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Das Pflanzenreich

Regni vegetabilis conspectus

Im Auftrage der Königl. preuss. Akademie der Wissenschaften

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Heft 36.

Reihe Sarraceniales

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Fam. 110. Sarraceniaceae

von

J. M. Macfarlane

(Heft 34; ausgegeben am 8. Mai 1908)

Fam. 111. Nepenthaceae

von

J. M. Macfarlane

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IV. 111

Nepenthaceae

mit 95 Einzelbildern in 19 Figuren

von

J. M. Macfarlane

Ausgegeben am 20. Oktober 1908

Leipzig
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1908

Nepenthaceae

von

J. M. Macfarlane.

(Gedruckt im März bis Juli 1908.)

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Character. Flores dioeci, apetali, inconspicui, virides aut purpurei, entomophili, saepe odore foetido. Sepala 4, rarius 3, distincta v. rarissime basi connata, hypogyna, imbricata, sed in paria duo aequalia v. rarissime inaequalia disposita, extus ± pubescentia, intus glandulosa et nectarifera. Stamina 24—4, filamenta in columnam connata, antherae in capitulum congestae, uniseriatae v. subbiseriatae v. biseriatae, parallelae v. ± convolutae, biloculares, extrorsae, longitudinaliter dehiscentes; pollen trilobatum. Carpella 4, rarissime 3, sepalis opposita; ovarium sessile v. breviter stipitatum, ovatum v. oblongum, cylindricum v. tetragonum, ± pilosum, intus 4—3-loculare; stylus 0 v. rarius brevis, crassus, stigma discoideum planum v. medio depressum, 4- rarissime 3-lobatum, lobis solidis v. ± lobatis; ovula ∞ anatropa, angusta et elongata, multiseriata, ascendentia, placentis centralibus affixa. Fructus capsularis, sessilis v. breviter stipitatus, fusiformis usque ovatus, coriaceus, 4- rarius 3-gonus, fusco-nitidus, loculicide dehiscens; valvae lanceolatae v. ovatae medio septiferae, apice lobis stigmaticis planis v. depressis, simplicibus v. bilobatis coronatae. Semina ∞ imbricata ascendentia filiformia, funiculo tenui placentis affixa; testa membranacea bicaudata breviter v. longe elongata, circum embryonem ± relaxata et sinuosa, raphe filiformi ascendentia; albumen carnosum, embryo cylindraceus rectus in axi albuminis; cotyledones lineares in germinatione demum virides et epigaeae, radicula brevis infera.

Suffrutices fruticesve, prostrati erecti v. scandentes, ad 0,5—15 m alti. Caulis cylindricus usque trigonus, nudus vel prolongationibus ab basibus foliorum decurrentibus alatus, glaber v. ± hirsutus, simplex v. ramosus. Folia alternantia, rarissime ad $^1/_2$ plerumque ad $^2/_5$ spiraliter disposita, integra, exstipulata, sessilia v. petiolata, membranacea, herbacea v. saepe coriacea; folia adulta in petiolum, laminam, cirrhum, ascidium et operculum divisa; petiolus ubi formatus ± elongatus alatus, basi saepe amplexicaulis; lamina alabastro involuta pubescens rarius glabra, demum lanceolata ovalis v. obovata, nervis longitudinalibus 2—15 parallelis, e costa v. e basi folii egredientibus, nervis transversis parallelis v. irregulariter areolatis, versus costam transversis v. oblique ascendentibus; cirrhus ab costa valida laminae prolongatus, tenax, saepissime convolutus et scandens, apice in basim ascidii ampliatus; ascidia monomorphia dimorphia v. trimorphia, inferiora saepe ampullacea usque ventricosa alis ventralibus ± expansis et ciliatis, ascidia superiora vel solum evoluta cylindracea alis reductis, summa infundibuliformia alis saepe ad nervos prominentes reductis, os transversum v. obliquum, saepe in collum postice productum, margine ± transverse expansa, coriacea, nitida striata et in peristomium formata, ascidium intus per totum nitidum glandulosum et »detinens« (p. 20) v. parte superiore eglandulosum glaucum opacum et »deducens« (p. 20); operculum ovatum ellipticum v. orbiculare, primum os claudens demum expansum et inclinatum erectum v. reflexum, postice versus os ascidii articulatum, intus

sparse v. copiose glandulosum et nectariferum; costa folii parte posteriore oris ascidii et insertione operculi in calcar simplex, v. rarius 3—5-fidum, producta. Inflorescentia terminalis et folio opposita, cymosa, paniculata, cymis densis composita vel ad racemum simplicem reducta, pedicelli tenues, bracteolati vel ebracteolati.

Vegetative Organs (Vegetationsorgane). Germination of the seeds of *Nepenthes* takes place readily and abundantly within 5 to 6 weeks after they are ripe, if kept in moist surroundings such as the surface of *Sphagnum* or amid loose humus. They also require a temperature of 25° to 30° C. The seed-coat ruptures along one side from elongation of radicle and hypocotyl, and from curvature of the latter and of the cotyledons into a saddle that gradually straightens till the linear green cotyledons are set free from the seed cavity. The radicle of the seedling steadily lengthens during the first year till it may be 10—15 cm long. Lateral rootlets are formed acropetally on it, and in considerable number. These incline to grow obliquely downward or even horizontally, since thorough aeration is essential to their welfare. The entire root system of the plant is therefore formed near the surface of the soil, and is most perfectly developed when amid loose decomposing vegetable humus, decaying fibrous roots of other plants or open gravelly soil that is permeated by decaying vegetable material, as indicated by Korthals, Burbidge and Scott-Elliot, and as praetised in successful greenhouse cultivation.

The annual growths of fine fibrous roots, in about 15 species studied, are greenish-yellow round the growing apex, but soon they assume a black-brown color. They are closely beset with brown absorptive root hairs, all of which remain functional throughout the season. Subsequent annual development results in the production of a copiously branched root system. Some authors have stated that average root-development in *Nepenthes* is comparatively poor and feeble. In healthy well grown plants this is not so. The active absorptive root-hair system is also exceptionally rich and abundant. By subsequent formation of a root cambium and associated tissue, the brown epidermal layer and subjacent cortex become split and ultimately shed in older roots. These then assume a yellow or flesh color that may be retained for years, but finally they become yellow-brown.

The young stem is at first closely beset by leaves placed in rosette fashion (Fig. 1*C*), since its internodes are almost suppressed. With increasing age the internodes gradually lengthen in most species. But in *N. ventricosa*, *N. Northiana* and others the internodes remain short, and so the adult leaves are inserted in close proximity to each other. If *N. Smilesii* and *N. Alicae* are mature species — and all present evidence is in favor of this — their stem attains a length only of 20—30 cm and is upright. In *N. Veitchii*, from the seedling stage onward, the stem as originally described by Burbidge is prostrate, and creeps epiphytically along the branches of trees. It then forms its leaves in close succession and in two-ranked order, but it seldom attains a greater length than 1—1,5 m in the living part, while the posterior portion tends to die away. This habit is perfectly retained under cultivation, and when plants are grown in a soil of fibre and sphagnum roots may grow down from the crowded nodes. In *N. ampullaria*, *N. melamphora* etc., the main stem may elongate, and by aid of the leaf-tendrils may climb to a height of 2—6 m. But in these and other species if the main stem or lateral branches fail to reach a support, they may lie along the ground, root abundantly at the nodes, and there produce on short lateral branches dense clusters of leaves with reduced lamina but large and often richly colored pitchers (Fig. 13 p. 32). The largest and heaviest stems of the group are those of *N. Rafflesiana*, *N. Burbidgei*, *N. Boschiana* and *N. bicalcarata* which attain a height of 6—20 m, while the last may be 3 cm across. In color the stem and branches are green during the first few months of growth as a rule. In such species as *N. albo-marginata* and *N. anamensis* they may vary from green to dark claret. With age all become brown and somewhat brittle in consistence. They are usually

cylindrical, but may be sharply trigonous as in *N. tentaculata* and *N. Bongso*, or 3—4-gonous as in *N. gracilis*, where the wings from one leaf above may be prolonged downward along the angles of the axis for 5—8 cm to meet the next leaf below. The young stem and branches are often clothed with a dense pubescence of a ferruginous or more rarely of a pale hue. This usually is shed within a few weeks, though it may persist for a much longer period as in *N. hirsuta*. Many of the species develop alluring honey glands (p. 14) on the young annual shoots. These glands appear as small papillae in the centre of a circular or elliptic area, and may be of a crimson hue. They are never abundant, are usually scattered, but may be prominent in *N. bicalcarata* etc.

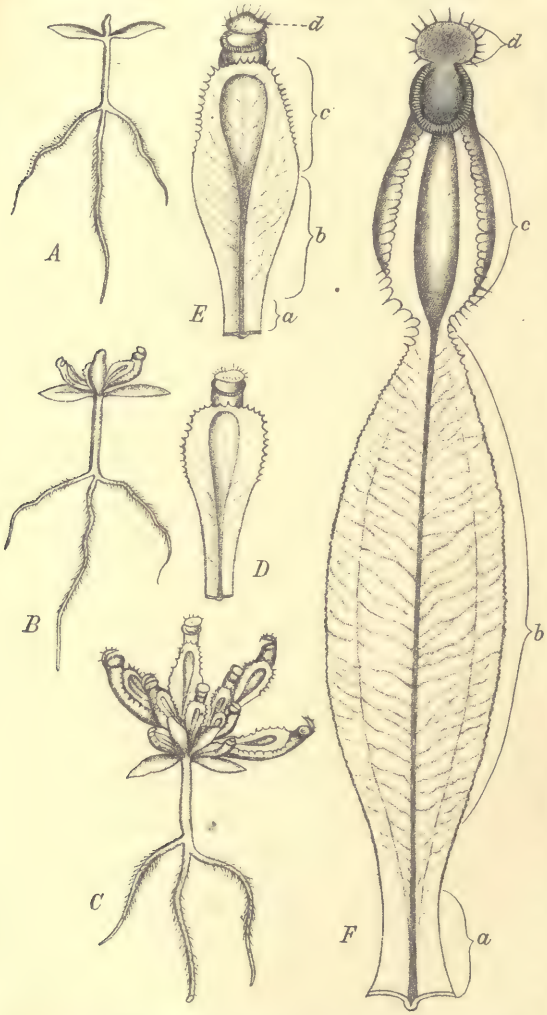

Fig. 1. Seedlings of *Nepenthes*. *A* Cotyledonary stage. *B* Seedling with first pitcher-leaves. *C* Later stage. *D* Early seedling leaf. *E* Tenth leaf from cotyledons. *F* Transition leaf between early seedling and adult leaf; *a* petiole, *b* lamina, *c* pitcher with wings, *d* lid or operculum. (Icon. orig.)

