

discernible in the (b) form, but usually sparse and difficult to distinguish from the miniature windows.

**Colours:** Face, margins, islands, various shades of opaque pale milky grey, tinted with green, blue, yellow, pink or buff, the margins sometimes faintly edged in a slightly paler tint. Windows, channels, miniature windows, various shades of translucent bluish, greenish, yellowish or pinkish grey. Pellucid dots dull bluish grey-green. Shoulders as for the margins, or a little paler.

**Size:** Small to medium, up to 30 x 20 mm, mostly about 22 x 16 mm. Number of heads up to 20 or more, mostly 2-7.

**FLOWERS** yellow, occasionally bronze-yellow, with white centre, very small to small, up to 23 mm Ø, mostly 15-20 mm Ø. **Seed capsules** usually 5-merous (94%), the remainder (6%) mostly 6-merous. Profile boat-shaped, top ± flat, usually with a dark line about 1,0 mm wide, just below the edge; face broadly elliptic, up to 9,0 x 7,0 mm, mostly 7,0 x 6,0 mm.

**12 *Lithops julii*** (Dint. & Schwant.) N.E. Br. (1925) (W). **Plate 6/1-6.**

**COLLECTED** by Professor Kurt Dinter in February 1924, and named for his friend, Dr Julius Derenberg of Hamburg.

**DISTRIBUTION:** SWA/Namibia, in a triangular area including Karasburg in the north, and in the south, points on the Orange River some 70 km SW and SE of Warmbad. Type locality SE of Warmbad, roughly halfway between Vahldorn and Warmbad.

**DESCRIPTION:** Extremely variable, some specimens being opaque and almost uniform in colour, others strongly reticulated with fine impressed markings, yet others with largely open obscurely translucent windows. At least three main forms have been recognized and were even given varietal status — pallid, reticulated and fuscous — but although most colonies tend to have a majority of one or other of these, all have at least two and many have all three of them. A distinctive feature of the species is the “lip-smear”, though this is not always present. **Profile** truncate, flat to slightly convex, occasionally slightly concave; fissure 5-10 mm deep, lobes conjunct. **Face** flush; mostly ± reniform; lobes ± unequal; mostly opaque; smooth to slightly rugose. **Margins** usually distinct but irregular, with numerous indentations and peninsular projections into the window area, but sometimes rather obscure. **Windows** rarely ± open, usually occluded by a number of islands and peninsulas, therefore reduced to a system of **channels**, sometimes broad and distinct, often rather obscure, and frequently further reduced to a network of narrow slightly impressed furrows which barely accommodate the markings. **Islands** usually large, sometimes small, mostly well-defined and distinct but often obscure and indistinct against the background of opaque channels. **Markings** some-

times absent; usually a network of lines in the channels, sometimes bold and prominent, but often reduced to a number of isolated and obscure short lines, hooks and/or dots; such a line or row of dots may also occur in the lip-smear or may replace it sometimes when the latter is absent; along the inner margins, usually a fuscous lip-smear, sometimes entire and prominent, sometimes broken and obscure, occasionally absent; the fuscous suffusion of the lip-smear occurs rarely as a narrow edging all along the outer margins.

**Colours:** Margins and islands, opaque pale whitish grey, sometimes with a faint tint of blue, mauve, pink, buff or green. Windows/channels usually opaque grey-white, with tints of blue, mauve, pink, beige or brown, sometimes very obscurely translucent greenish grey, greenish or yellowish brown, or pinkish grey. Markings dark red, sometimes very obscure and visible only under a lens. Lip-smear dark greenish or brownish grey or beige. Shoulders as for margins and islands, or a little paler.

**Size:** Small to medium, up to 38 x 25 mm, mostly about 25 x 20 mm. Number of heads up to 8 or more, mostly 2-4.

**FLOWERS** white, medium to large, up to 43 mm Ø, mostly 25-35 mm Ø. **Seed capsules** usually 5-merous (90%), otherwise (10%) mostly 6-merous. Profile boat-shaped, top ± flat; face elliptic to narrow elliptic, up to 11,0 x 7,5 mm, mostly about 8,5 x 6,0 mm.

