenbosch Vol. XXI, Sect. A. No. 1 (1943) p. 9. t. North West Cape: Kenhardt.

Lithops Weberi Nel, Succulenta (1940) p. 16. t. Ceres Karroo: in limestone openings

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