As in the *Sarraceniaceae*, so in the *Nepenthaceae*, the cotyledonary leaves are green, and are retained within the albumen of the seed till this is absorbed. The cotyledons in both families closely resemble each other, but those of the *Nepenthaceae* are typically elliptic (Fig. 1 *A*). As in the *Sarraceniaceae* they are succeeded by pitchered seedling leaves, of which 8—10 that resemble each other may be formed as a little rosette on the ground. Each becomes increasingly longer than its predecessor (Fig. 1 *B*, *C*) and, as emphasized by Hooker and Dickson, they suggest decided affinity with leaves of *Sarracenia*. They are still more nearly related to those of *Heliamphora*. Each of the 6 to 8 leaves first produced consists of a sheathing petiolar rib that is gradually prolonged upward into a broad laminar midrib whose upper extremity is hollowed out from above downward. The petiolar rib bears lateral wings that broaden out and are continued upward as laminar expansions of the midrib. The front or ventral part of the laminar midrib is somewhat flat and bears the laminar expansions on either side, so that the pitcher appears as a hollow appendage to the under surface (Fig. 1 *C*, *D*). As development proves, the pitcher is an inpouching from the upper surface of the leaf near its apex. But by transverse growth in front of and below the pitcher orifice the laminar expansions may form a peltate union, as described by Hooker and by Dickson, and as observed by the writer in three sets of hybrids. Goebel however failed to notice such a peltation in specimens studied by him.

The mouth of the seedling pitcher is bounded by a narrow corrugated rim, that is formed by outward and inward growth and reflection of the margin. The cellular and specially the vascular tissue of the pitcher is prolonged round and behind the mouth to end in a pointed process or spur on the dorsal side. This is the organic apex of the leaf. Between the apex and the orifice the lid grows out to overhang the latter. The margins of this lid like the margins of the lamina, are often glandular-ciliate. In the 8th to 10th seedling leaf the pitcher is hollowed out of the midrib of the distal laminar half only, and is being gradually constricted off round its base from the inferior or proximal laminar half (Fig. 1 *E—F*), which remains continuous with the winged petiole. The laminar wings of the distal pitchered portion thus become the ventral wings of the pitcher. These become wide and highly conspicuous objects in *N. ampullaria* (Fig. 13, p. 32), *N. Rafflesiana* (basal pitchers), *N. bicalcarata* and others. They are often richly provided with alluring glands. In succeeding leaves the distal or pitchered part becomes completely separated from the proximal part, that has usually been called the lamina or blade, through increasing elongation of the midrib between the two (Fig. 1 *E*) and conversion of it into a functional tendril. It will thus be seen that the fundamental morphological similarity of the *Nepenthes* and *Heliamphora* (q. v.) leaves is perfect, and that the rather puzzling adult leaf of *Nepenthes* is readily interpreted when its morphological evolution from the earliest seedling stage is traced.

The adult leaf in petiolate species like *N. phyllamphora*, *N. Rafflesiana* etc. consists of (*a*) a petiole that is usually winged. The wings may be horizontal, or directed obliquely or vertically upwards as in *N. rajah* and *N. maxima*. Frequently the expanded base of the petiole and of its wings enlarge into an amplexicaul attachment to the stem, while in such species as *N. gracilis* (Fig. 2) and *N. Burbidgei* the wings may be prolonged down the stem almost to the insertion of the next lower leaf. That portion which we will subsequently speak of as (*b*) the lamina or blade is clearly proved, by the above history of seedling leaves, as well as by leaf-embryology, to be but the basal part of the entire lamina. In view however of its relatively extensive green surface, we will for convenience speak of it as the lamina. The prolonged petiolar midrib that is continued upward as the laminar midrib may be strongly concave on its upper and still more strongly convex on its under surface. The lamina varies from semimembranous to succulent-leathery or leathery in consistence, from linear-lanceolate to oval or elliptic in outline, and from bright green to dark green or reddish green in color. Rarely as in *N. madagascariensis* the lower surface may be greenish-crimson to crimson. In most species the laminar halves end abruptly or by tapered extremities in the prolonged midrib or tendril. But in such as *N. rajah*, *N. Northiana* and at times *N. maxima* the halves of the lamina become peltately fused above the excurrent tendril. The margin of the lamina is usually entire, but in the group of related species that includes *N. phyllamphora* and *N. Bernaysii* the margin is ciliate-toothed.

Valuable characters for distinguishing the species are furnished by the venation. In all of the species two or more veins run parallel to and on either side of the midrib, but at varying distances from it and from each other. These usually start from the midrib, near its junction with the petiole, but sometimes they pass directly from the base of the petiole upward along its wings, and then spread into the lamina. In a few species such as *N. alata*, *N. madagascariensis* and *N. Reinwardtiana* each leaf has several pairs of veins, but the innermost two to four pairs spring at different levels from the rib, the innermost pair starting at or above the middle of the leaf, while those further out start from the midrib at varying levels below. In striking contrast to the foliage leaves are the bracts, which are typically sessile, and whose venation nearly always differs fundamentally from that of the foliage leaves, even on the same plant (Fig. 15). In these the longitudinal veins are undeveloped or appear only as one or two faint marginal lines, while the substance of the bract is traversed by an abundant reticulation of oblique or nearly transverse veins. The greatest

development of longitudinal veins occurs in *N. bicalcarata*, where 12 to 15 may run on either side of the midrib. The parallel veins are united by numerous transverse ones, that may radiate out at right angles to the rib, or may run more or less obliquely upwards. All of these may be of equal strength and continuity, but more frequently each alternate vein is finer and shorter than that above or below. The branching and reunion of the veins are copious and intimate, so that the leaves are extremely resistant to strains. The vernation of the leaves is involute.

The next leaf portion, the (*c*) tendril or cirrhus is, as already described entirely absent from the earliest or seedling leaves, and only begins to form as the pitchered part of the lamina grows asunder from the basal part. In adult leaves it is nearly

Fig. 2. *Nepenthes gracilis* Korth.

always well developed and of great tensile strength. Thus the tendril of *N. Rafflesiana* may be loaded with a weight of six kilos without rupture. Like other tendrils they are sensitive to contact stimulus when young, and may then coil round supports by two or three spirals, after which it is difficult to displace them. Only in short upright or in creeping species such as *N. rajah* and *N. Veitchii* do the tendrils remain straight and uncoiled. They are rarely uniform in thickness, usually they enlarge suddenly or gradually as they near the pitcher base. An interesting biological condition of the tendril is seen in *N. bicalcarata*, the structural relation of which was first explained by Beccari and Burbidge. Like the tendrils of most *Nepenthes* this has alluring honey glands, but here they are exceptionally large and numerous, appearing as evident papillae over the surface. Opposite the middle or lower half of the pitcher, where these glands are most numerous, a swelling that is about twice the thickness of the tendril above or below, is seen in wild specimens, and a similar though more reduced swelling is seen in cultivated specimens (Fig. 14). The swollen area is hollowed out and occupied as a formicary by ants. About the middle of the area is a circular hole, the entrance of the formicary (Fig. 14). The hole seems, at least in some cases, to have been the duct of a honey gland that the ants have gnawed into and enlarged while sipping its nectar. The liquid contents of the pitcher cavity, filtering upward through the cells of the tendril, can be sipped by the insects in safety. This constant liquid supply has caused enlargment and watery hypertrophy of the area. Its central cells break down or are destroyed by the ants, and the cavity thus formed becomes a formicary. As Beccari has shown it may vary in size from 2—6 cm × 1 cm. From the standpoint of plant heredity it is significant to note that the swelling always persists in cultivated plants, though these are not frequented by, nor perforated by, appropriate ants.

The next area of leaf specialization is (*d*) the pitcher or ascidium. The constituent parts of this have been very variously interpreted by different botanists. Their views are in part set forth by Bower and the writer [Ann. of Bot. III. (1839) 239, 254; IV. (1890) 165; VII. (1893) 450]. The adult pitchers in some species are all uniform or monomorphic, in other species dimorphic types of pitcher are produced, while several are trimorphic in that three distinct forms of pitcher develop at different heights on the plant. Alike from evolutionary, embryological and morphological evidence, the primitive type seems to be the tubular pitcher, that approximates in shape to pitchers of some species of *Sarraceniaceae*. This shape is retained in most of the monomorphic species such as *N. gracilis* (Fig. 2), *N. khasiana*, and *N. phyllamphora*. But possibly through weight of the liquid contents of the lower or terrestrial pitchers while these rested on the ground, some species bear ampulliform or goblet-shaped pitchers below, while the upper suspended or cauline ones are tubular or tubular ventricose (Fig. 15). *N. alata*, *N. ampullaria*, *N. anamensis*, *N. melamphora* and others show such dimorphic conditions. But in *N. Boschiana*, *N. maxima*, *N. Vieillardii* and less strikingly in a few other species, the lowest pitchers are ampulliform, those above are tubular, while toward the upper part infundibuliform or cornucopioid pitchers are alone produced. Gradation types between all of these are usually noted.

As study of the seedling pitcher in relation to the adult pitcher shows (Fig. 3*A*—*D*), the often wide and almost flat area that intervenes between the wings of the pitcher on the ventral surface, is the expanded upper or ventral side of the midrib. The remainder of the pitcher wall is the inflated lower or dorsal side of the midrib. As is proved by successive stages in the evolution of seedling leaves, the pitcher wings represent the upper lobes of the originally continuous lamina, that become completely separated from the inferior or basal halves, by intercalary growth of the midrib region that becomes the tendril. These wings are usually well developed as lateral often ciliated expansions that traverse the length of the pitcher in the terrestrial type of the dimorphic species cited above. Their often richly ciliated margins are in striking contrast

to the straight margins of the narrow or ridge-like wings seen usually in the tubular or funnel-shaped upper pitchers.