**13 *Lithops karasmontana*** (Dint. & Schwant.) N.E. Br. (1920) (W).

We recognize four varieties within this very variable species, namely var. *karasmontana*, var. *aiasisensis* (De Boer) Cole, var. *lericheana* (Dint. & Schwant.) Cole, and var. *tischeri* Cole.

**13.1 *Lithops karasmontana*** (Dint. & Schwant.) N.E. Br. var. *karasmontana* (W). **Plate 8/1-3.**

**COLLECTED** by Professor Kurt Dinter and his wife, Mrs Jutta Dinter, who discovered it in the Karas Mountains.

**DISTRIBUTION:** SWA/Namibia, to the W and SW of the Great Karasburg, mainly in the areas around and between Klein Karas, Grunau and northwards, and Ai-Ais. Type locality Karas Mountains, without further detail, but apparently near Klein Karas.

**DESCRIPTION:** Extremely variable, some specimens being opaque and uniformly coloured, others with an extensive network of narrow channels and markings, and yet others with obscurely translucent open windows; there is also a great deal of variation in the colours. In some colonies the plants tend to represent predominantly one colour or pattern form or another, but all colonies are “mixed” in some degree, and in

some all possible forms and intermediates occur. **Profile** truncate, flat to slightly convex, occasionally slightly concave; fissure 4-10 mm deep, lobes conjunct. **Face** flush; elliptic to mostly reniform; lobes mostly  $\pm$  unequal; mostly opaque; mostly somewhat rugose, occasionally smooth. **Margins** usually obscure, sometimes well-defined but irregular with numerous indentations. **Windows** sometimes absent, the whole face then  $\pm$  uniformly opaque; sometimes very obscurely translucent, when there may be a network of shallow valleys and markings within them; mostly reduced to relatively narrow impressed **channels** or furrows which are taken up almost entirely by the markings. **Islands** sometimes absent; usually surrounded by narrow channels or furrows and then clearly defined but irregular in shape; often obscure and manifest only as indistinct humps surrounded by equally obscure shallow valleys. **Markings** sometimes absent, usually a number of short lines, hooks and/or dots which may be linked into a network.

**Colours:** Margins opaque light grey tinged with a variety of blue, green, yellow, beige, light to dark brown, pink or red tints, sometimes constituting an obscure band around the face. Face, when entirely opaque, various shades of brick-red, beige, yellow, brown, pink, salmon, milky blue, grey-white. Windows, when obscurely translucent, various shades of salmon, greenish brown, pink, greenish grey, yellowish grey. Narrow channels, very obscurely translucent grey-green. Markings, dark-brown, red, purplish. Shoulders sometimes as for margins, but lighter, otherwise bluish grey.

**Size:** Medium to large, up to 35 x 28 mm, mostly about 25 x 20 mm. Number of heads up to 12, mostly 2-6.

**FLOWERS** white, medium to large, up to 45 mm  $\varnothing$ , mostly 25-35 mm  $\varnothing$ . **Seed capsules** usually 5-merous (87%), otherwise (13%) mostly 6-merous. Profile boat-shaped, top  $\pm$  flat; face elliptic, up to 11,0 x 8,0 mm, mostly about 8,0 x 6,5 mm.

**13.2 *Lithops karasmontana* var. *aiaisensis*** (De Boer) Cole (1964) (W). **Plate 7/1-2.**

**COLLECTED** by Roy C. Littlewood in 1961, near Ai-Ais.

**DISTRIBUTION:** SWA/Namibia, in a small area to the east of Ai-Ais, SW of Klein Karas. Type locality, near Ai-Ais.

**DESCRIPTION:** Relatively uniform. This was originally published as a variety of *L. erniana* (see under *L. eberlanzii*), despite the contrary views of Dr Geyer. We agree with him that it is more closely related to and therefore more appropriately placed as a variety of *L. karasmontana*. **Profile** truncate, flat to very slightly convex; fissure 6-10 mm deep, lobes conjunct. **Face** flush;  $\pm$  reniform; lobes  $\pm$  unequal; opaque; slightly rugose. **Margins** mostly indistinct and irregular. **Windows** absent; face mostly opaque, divided up into a system of shallow **valleys** in which **channels** may be discernible, usually obscurely, sometimes more dis-

tinctly and then tending to taper off digitately into the margins. **Islands** occasionally clearly delineated by the markings, usually very indistinct and manifest merely as slight humps between the shallow valleys. **Markings** often absent, otherwise obscurely manifest as a number of dots, hooks and/or branched lines, sometimes linked to form a broken network. **Pellucid dots** absent or rarely present, then very sparse, located mainly along the inner margins.