The color of the pitcher surface, including the wings, varies greatly in different species, and may even vary much in different pitchers of the same individual, according to age, exposure to light, and soil conditions. In *N. ampullaria*, *N. Veitchii*, *N. distillatoria* the pitcher is often uniformly green; in *N. gracilis*, *N. khasiana* and *N. hirsuta* it is green and finely spotted or even suffused with red or crimson; in *N. maxima*, *N. Northiana* and *N. Rafflesiana* it is light green with sharply defined and often extensive spots or blotches of a deep crimson hue; while in *N. sanguinea*, *N. Edwardsiana* and *N. villosa* it is largely or wholly of a rich scarlet or crimson color. *N. Rafflesiana* var. *nivea* and *N. Burbidgei* bear pitchers that are typically of a porcellanous white color with deep crimson blotches. Some species may be dimorphic in color as well as shape. Thus the relatively large lower or soil pitchers of *N. ampullaria* are often in the wild state richly blotched with crimson, while the aerial and smaller pitchers may be almost or wholly green. Similar variation is seen in *N. alata*, *N. Macfarlanei*, *N. rajah*. Green and red varieties of the same species are not unfrequent, as in *N. bicalcarata*, *N. distillatoria*, and to a certain degree *N. Rafflesiana*. Several travellers have commented on the fact that the basal, more shaded and even moss-covered pitchers of such species as *N. rajah* and *N. Edwardsiana* are much more highly colored than are the sun-exposed cauline pitchers, though the exact explanation of this does not yet seem to have been given.

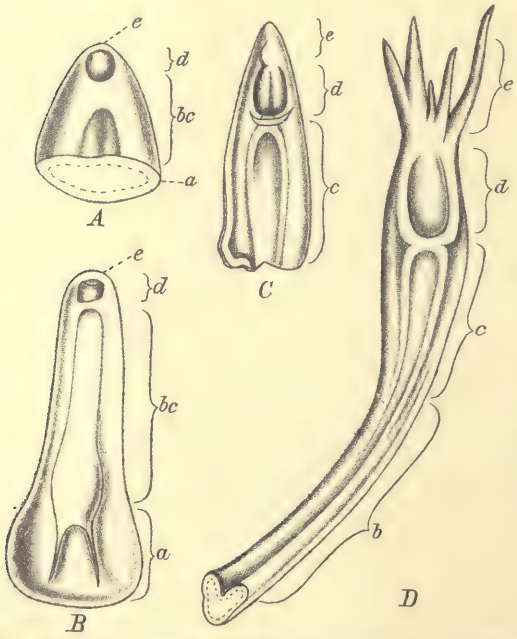

Fig. 3. Development of *Nepenthes* leaf. *A* Foliar rudiment showing commencing depression for pitcher cavity. *B* More advanced stage. *C* Terminal part of leaf. *D* Leaf cut above petiole; *a* petiolar base, *bc* laminar rudiment continuous with pitcher wings, *d* pitcher depression and lid, *e* leaf apex, with lateral lobes in 4. (After Hooker f.)

The fundamental color of the pitcher may be somewhat modified in appearance by local or general hair coverings. Thus the green pitchers of *N. ampullaria* and *N. hirsuta*, also the crimson-green pitchers of *N. villosa* may be brownish-green or brownish-crimson in the young state, owing to the abundance of long ferruginous hairs. In *N. albo-marginata* and to a less degree in its probable hybrid *N. cincta*, a white belt of long stellate hairs in the former, and of brownish-white hairs in the latter, surround the pitcher margin beneath the peristome.

The distribution of veins throughout the pitcher wall is in all cases copious. The circle of vascular bundles that enters the base of the pitcher from the tendril, spreads out into two systems. One of these, pursuing a ventral or upper course, consists of two main lateral veins that run upward along the edges of the widened-out ventral part of the pitcher. From these veins pass outward into the ventral laminar lobes or wings when such are well developed, and inward across the ventral area between the wings to unite with one or more median veins that run up the front of the pitcher. The second and more abundant system is composed of numerous veins that curve

outward and run upward along the lateral and dorsal sides of the pitcher, till they approach the pitcher orifice. The lateral veins, as well as the upper ends of the ventral ones then curve gracefully round toward the dorsal region, and in their course give off minor bundles that run up into the substance of the thick corrugated peristome. Here each bundle divides along the inner margin into still smaller bundles that surround the marginal glands of the rim. The recurved lateral and the dorsal veins converge and thin out toward the point of insertion of the lid, into which they give off two main veins. Their now attenuated extremities end in the dorsal spur, situated behind and near the point of insertion of the lid. This spur has therefore generally and rightly been regarded as the organic apex of the entire leaf system.

A noteworthy relation of the veins of the pitcher is that every gland, whether external or internal in position, has a bundle termination ending in or around it. This can be beautifully demonstrated to the naked eye, by macerating a pitcher in hot potash solution for 20—30 minutes, and then removing the outer and inner epidermis in water. The looser mesophyll tissue readily washes away, and the bundle twigs that supplied the glands appear as fine branch terminations of the vascular network of the pitcher.

The alluring glands of the leaf are readily visible to the naked eye, and are more or less developed from the base of the petiole to the peristome and the outer lid surface. Their microscopic structure is described later (p. 17). In such species as *N. ampullaria* and *N. Rafflesiana* they are scarce over the petiole and lamina, but a few may be observed along the sides of the lower midrib surface, as minute papillar swellings that exude a sweet juice in fresh leaves. They are somewhat more abundant over the pitcher wings, less so over the dorsal part of the pitcher. In *N. Veitchii*, *N. khasiana*, and *N. maxima* they are frequent over the petiole and lower laminar surface. In *N. Northiana* and *N. sanguinea* they are also found on the upper laminar surface, the tendril and the pitcher. But in *N. bicalcarata* they attain largest size and are quite abundant. Here they often form conspicuous warts along the sides of the petiole, the midrib and the tendril. These glands, in conjunction with the alluring glands of the stem, tempt insects upward by their secretion, to the pitcher mouth or to the lid. In hot dry weather the sweet secretion may even dry, so as to appear as a fine white vermiform thread attached to the orifice of the gland.

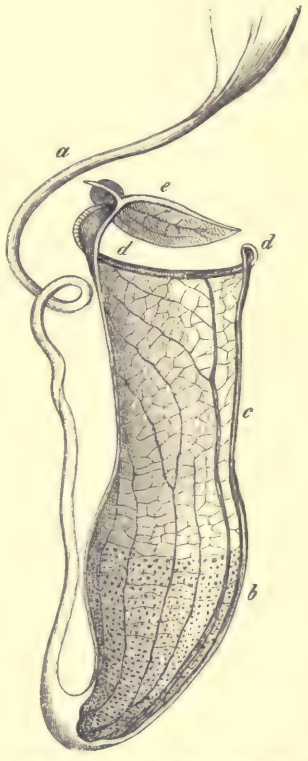

Fig. 4. *Nepenthes gracilis* Korth. Extremity of lamina with midrib prolonged into a tendril or cirrhus (*a*), that expands into a pitcher shown in section; *e* operculum in section, *d* corrugated peristome, *c* deep conducting surface, *b* detentive and digestive surface with digestive glands. (After Sachs.)

The peristome or corrugated rim of the pitcher (Fig. 4 *d*) is a conspicuous feature in nearly all species of the genus. *N. Lowii* (Fig. 19) is the only species in which it is undeveloped, the pitcher margin being straight and somewhat reflexed. Along its inner margin are fine parallel longitudinal ridges, that indicate vascular bundles traversing the internal tissue. Each ends below the edge in a deeply sunk marginal gland that opens by a small papillar pore. The pores collectively form a dotted line about 4—6 mm beneath the edge of the pitcher. The typical peristome is formed in part from incurving of the margin, which up to the period of opening of the young pitcher is a uniform rim that projects upward under the closely fitting lid. In part

also it results from growth and recurving of a circular area below the rim, that appears as a circular swelling below and outside of the lid in the young pitcher. The zone of tissue just beneath the recurved portion often develops a copious felt of hairs that attain their maximum in *N. albo-marginata*, the rim of which is subtended by a white tomentose band. The convex surface of the mature rim is firm and shining, owing to heavy cuticularization of its epidermal cells. It is traversed by fine or prominent parallel ridges that are above and in line with vascular bundles. Its surface affords a very insecure foot-hold for insects. The ridges are usually prolonged beyond the infolded margin as teeth of varying length. While the ridges and teeth are very feebly developed in *N. Reinwardtiana*, they become long evident processes in *N. melamphora*, *N. villosa* and *N. Edwardsiana*. But their most striking development is reached in *N. echinostoma*, where the entire rim has become split up into a double row of incurved teeth that project toward the pitcher mouth. Round the infolded margin of the peristome, or toward the tips of the teeth are pores that correspond to those already mentioned in *N. Lowii*. These open into longer or shorter canals, that are in line with, and act as ducts for, the deeply embedded marginal glands. From these glands a sweet juice is discharged that is greatly relished by insects. In relation to the size of the pitcher, the widest and most perfectly inclined peristome is that of *N. ampullaria* (Fig. 13). Those of *N. Northiana*, *N. rajah*, *N. sanguinea* and *N. Veitchii* form a wide conspicuous often richly colored "frill" round the mouth. But more commonly the peristome is a nearly uniform circular collar, as in *N. gracilis*, *N. khasiana* and *N. phyllamphora*. It attains huge proportions in *N. villosa* (Fig. 9) and *N. Edwardsiana* (Fig. 16, p. 53) where it is a broad cylinder elevated at rather distant intervals into plate-like ridges that are continuous with the long marginal teeth. In several species, notably *N. Hemsleyana* and *N. Rafflesiana* the peristome and pitcher wall are greatly elevated posteriorly into a high neck that bears the lid. The upper halves of the peristome, in the latter species, are widened out, while the ridges and teeth are decurved toward the pitcher orifice. This becomes more pronounced in *N. bicalcarata*, where the uppermost parts of the peristome are lengthened out, decurved, and tapered into two hard sharp pointed spurs or spines that overhang the pitcher orifice (Fig. 14). Burbidge's explanation of their significance seems good. He observed in North Borneo that the pitchers of many species are visited by the small rodent *Tarsius spectrum*. Perched on the pitcher margin, it bends in its head and neck, scoops out the caught insects and devours them. But if it attempts such action with *N. bicalcarata* the two sharp spines often transfix it by the nape of the neck, and tumble it into the pitcher, or frighten it from attempting such action on other pitchers of the species. Another suggested explanation of the spines has recently been made, by supposing that they exude honey drops by their tips from a few marginal glands that are so placed as to cause an insect that attempts to sip, to drop off into the pitcher cavity. Such may be a partial reason for their gradual evolutionary selection and development, but Burbidge's view seems more natural.