**Colours:** Face, margins, islands, opaque grey-white tinged with various shades of green, brown, buff, pink, mauve or cream, the margins sometimes banded obscurely in a slightly deeper or paler hue. Channels very obscurely translucent grey, bluish or brownish grey, or grey-green. Markings dull brownish to purplish red. Pellucid dots dull bluish grey-green. Shoulders as for margins or lighter, or pale bluish grey.

**Size:** Medium, up to 32 x 23 mm, mostly about 27 x 20 mm. Number of heads up to 5 or more, mostly 2-3.

**FLOWERS** white, medium to large, up to 38 mm  $\varnothing$ , mostly 20-30 mm  $\varnothing$ . **Seed capsules** usually 5-merous (93%), otherwise (7%) 4- or 6-merous. Profile boat-shaped, top  $\pm$  flat; face elliptic, up to 9,5 x 7,0 mm, mostly about 7,5 x 6,0 mm.

**13.3 *Lithops karasmontana* var. *lericheana*** (Dint. & Schwant.) Cole (1925) (W). **Plate 7/3-4.**

**COLLECTED** by Professor Kurt Dinter in April 1924, and named for Peter le Riche of the farm "Stinkdorn", who provided Dinter with information as to how to find the locality.

**DISTRIBUTION:** SWA/Namibia, W and E of the Great Karasberg range (NNW and NNE of Karasburg). Type locality Garub.

**DESCRIPTION:** Relatively uniform and fairly easy to identify. **Profile** truncate, flat to slightly convex; fissure 4-8 mm deep, lobes conjunct. **Face** flush; slightly reniform; lobes  $\pm$  unequal; translucent + opaque; slightly rugose. **Margins** usually distinct, sometimes  $\pm$  regular with minor indentations, more often very irregular with peninsular projections into the window area. **Windows** seldom open, usually occluded by small to bold irregularly shaped islands and peninsulas, therefore reduced to a number of **channels** which are usually fairly distinct though irregular in shape. **Markings** in the channels, rarely absent, sometimes rather obscure, usually consisting of a number of hooks and short branched lines which may be linked into a distinct network. **Pellucid dots** often absent, otherwise obscure and visible only with a lens, rather sparsely scattered over the whole face but mainly near the inner margin.

**Colours:** Margins and islands, various shades of opaque greenish, yellowish or pinkish grey, the margins sometimes banded obscurely in a slightly deeper hue. Windows/channels, various shades of dull translucent greenish, brownish, reddish or pinkish grey, or

reddish grey-green. Markings mostly rather dull blood-red to purplish red. Pellucid dots dull dark grey-green. Shoulders as for margins or more greyish.

**Size:** Small, up to 27 x 20 mm, mostly about 20 x 15 mm. Number of heads up to 10, mostly 2-3.

**FLOWERS** white, medium to large, up to 45 mm  $\varnothing$ , mostly 25-35 mm  $\varnothing$ . **Seed capsules** usually 5-merous (89%), otherwise (11%) mostly 6-merous. Profile boat-shaped, top  $\pm$  flat; face elliptic, up to 9,0 x 6,5 mm, mostly about 8,0 x 6,0 mm.

**13.4 *Lithops karasamontana* var. *tischeri* Cole (1973) (W). Plate 7/5-6.**

**COLLECTED** by D.T. & N.A. Cole on 20 July 1970, and named for Dr Arthur Tischer of Heidelberg, West Germany. This taxon is presumed to be identical with *L. fossulifera* Tisch. nom. nud. (See Cole 1973b).

**DISTRIBUTION:** SWA/Namibia, at only one known locality, about 65 km NW of Karasburg. Grows in red-brown soil with some brown granite and white quartz.

**DESCRIPTION:** Relatively uniform and easy to identify by its colour which gives an overall impression of reddish brown or brick-red. **Profile** truncate, flat to slightly convex; fissure 4-8 mm deep, lobes conjunct, sometimes slightly divergent. **Face** flush; elliptic to slightly reniform; lobes equal to slightly unequal; opaque to obscurely translucent; usually distinctly rugose. **Margins** absent or obscure, irregularly indented. **Windows** rarely open, usually occluded by islands and peninsulas, therefore reduced to a number of **channels**, sometimes absent or obscure, but otherwise set in a narrow to broad network of shallow valleys which usually divide the face up into a number of humps and make it distinctly rugose. **Islands** mostly rather obscure and not well-defined, often manifest simply as a number of humps surrounded by valleys and markings. **Markings** set in the valleys and/or channels, sometimes very indistinct and not visible without a lens, but usually consisting of a number of branched lines, hooks and/or dots, which may be linked to form an irregular broken network. **Pellucid dots** often absent, otherwise rather sparsely scattered over the whole face; usually very obscure and visible only with a lens.

**Colours:** Face sometimes obscurely translucent in one or other shade of bluish pink or red, a window then being indistinctly discernible; otherwise, the margins and islands in various shades of opaque beige, yellow-brown or pink, the margins sometimes banded in a slightly deeper hue. Channels usually obscure dull greenish grey. Markings blood-red to dull purplish red. Pellucid dots dark greenish grey. Shoulders opaque bluish, greenish or pinkish grey.

**Size:** Medium to large, up to 35 x 25 mm, mostly about 30 x 20 mm. Number of heads up to 5, mostly 1-2.

**FLOWERS** white, medium to large, up to 45 mm  $\varnothing$ , mostly 25-35 mm  $\varnothing$ . **Seed capsules** usually 5-merous

(96%), otherwise (4%) mostly 6-merous. Profile boat-shaped, top  $\pm$  flat; face elliptic, up to 9,0 x 6,5 mm, mostly about 8,0 x 6,0 mm.

**14 *Lithops optica* (Marl.) N.E. Br. (1910) (W). Plate 11/5, 12/1-2.**

**COLLECTED** by Dr H.W. Rudolf Marloth in April 1909. Latin *optica* "eye-like".

**DISTRIBUTION:** SWA/Namibia, in a narrow strip some 200 km long but only about 25 km wide, extending southwards along the coast from a point about 20 km north of Lüderitz. All of this is in the Diamond Area. Type locality near Prince of Wales Bay (Prinzenbucht), at an altitude of 50 m and "growing in sand-covered fissures of gneiss-rocks."

**DESCRIPTION:** Rather variable. Plants occurring some distance inland from the coast and above the 150 m contour line tend to be somewhat larger than the coastal form and are very often quite strongly maculate. **Profile** truncate to cordate, usually somewhat convex, often strongly convex and keeled; fissure 6-13 mm deep, lobes conjunct to divergent. **Face** slightly elevated; reniform; lobes unequal; translucent + opaque; smooth. **Margins** distinct, regular to slightly irregular, with small indentations, but in the maculate form often very irregular with peninsular projections into the window area; inner margins are usually very even. **Windows** usually open but sometimes with a few small islands; in the maculate form often reduced to small irregular channels, the face then largely opaque; especially in strongly convex and keeled plants, the windows are often extended sharply down to long fine points at each end of the inner margins. **Channels** mainly in the maculate form, usually broad but irregular, sometimes narrow and very irregular and ragged. **Islands** often absent; when present, usually superficial, small and sparse, sometimes rather obscure; in the maculate form, often larger, more numerous and irregular in shape. **Markings** absent.

**Colours:** Margins, islands, peninsulas, opaque whitish grey, sometimes tinged with green, pink, blue or yellow; margins occasionally have a slightly deeper tinge at the edges of the windows. Windows or channels, various shades of translucent greenish grey, grey or bluish grey. Shoulders as for margins, or slightly duller.

**Size:** Small to medium, up to 30 x 20 mm, mostly about 20 x 15 mm. Number of heads up to 20 or more, mostly 2-5.

**FLOWERS** white, often with pink tips; very small to small, up to 20 mm  $\varnothing$ , mostly 12-15 mm  $\varnothing$ . **Seed capsules** usually 5-merous (96%), otherwise (4%) 4- or 6-merous. Profile boat-shaped, top  $\pm$  flat, sometimes slightly convex or concave, usually with a dark line, about 1,0 mm wide, just below the edge; face broadly elliptic, up to 10,0 x 7,0 mm, mostly about 7,0 x 6,0 mm.