The lid or operculum (Fig. 4*e*) is always developed, but it varies from a small narrow elliptic process as in *N. ampullaria* (Fig. 13) to large cordate or reniform expansions as in *N. rajah* and *N. bicalcarata* (Fig. 14). Bower and the writer have both suggested, from embryological (Fig. 3*c*) and morphological evidence that the lid is to be viewed as two peltately fused laminar lobes or leaflets. Bower regards them as leaflets that are distinct in morphological value and continuity from the laminar lobes in front of the pitcher, and from the basal laminar halves. The writer views them as lobes of the primitively continuous lamina, that have early become rounded off and fused in peltate fashion in front of the spur to form the lid, while later and less perfect separation of the pitcher wings and the laminar lobes has occurred. Each lid shows, in most species, two strong and somewhat approximated veins running into it, and distributing minor median and lateral veins. Its apex is often emarginate or indented. Its external surface closely agrees with that of the outer pitcher wall, alike

in color, in hair-development, and in the presence of occasional glauring glands. Its internal surface may be entirely devoid of nectar glands as in the rudimentary lid of *N. ampullaria*, but in most species it is richly studded with glands whose sweet secretion is attractive to insects. In *N. alata*, *N. Boschiana*, *N. Burbidgei*, *N. Veitchii* and *N. maxima* Fig. 18 the inner base of the lid is expanded into a vertical crest that is copiously covered with glands, while in *N. maxima* an additional tongue-shaped or at times filiform outgrowth starts from near the lid apex. Two species only, *N. Lowii* Fig. 19 and *N. Macfarlanei* develop long attenuate hairs from the inner lid surface, that are scattered amongst the nectar glands. In *N. tentaculata* Fig. 15 a few similar hairs spring from the outer lid surface, often near the margin, but such are absent in the var. *imberbis*, while the hairs may be few on the inner lid surface of *N. Macfarlanei*. In developing pitchers that have almost attained their full size, the lid is applied very closely to a circular or oblique area, beneath the as yet uniform margin of the pitcher, and above a slightly bulged part of it. So tightly is the lid applied, and so closely do the hairs of the zone interweave, that the pitcher is thoroughly air-tight, and considerable pressure is needed to force open the lid, or to burst the pitcher. At such a stage in development, one can readily see by shaking the pitchers of most species, that a considerable quantity of liquid has already accumulated at the bottom of the pitcher-cavity. This has exuded from the inner pitcher wall, and is neutral in chemical reaction.

The calcar or spur is a short straight or more often curved process, that projects from the posterior apical part of the pitcher, behind the insertion of the lid. This has properly been regarded as the organic apex of the leaf, alike on embryological and morphological grounds. Thus in the embryo pitcher the spur is the terminal pointed apex, below and in front of which the future lid originates as a usually bilobed process, and the future pitcher cavity as a small depression Fig. 3 *B*, *C*. In the adult pitcher also the vascular system converges toward the spur and in part ends in it. It is usually a simple filiform attenuate process, but in several Australian species it is flattened from above downwards, while in *N. ampullaria* Fig. 13, *N. tentaculata* etc. it may bear several paired or unpaired lateral processes, that the writer views as greatly reduced leaflets.

Anatomy (Anatomische Verhältnisse). Root system. Transverse section of a young root extremity shows an epidermal layer with dark brown cell walls. The free face of each cell is considerably thicker than the lateral and inner faces. From this layer originate the abundant dark brown root hairs. The cortex consists of three rather irregular layers of rounded cells with brown slightly thickened walls. These contain many small single or aggregate or compound starch grains. The endodermis is a layer of nearly cubical cells containing small starch grains. The pericambium is a single layer of cells, and from it originate many lateral rootlets, but a considerable number fail to develop. The vascular bundle system is stated by Zacharias to be tetrarch in *N. Sedenii*, pentarch or hexarch in *N. pitcairniaefolia*. But in any one species the vascular system of the tip is tetrarch, but by splitting of one or more of xylem and phloem arms higher up, it usually becomes hexarch. The 4—6 protophloem patches consist of a small central patch of phloem cells, surrounded by sieve tubes. The protoxylem consists of a few spiral tracheae at the tips of the arms, that are succeeded centripetally by elements that become greatly lignified, and constitute a central tracheidal patch. By cambial formation between the protoxylem and protophloem, metaxylem and at first a limited amount of metaphloem are laid down, along with 4—6 uniseriate medullary rays. Simultaneously the pericambium reorganizes as a cork cambium, and begins to lay down cork. Succeeding death, and sloughing off, of the cortex and epidermis occur. The cork developed consists of several layers annually, each formed of shallow cells of reddish-yellow hue, that give the characteristic color to the older rootlets. From the second year onward decided additions are made to

the metaphloem, which becomes a cylindrical zone of considerable width. The metaxylem develops the same elements as are to be treated of under the stem.

Stem system. The anatomy of the stem was studied by Schultz and Korthals, but more recently in a thorough manner by Zacharias. The following account confirms, and only in some points extends his observations, specially as pertaining to other species than those studied by him. Transverse sections of the stem of *N. Hookeriana* through the first internode beneath the expanding leaf, show a shallow epidermal layer with cuticularized walls. From it arise many multicellular hairs. Beneath are 3—4 layers of chlorophylloid cells with clear walls, succeeded by 12—14 layers of fibrous cells. These contain a few chloroplasts, and their walls are strongly thickened at the angles. Isolated spiral cells traverse the fibrous tissue at irregular intervals. Beneath this is a zone of loose cortex tissue, composed of very unequal cells. Some of the smaller ones enclose small starch grains, some conglomerate crystals, a few contain chloroplasts, and some are spiral cells of rather large diameter. The endodermis (Fig. 5*f*) is a regular layer of cells with thin walls. The cells contain small starch grains. Internal to it are 2—3 angular small-celled layers, succeeded by a relatively broad zone of large spiral cells, that are linked together by small thin-walled ones. Though thus peculiarly modified, if we accept present histological classifications, this double zone must be regarded as a highly specialized pericambial layer. The remaining plerome tissue within the last, indicates commencing modification along various lines. A relatively large amount in the centre is converted into pith tissue. This differentiates in part into thin-walled cells, that later may become filled with starch grains, and into large spiral cells. All of this tissue, as it continues to mature, so strikingly resembles that of the cortex, as to suggest a common origin embryologically with it. But later methods of wall thickening develop in the pith that cause it to differ strikingly from the cortex, while the conglomerate crystal cells of the latter have no parallel in the pith cells. The marginal mass of tissue beneath the pericambium differentiates into a ring of cambioid tissue, in which arise the proto-rudiments of the bundles. These are widely apart from each other, though they are connected by a ring of flattened cambial cells. The number of bundle rudiments varies from 29 to 34, and each bundle consists at first of a few spiral tracheae and companion cells internally, with phloem cells and sieve tubes externally. But a noteworthy detail, not shown evidently in the material used by Zacharias, is the formation of a set of pith bundles (Fig. 5) out of strands of meristem cells. The tissue that originates these is either part of a wide cylinder, or of isolated strands embedded in the pith, and made up of small-celled elements, in the midst of which the bundles mature. Each of these pith bundles is wedge-shaped, collateral, and consists of the usual elements. Their number varies from 5 to 8, and while one or two may arise toward the middle of the stem, the majority are disposed near or against the protomeristem zone. Growth in the normal cambial ring gives rise to interfascicular tissue that fills up the areas between the bundles, and to numerous uniseriate medullary rays, that run out between the vascular masses formed. The vascular tissue consists of narrow elongated tracheids with pitted lateral walls, of broad quadrangular indurated cells, and of pitted or porous vessels of varying diameter. One to six rows of this tissue may intervene between each pair of medullary rays. Division into annual rings of growth, is as a rule impossible, since tissue is laid down with perfect and more or less continuous uniformity. But the total number of elements in depth, even in a three-year-old stem, is not great. During the second year however, an interesting change takes place in the region of the pericambium. The outer cells begin to divide, and cut off a typical cork tissue (Fig. 5*Bg'*) composed of shallow pale-yellow cells, much resembling those of the root. This cork-formation causes gradual shrivelling, browning and decay of all the tissue outside. By the fourth or fifth year therefore, in such species as *N. ampullaria*, *N. gracilis* etc. this decaying tissue composed of epidermis, fibrous and cellular cortex, and endodermis, bursts lengthwise, then transversely and finally scales off. In such species as

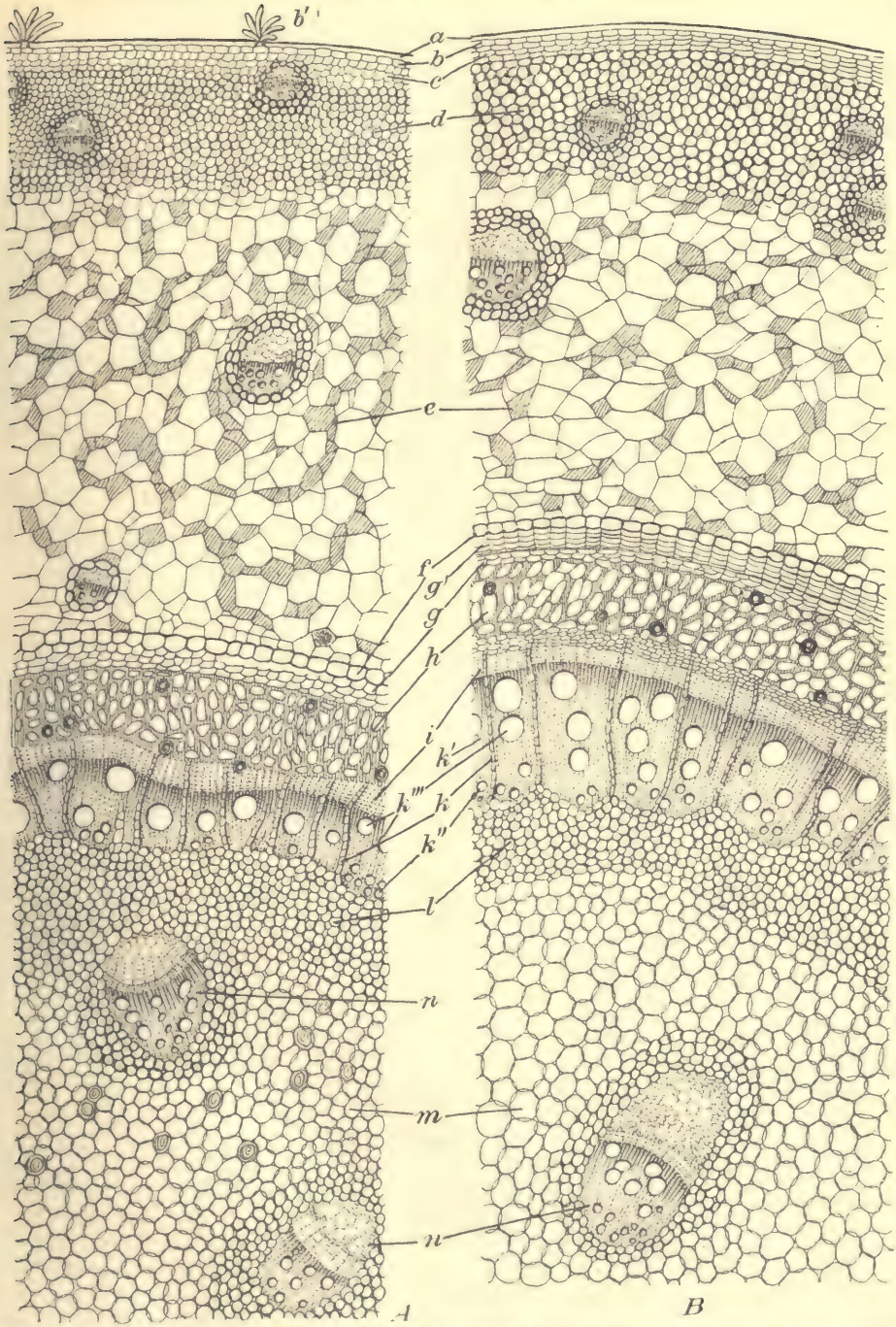

Fig. 5. Transverse Sections of Stem of *N. Hookeriana* Lindl. *A* Section of stem eleven months old. *B* do. do. three years old. *a* cuticle; *b* epidermis, *b'* epid. hairs, *c* chlorophylloid cortex, *d* fibrous cortex with embedded leaf-traces, *e* loose inner cortex, *f* endodermis, *g* outer pericambial zone, *g'* (in *B*) cork and cork-cambium, *h* inner pericambial zone with abundant spiral cells, *i* phloem, *k* xylem, *k'* xylem tracheids, *k''* spiral tracheae, *k'''* pitted vessels, *l* outer or fibrous pith zone, *m* inner pith zone, *n* pith bundles. (Icon. orig. × 75°.)

N. bicalcarata this tissue only begins to separate by the 10th—12th year. Finally as the stem matures, rounded elements in the cylinder of spiral cells of the pericambium become increasingly thickened, till the lumen of each element is greatly reduced or almost obliterated (Fig. 5 *Bh*). These elements are most abundant next the outer phloem, but are also scattered throughout the entire zone in some species. In *N. ampullaria* they form a discontinuous mass of greatly thickened scleroid elements around the phloem.

The stem and branches of many species may be abundantly covered with hairs of diversified structure, but as these resemble leaf hairs, they will be treated of under that heading. The nectar-glands of the axial parts however deserve special mention, not least from their striking resemblance to simple animal glands. Fig. 7 *A*, is a section of a gland from the stem of *N. phyllamphora*. The epidermis has become deeply and sharply involuted. It has divided into three layers of gland tissue, of which the surface layer is deeply columnar. This lines a lumen that is lenticular below, constricted above, and that again widening, opens by a small circular orifice that discharges the sweet secretion. The three glandular layers of cells contain rich finely-granular protoplasm. Beneath these are two layers of bead-shaped cells, which in position and relation suggest resemblance to the membrana propria of animal glands. A vascular bundle given off from one of the accessory stem bundles ends in the base of the gland. A similar vascular supply exists for all the glands of *Nepenthes*. The axial glands attain their largest size in *N. bicalcarata*, where the glandular tissue may even undergo branching as seen in glands on the flower stalk.

The Leaf. The vascular connection and the course of the bundles in the stem and leaf, have been fully elucidated by Zacharias. The bundles that have bent out from the main cylinder as leaf-trace bundles, run into the cortex, and after branching and proceeding for a distance through it, they bend into the leaf-cushion as a double set of bundles, an inner and an outer. The inner ones are few in number, are of large size, and lie in part against, in part outside of the fibrous cortex ring. The outer are small, numerous, more or less alternate with the inner, and run between the inner bundles and the chlorophylloid cortex. Crossing and fusion occur between them, but higher up where the leaf cushion is prolonged into the petiole, the large inner bundles become mainly the strong upper or ventral bundles of the petiole, while the smaller ones in part become the arched set of bundles of the dorsal surface. Section of the middle or lower part of a petiole of *N. phyllamphora*, *N. bicalcarata* or others, shows within the epidermis and chlorophylloid cortex, a ventral plate of cortex sclerenchyma, that may or may not be continued round the petiole as a ring. Embedded on the inner side of it are the vascular bundles, either isolated or grouped into patches of 2—4, two such groups usually occurring along the ventral angles of the petiole. In *N. Veitchii* and others the cortex sclerenchyma is not continuous, but sclerenchyma rings exist round the individual bundles. All of the bundles that make up the plano-convex ring are oriented so that their xylem is toward the upper or ventral, the phloem toward the lower or dorsal side. The cellular tissue enclosed within the ring has one median dorsal (*N. phyllamphora*, *N. bicalcarata*) or several ventral vascular bundles (*N. Veitchii*) embedded in it. Its cells also may or may not contain conglomerate crystals.

The histology of the leaf will be treated of under the following sections, (*a*) epidermis, (*b*) epidermal hairs, (*c*) stomata, (*d*) epidermal glands, (*e*) mesophyll tissue, (*f*) vascular bundle tissue. The relation of these in the petiole and the basal lamina, in the tendril and in the parts of the pitcher will now be traced.

(*a*) The epidermis of the petiole and lamina, in the entire group, consists of a shallow layer of small cells, protected by a thin delicate cuticle. The cells of the upper epidermis of the lamina are typically polygonal and straight-walled, those of the lower epidermis are more or less sinuous in outline. In *N. Rafflesiana* var. *nivea* the upper and lower epidermal cells are alike sinuous, and in size as well as shape

resemble each other. The striking modification undergone by the epidermal cells of the corrugated pitcher rim is described below.

(*b*) The epidermal hairs vary greatly in structure and aspect. Such species as *N. bicalcarata*, *N. Northiana* and *N. ventricosa* may be almost devoid of them, other species have a greater or less abundance of one or two varieties, while some may bear from three to five. The most widely distributed, and apparently the most important physiologically, are the brown peltate hairs (Fig. 6). These may be slightly raised above, or on a level with, or somewhat sunk below the level of the epidermis, and they persist even in species that are destitute of other hair covering, as in *N. ventricosa*. They often become prominent as small brown spots in herbarium specimens. Each hair springs from a sharply depressed part of the epidermis, and consists of a stalk-cell of brown color that bears a rosette of 4, 8 or even 16 cells according to the species studied. These rosette cells are level with the epidermis in most species,

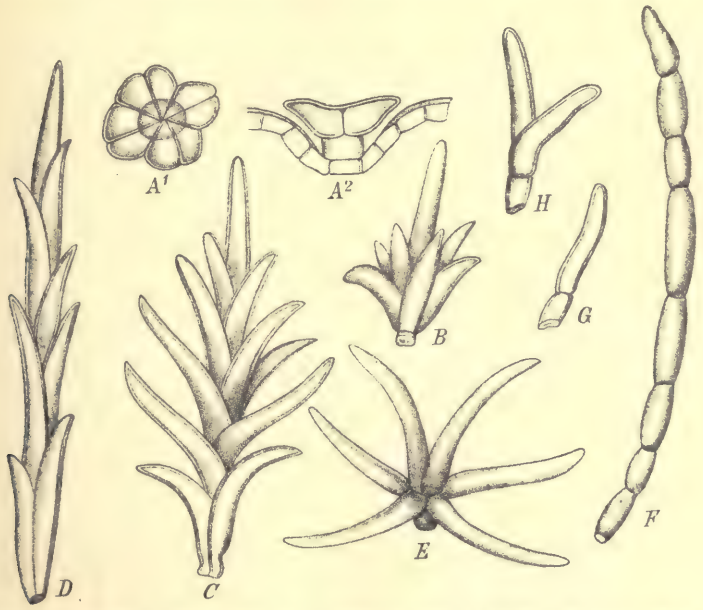

Fig. 6. Epidermal hairs of *Nepenthes*. *A*1 Surface view, *A*2 side view of brown peltate hair. *B* Brown rosette hair. *C* Brown branched hair. *D* Elongated brown hair. — *E* Clear thin-walled stellate hair of *N. Veitchii* Hook. f. — *F* Hair of *N. Burkei* Masters. — *G*, *H* Hairs of *N. madagascariensis* Poiret. (Icon. orig.)

they may be equally abundant on both surfaces, or more abundant on the lower than on the upper epidermis. From experimental evidence the writer considers that they act as moisture absorbents, and so resemble the somewhat similar hairs of *Tillandsia* and other Bromeliads. The soft young epidermal tissues of some species are covered with protruding hairs, that are partially or wholly shed as the lamina matures, but in other species the hairs persist. In the former case circular epidermal cells, often with thickened brown walls, represent the region from which the hairs have dropped. Rarely the hairs are simple and unicellular, usually they are multicellular. In *N. madagascariensis*, *N. Burkei* and *N. ventricosa* short thick-walled hairs of 2—4 cells are frequent (Fig. 6 *G*) but interspersed with these are longer filiform hairs of 6—8 cells, that are either cylindrical or branched. In *N. albo-marginata* three types are distinguishable, stellate hairs each made up of four long radiating thin-walled cells. These are very abundant over some parts of the pitcher, and in a dense felted form make

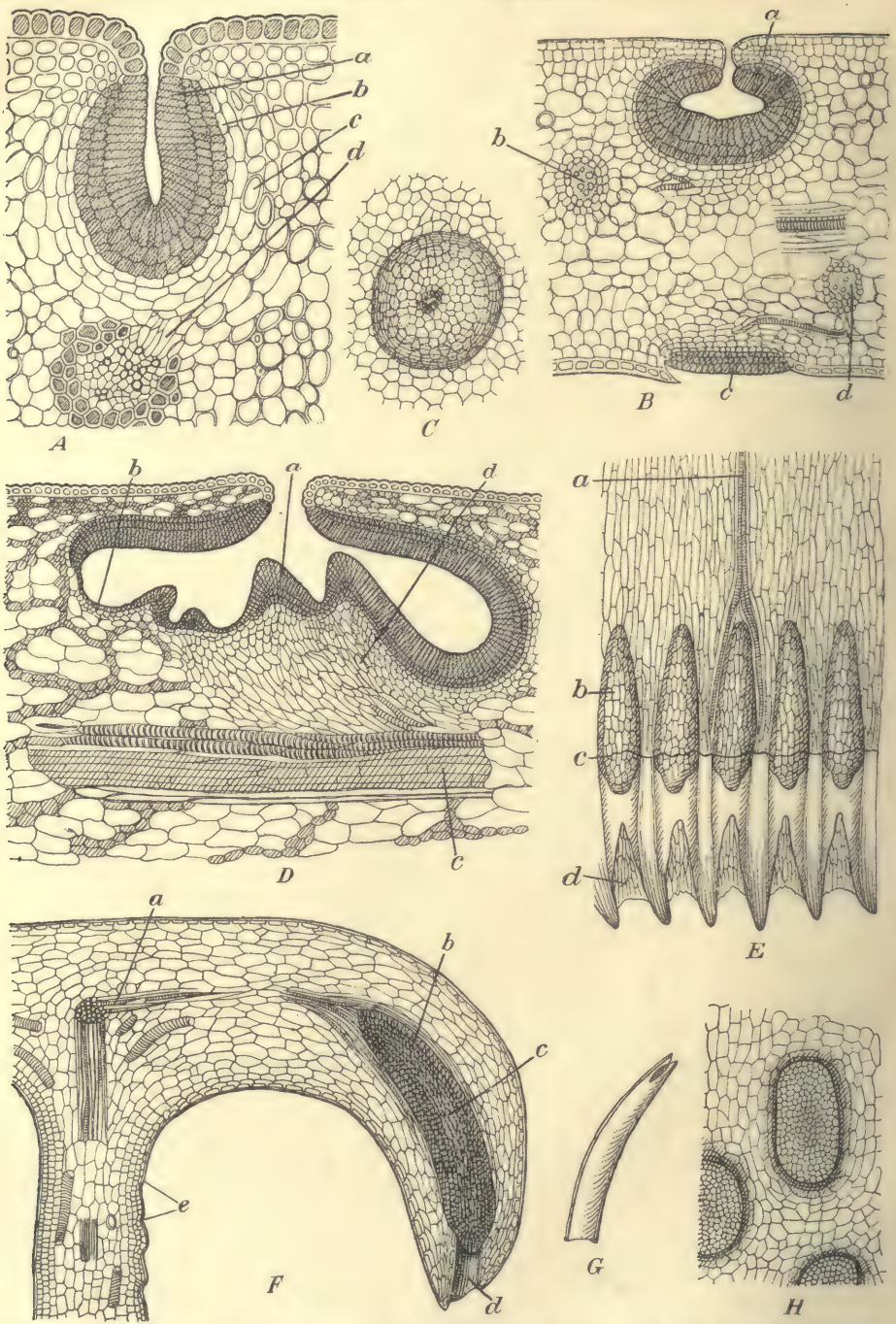

Fig. 7. Glandular Structure of *Nepenthes*. *A* T. S. alluring stem gland of *N. phyllamphora* Willd., *a* columnar glandular layer, *b* limiting layer, *c* spiral cell, *d* vascular bundle connection. *B* L. S. pitcher wall of *N. khasiana* Hook. f. *a* alluring gland, *b* its bundle, *c* digestive gland, *d* its bundle. *C* Attractive gland of *N. Pervillei* Blume. *D* Attractive lid gland of *N. Lowii* Hook. f., *a* columnar layer, *b* limiting layer, *c* vascular bundle giving off a branch (*d*) to gland. *E* Surface view of dissected-out peristome of *N. Hookeriana* Lindl., *a* vascular bundle, *b* gland, *c* line of tissue separation, *d* marginal orifice. *F* L. S. inner peristome margin of *N. khasiana* Hook. f., *c* central gland tissue, *e* digestive glands; other references as in *E*. *G* Peristome tooth of *N. echinostoma* Hook. f. with marginal gland. *H* Honey gland from sepal of *N. bicalcarata* Hook. f., that exactly resembles lid glands of many species.

up the white collar below the peristome that is characteristic of the species. The same form of hair is developed in *N. phyllamphora* and related types. A second in *N. albo-marginata* is the short thick-walled hair that bears one to three basal radiating cells from whose united centre springs a long strong 2—3-celled shaft, while a third is the greatly elongated multicellular hair that is most abundant along the midrib. Each consists of 5—8 narrow thick-walled cells, the upper parts of which grow out as lateral branch processes. This is the type that is specially abundant over the lamina and outer pitcher surface of *N. villosa*, and which gives it specific designation. In *N. Veitchii* five types of hair occur. In addition to sessile peltate hairs there are a few thin-walled stellate hairs made up of 5—7 — usually 6 — long clear radiate cells. Many short brown hairs, composed of a strong dagger-shaped central cell surrounded by 6—8 radiate basal cells (Fig. 6 *B*) give a fine brown pubescence to the leaves. Less abundant are strong dark-brown greatly branched hairs that give a slightly hirsute character to the lamina, and particularly to the midrib region of it. The fifth type is that which gives the hirsute aspect to the unfolding, and even to the mature lamina. It corresponds closely in histology to the long hair of *N. villosa* already described. In studying the specific value of related species, and the probable parentage of doubtful hybrids, the writer has found these hairs to be of extreme value, and they will doubtless be regarded with increased interest in the future. Functionally the elongated felted hairs evidently act as a protective covering to the young shoots and leaves against over-rapid heat radiation and evaporation. But in the mature state of such species as *N. albo-marginata*, *N. Veitchii* and *N. villosa* they possibly may act as felted moisture holders for the general epidermal surface.

The stomata (*c*) of the lamina are wholly restricted to the lower epidermis, but are there very abundant. Their surface cell-area may amount to from $^1/_3$ to $^1/_4$ that of the epidermal surface. Each stoma is almost or quite circular in outline, and the guard cells are well filled with chloroplasts.

The epidermal glands (*d*) of the petiole and lamina vary in number and distribution in the different species. Each gland appears to the naked eye as a little greenish-yellow papilla, with minute central orifice. Microscopically it differs from the stem gland already described, in being flattened out in its glandular tissue (Fig. 7 *Ba*). The glands increase in number as a rule from stem and petiole up to the laminar end and the tendril. Only a few species such as *N. bicalcarata*, *N. Northiana* and *N. sanguinea* possess them on the upper surface, though 20—50 may be at times counted on the two last. Their number, as compared with that over the outer pitcher surface, may be indicated by the following statistics. In *N. ampullaria* three leaves showed 35, 50, 41 over the lower laminar surface, and 5, 7, 10 over the outer pitcher surface. In *N. Veitchii* 70, 64, 81 were noted over the former, 115, 83, and 121 over the latter. In *N. khasiana* one leaf showed 61 over the former and 260 over the latter. As a rule the larger, more specialised, and more richly colored species, have a greater number than the smaller less striking forms. That these alluring nectar glands should wholly or mainly be confined to the lower laminar surface is appropriate and explicable on principles of natural selection, when one remembers that insects in the tropics usually run along that area, and so shelter themselves from the observation of enemies.

The mesophyll tissue (*e*) may be divided into three zones, the aqueous, the palisade and the spongy layers. The first consists of 1—3 strata of clear round — or rarely (*N. bicalcarata*) transversely elongated — cells, placed beneath the upper epidermis. In *N. Veitchii* this zone is about one-fourth the thickness of the entire lamina, in *N. Northiana* about one-sixth, in *N. bicalcarata* it is one-eighth. The cell walls show minute pore areas, and a few of the cells may contain crystals. The palisade parenchyma consists of 2—5 layers of cells that may be slightly elongated vertically, or rounded, or transversely widened (*N. bicalcarata*), and the cells are richly supplied with chloroplasts. The loose parenchyma is twice to three times the depth of the

last, and is abundantly traversed by irregular intercellular spaces. Many of its cells contain crystals. Spiral cells ramify through the palisade layer, but are more abundant in the loose layer. The vascular bundles (*f*) run beneath the junction of these two zones. Each bundle is ensheathed by a fibrous sclerenchyma ring, and has the normal bifacial arrangement.

The histology of the tendril does not differ fundamentally from that of the petiole. Its epidermis, cortex, and pith tissues are quite similar. The vascular bundles are united into a ring, even more perfectly than in the petiole, by a zone of sclerenchyma. The normal bundles that are thus connected, tend in nearly all cases to show bifacial arrangement, even though the tendril may be cylindrical (*N. ampullaria*, *N. maxima*, *N. phyllamphora* etc.). But in a few cases the bundles of the upper or ventral region of the tendril may be inverted, when the xylem faces internally the phloem externally (*N. Veitchii* etc.), and so a close approximation to stem structure occurs. A set of accessory pith bundles is even more perfectly developed than in the stem or petiole. These are relatively of large size, even in such thin tendrils as those of *N. phyllamphora* and *N. gracilis*. With the exception of the dorsal median one, which is in contact with the sclerenchyma ring, all are embedded in the pith. In most cases also the xylem is ventrally, and the phloem is dorsally placed.

As might be expected from its morphological relation, the general histology of the outer wall of the pitcher and of the mesophyll substance broadly agrees with that of the basal lamina. The corrugated surface of the peristome consists of highly cuticularized epidermal cells arranged in radial rows, and neatly fitting into each other by oblique walls. The surface of each cell is delicately striated radially, while the end of the cell that is toward the mouth of the pitcher may slightly overlap the adjacent end of the next cell within. These smooth glistening cells of the inwardly sloping part form an insecure zone for insects that attempt to walk across it. Its action is aided by the presence of a secretion from a series of remarkable nectar-glands, that are deeply embedded in cavities of the incurved margin. These were first observed and described by Gibbons-Hunt, and later were studied in detail by Dickson who named them "marginal glands". They may attain to large size, and all excrete a juice that has been proved by the writer to be particularly relished by insects. They are always developed in the first seedling leaf, as a few (5—8) dark oval glands embedded in the translucent margin. They increase in size and number as older pitchers form. Each fully developed gland is an oval (*N. ampullaria*, *N. gracilis* etc. Fig. 7 *E*) or elongated cylindrical (*N. Edwardsiana*, *N. khasiana* Fig. 7 *F*, *N. phyllamphora*) mass of cells. Each originates as a central patch of epidermal cells that is carried inward by invagination of a circular area of the peristome margin. This patch swells out in the centre of the depression, as an oval protruding body, while internally it continues to grow into the substance of the peristome. When the gland has reached maturity the greater part of its tissue is embedded in the mesophyll of the margin, while its free mamillar extremity protrudes into the depression or canal of the margin, that acts as a lumen for the discharge of the nectar secretion. Each gland is surrounded by a circle of bundles, derived by splitting of a single bundle that runs toward the gland from the veins of the pitcher system (Fig. 8 *A*). These bundles surround the limiting membrane of the glands, and doubtless supply the glands with their secretion substance. They are of smallest size in *N. gracilis*, *N. Reinwardtiana* and *N. tentaculata*, of medium size in *N. maxima*, *N. sanguinea* and *N. ventricosa*, are long and cylindrical in *N. khasiana* and *N. phyllamphora*, but the largest are those of *N. Edwardsiana*, which may measure 6—8 mm × 1—1,5 mm. Their position is indicated, round the simple margin of the pitcher in *N. Lowii*, by the minute apertures seen in the middle of small papillae (Fig. 19). These apertures lead into cavities whose embedded glands are elliptic and blunt. In *N. echinostoma* each is sunk in a depression at the tip of each isolated tooth, and is oval in shape (Fig. 7 *G*). Though an abundant secretion is rarely poured out by them, the writer has had frequent and convincing proof that it is greatly

preferred by insects to the secretion from the lid or the pitcher exterior. Their efforts to hang over the inner peristome margin so as to reach and sip the secretion often lead to their capture and destruction.

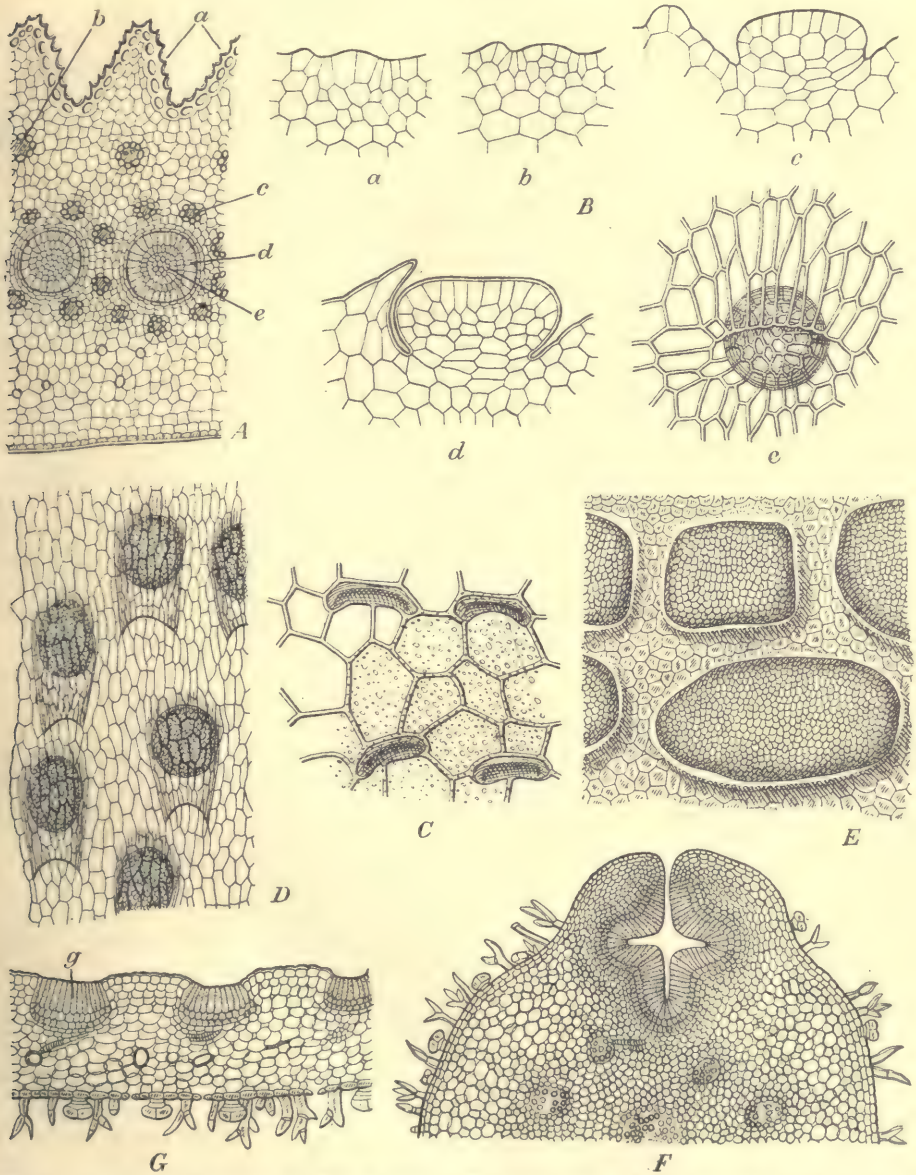

Fig. 8, Glandular Structure of *Nepenthes*. *A* T. S. peristome of *N. khasiana* Hook. f., *a* corrugations or ridges, *b* bundle, *c* periglandular bundles, *d* gland tissue, *e* loose lumen tissue. *B* Development of digestive glands of *N. phyllamphora* Willd. (*a—c*) and *N. gracilis* Korth. (*d—e*), *a—d* side view, *e* surface view. *C* Conducting surface of *N. phyllamphora* Willd. showing modified stomata, wax covering in part shown in part removed. *D* Digestive glands of *N. Pervillei* Blume. *E* do. of *N. Lowii* Hook. f. from pitcher base. *F* Gland from pedicel of *N. bicalcarata* Hook. f. *G* T. S. sepal of *N. bicalcarata* Hook. f., *g* gland tissue. (*A*, *D—G* Icon. orig., *B*, *C* after Wunschmann).

The histology of the lid or operculum in the different species closely agrees, the greatest feature of variation being the relative amount and character of the hairs. But the internal surface often presents features of great morphological and taxonomic importance. In *N. ampullaria* alone the elliptic rudimentary lid has as a rule no attractive lid glands, though in large richly colored examples from Singapore and Borneo an occasional gland may be detected. In all others the lid glands are either fairly or very abundant, and as a rule secrete freely in young fresh pitchers. In *N. Hookeriana* *N. Rafflesiana* and *N. Northiana* the glands are mainly or wholly disposed in two longitudinal series between the middle line and the margins of the lid. In the majority of species they are largest and most thickly massed along the middle. In such species as *N. maxima* and *N. Boschiana* that have basal keels to the lids, the keels are richly paved with large glands. In *N. bicalcarata* and *N. Burbidgei* numerous glands of moderate size are uniformly distributed over the entire lid. In most cases the gland tissue is almost flat, and is directly exposed (Fig. 7 *H*) or slightly covered by a downgrowing epidermal flap, but in *N. gracilis*, *N. Lowii* and *N. Pervillei* (Fig. 7 *C*) the glands are almost identical with those of the lamina, and similarly open by a small circular orifice. Those of *N. Lowii* are relatively gigantic (Fig. 7 *D*) and are deeply embedded in the thick substance of the lid.

Histologically and physiologically, the pitcher cavity shows two diverse conditions in some species, that are connected by all gradation forms in other species. In a considerable number, typified by *N. Lowii*, *N. ampullaria*, *N. Burbidgei* and *N. bicalcarata* (Fig. 14), the entire cavity is lined by a greatly cuticularized glistening and smooth epidermis, that has glands uniformly distributed over it. This can appropriately be called the "detentive" (detinens) and digestive surface, since physiologically it fulfils the functions of preventing the escape of caught insects, of pouring out a digestive liquid when the glands are stimulated, and of absorbing the digested products of animal tissues. Very different is the relation in such species as *N. alata*, *N. Reinwardtiana*, *N. gracilis* (Fig. 4) and *N. khasiana*, where the lowermost half or one-third is detentive, while the upper area from the rim to the top of the last-named region is usually glaucous, glaucous-purple or purple, in part due to a waxy surface secretion in part to an epidermal pigment. It is extremely smooth and ill-adapted for free insect movements. Further, it is closely covered by many transversely placed ledge-like cells (Fig. 8 *C*) that are raised slightly above the epidermal surface. These ledges represent transversely placed stomata, which in embryonic pitchers have a normal stomatic aspect. But gradually the lower of the two guard cells sinks inward behind the upper, so that the former and the stomatic orifice become hid by the excrescent and parallel position of the outer cell. This area may well be named the "conducting" (deducens) surface, since it affords no sure foothold for insects, but rather conducts or drops them into the lower part. In such species as *N. Macfarlanei* and *N. Rowanae* it may not extend over more than one-eighth to one-fifth the depth of the pitcher. Where distinctly dimorphic basal and cauline pitchers are developed, as in *N. Rafflesiana* and *N. melamphora*, the former may be wholly glandular, the latter glandular below and conducting above to one-sixth or one-third of its depth.

The glands of the detentive surface are almost identical in structure with those of the lid, though they differ greatly in function. In some species, or in large pitchers, they may be relatively large. Thus in mature pitchers of *N. Lowii* the upper glands are of small size, are widely apart, and are completely covered by downwardly directed epidermal flaps. Gradual transitions from these can be traced to glands at the bottom of the pitcher that may be huge quadrangular or polygonal masses separated from each other by ridges of thick-walled epidermal cells (Fig. 8 *E*). As compared with typical lid glands the detentive ones are usually covered by a shallow to deep epidermal and cuticular flap (Fig. 8 *Be*) that may partially or wholly cover the gland. In the geographically widely separated species *N. Pervillei* and *N. Vieillardii* the flap is so largely developed as to form a deep pocket with narrowed mouth (Fig. 8 *D*). The epidermal and subepidermal

cells of the detentive region may be slightly to greatly indurated, and in the former cuticularized. The cuticularization and induration may be so extensive as almost to obliterate the lumen of the epidermal cells as in *N. Edwardsiana*. But the protoplasm of the gland cells, and of the surrounding epidermal cells is placed in living and direct continuity with the more deeply-placed tissue of the mesophyll, by fine canals that traverse the thickened walls, and which contain fine intercellular protoplasmic threads. As in all of the glands already described, each detentive gland is directly in connection with a vascular bundle-termination.

Biological Relations of the Leaf. The general morphology and alike the histology of *Nepenthes* leaves suggest a carnivorous and particularly an insectivorous habit. Observation of the relation between insects and pitchers clearly demonstrates this, while all travellers agree in describing the abundance of insect remains in the pitchers. While some of the caught insects in herbarium specimens from the East are winged, it seems largely true that running insects such as ants and cockroaches form the principal prey of the group. Such is typically the case in conservatories, where the writer's experience is that ants and cockroaches are almost invariably the victims. Running up the stem such insects turn to right and left in quest of food; a globular drop exuded from an alluring stem-gland may arrest them for a time. Reaching the base of a leaf they may pass along it, attracted by the frequent presence of honey-drops there. They almost invariably run along its under side, to shelter themselves from enemies and hot suns. Moving on restlessly, and sipping from glands as they proceed, they reach the tendril which in some species offers considerable attraction. The ventral wings and the areas between are more beset with alluring glands than is the outer or dorsal part of the pitcher, and along this they often run till they reach the orifice or the lid. The lid-glands of the inner surface prove a great attraction, specially in such species as *N. khasiana*, *N. maxima* and *N. sanguinea*, but their secretion does not compare with that from the marginal glands. Straining to reach the orifices of the glands the insect visitors often over-reach themselves after a few efforts, tumble into the pitcher cavity, and in rare cases is escape again possible. Where a definite conducting surface is developed, the irregular tottering and struggling efforts made by insects on it, demonstrate how effective it is for the work in hand.

The presence of liquid in the pitcher-cavities early attracted the attention of botanists. Thus Grimm in 1682 spoke of the native Ceylon species, *N. distillatoria* as "planta mirabilis destillatoria". Later observers like Rumph and Loureiro spoke of the varying amount of the secretion during day and night, while Korthals stated that the fluid was more abundant in plants that grew in the sun, than in those that grew in the shade. As already stated, a considerable quantity of liquid accumulates in the young pitcher cavity, while it is still air-tight, and hermetically closed by the lid. This liquid is clear and slightly viscous. According to the original statement of Hooker it "is always acid and effects digestion of proteinaceous substances". He further noted that when the fluid was emptied out of a fully formed pitcher that had not received or been in contact with animal matter, the liquid again collected in small quantity, and further that placing of inorganic substances in the fluid, did not apparently cause increased secretion, though animal matter did. Gorup-Besanez extended Hooker's observations, and further stated that acidification of the liquid in young pitchers with dilute hydrochloric acid, increased the digestive action. Vines and Clautriau have supplied more exact information, and they both oppose the views of Dubois and Tischutkin, who contended that digestion of animal prey or of other proteinaceous substances is effected by bacteria in the pitcher cavity. Vines and Clautriau agree that a specific ferment is excreted, which the former has named Nepenthin. From experiments conducted on *N. melamphora* at a high elevation in Java, supplemented later by experiments in greenhouses at a warmer temperature, Clautriau concluded that the liquid of the unopened pitcher was at first neutral. After mechanical irritation or shaking of the pitcher, the liquid became acid and a digestive ferment was

simultaneously set free. He considered that this ferment converted insoluble proteids into dissolved peptones, and so that it was referable to the pepsin series of ferments. From more extended comparative observations Vines concluded that it has the power not merely to peptonize, but further to proteolyse. The disintegration or katabolism of proteids is thus effected not merely to the peptone stage, but further to that which yields the tryptophan products of decomposition. As in the case of *Drosera* and *Dionaea*, mechanical or chemical irritation of the thin-walled gland cells, causes the aggregation substance of each cell to ball up speedily. According to Vines' experiments, when the temperature is sufficiently high, rapid digestion within two to eight hours is effected, while at lower temperatures as those at which Clautriau carried on his experiments in Java, digestion is slower.

Floral Structure (Blütenverhältnisse). The inflorescences of *Nepenthes* seem always to be oppositifoliar, and each accordingly is the direct termination of an axis.

Fig. 9. *Nepenthes villosa* Hook. f. *A* Extremity of axis. B^1 Leaf with pitcher or ascidium in front view. B^2 Ascidium in side view. *C* ♂ Inflorescence. *D* ♂ Flower. *E* ♀ Inflorescence. *F* ♀ Flower. *G* Fruit. (After Hooker f.)

The opposed bract leaf is sessile in nearly every instance, even though the foliage leaves may have long stalks, but it is usually equal or little inferior in size to them in its lamina, while in general outline they are nearly alike. But in *N. ventricosa* the bract leaf is typically oval, while the foliage leaves are linear or linear-lanceolate. The bract differs also from the foliage leaf in its venation. Thus instead of showing 2—15 pairs of longitudinal veins, each bract is irregularly and closely reticulated by a series

of fine oblique veins that only fuse near the margin. If two or more inflorescences are produced in succession, as often happens in *N. Bongso* and other species, the bracts conform with each other.

Each inflorescence consists of a peduncle of varying length and thickness, surmounted by an expanded panicle of scorpioid cymes in *N. distillatoria*, *N. madagascariensis*, *N. bicalcarata* and *N. Pervillei*, by a dense ferruginous panicle in *N. ampullaria* or subpanicle as in *N. Hookeriana* etc. and by a simple or sub-simple raceme in the remaining species. But the last type is evidently derived by condensation and simplification from the panicle, for not unfrequently the lower flowers, or most of the flowers of a raceme may be grouped into reduced 2—3-flowered scorpioid cymes. The inflorescences are dioecious in their flowers, but an interesting case of monoecism was described by Moore (Trans. Roy. Irish Acad. XXIV. (1870) 629), where the lower flowers in an inflorescence were pistillate to the number of about twelve, while the numerous upper flowers were staminate. Nectar glands are not uncommon along the axis and on the pedicels of the flowers (Fig. 8 *F*) though the delicate pedicels of *N. Pervillei* alone possess many small nectar-glands. In most species the peduncle and the pedicels have a close covering of hairs that are ferruginous in color, but may vary to cinereous or silvery. In some species small linear bracteoles occur on most of the pedicels, or may only develop on the lower pedicels of an inflorescence. In length each inflorescence may vary from the short ones of *N. Bongso* and *N. tentaculata* (Fig. 15) that are 10—15 cm to those of *N. Rafflesiana*, *N. rajah* and *N. bicalcarata* that may be from 40—100 cm in length. The number of flowers borne by an inflorescence may vary also from 15 or 20 up to several hundred.

The blooming period seems to be rather extended and somewhat inconstant for most of the species in the wild state, though March to September is the period given in the majority of the accurate records. Under cultivation in the northern hemisphere, they bloom commonly from August to October. The length of time during which an inflorescence may remain in bloom varies with the number of flowers in it, and the species studied. Thus in a staminate inflorescence of a hybrid of *N. maxima* (*Curtisii*) 171 flowers were produced. These expanded on the average at the rate of six blooms daily, and during the blooming period a heavy foetid odor, similar to but fainter than that exhaled from staminate *Ailanthus* flowers, was given off. The staminate flowers soon wither, but the pistillate flowers may remain fresh in appearance for several weeks if not pollinated.

Each flower consists of four — or sometimes in *N. Pervillei* of three — small oval or elliptic green, greenish-yellow or claret-colored free sepals (Fig. 10). In *N. Pervillei* the sepals are synsepalous at their bases. They are rarely glabrous without, more commonly they are clothed with a dense silvery or ferruginous tomentum, that in some species may extend to the inner edge of each sepal. An occasional nectar-gland may be detected on the outer surface, that is similar in structure to the leaf glands. The inner surface of each sepal is richly provided with glands over its middle area (Fig. 8 *G*) or over its entire surface. These generally resemble the attractive glands of the inner lid surface of the pitcher. But there is a decided tendency in some species to depression of the gland, and overgrowth of the surrounding epidermal tissue. This proceeds to such an extend in *N. Pervillei* that each gland opens by a very narrow elongated orifice. The amount of nectar excreted by these is always considerable, and in connection with this Burbidge informed the writer that clouds of small insects flit about the inflorescences, or alight to sip the nectar. Small therefore though the flowers are, they are evidently cross-pollinated by insects as well as, or perhaps more frequently than by wind. The odor already mentioned probably aids in attracting insects.

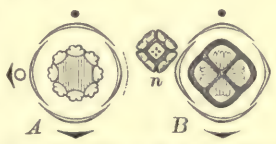

Fig. 10. *Nepenthes distillatoria* L. *A* Diagram of ♂ flower. *B* of ♀ fl.; *n* stigma from beneath, with the upper part of the ovary cut transversely, showing the four cells.

The stamens vary from 4 or 6 to many, and are monadelphous. The staminal column may be naked as in *N. distillatoria*, or hairy below and glabrous above as in *N. Bongso*, or uniformly hairy as in *N. albo-marginata*. The column may be shorter than, or equal to, or somewhat longer than the sepals. The terminal anthers (Fig. 11 *A*) form a knoblike mass, and are uniseriate or arranged in one circular series, or they may be biseriate when the anthers of the upper set are circular and are dovetailed into those of the lower series, or an intermediate condition may be shown when one circular series is capped by a few transversely-placed upper ones. The dehiscence of the anthers is extrorse, and the microspores or pollen-grains are three-lobed.

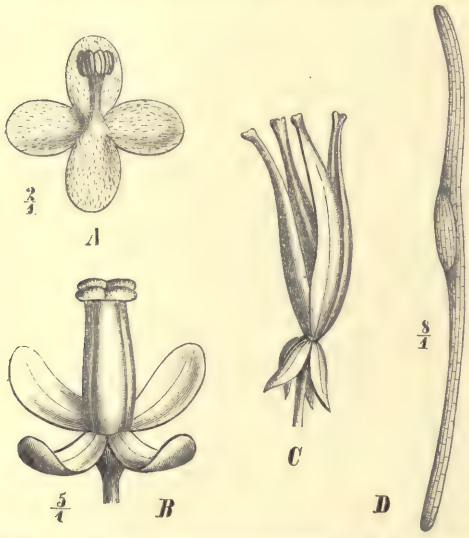

Fig. 11. *Nepenthes phyllamphora* L. *A* ♂ Flower. *B* ♀ Flower. *C* Fruit. *D* Seed.

The pistil consists of 4 — or not unfrequently in *N. Pervillei* of 3 — united carpels, that form an oval or ovate ovary below. The style is absent in most species, but in a few a short thick style can be traced. This or the upper part of the ovary ends in 4 — rarely 3 — short thick radiating often bilobed stigmas (Fig. 11 *B*). The ovarian surface may be glabrous, but is more often hairy, and may rarely bear a few nectar glands like those of the lamina. The ovary is 4- rarely 3-celled, and the ovules are numerous, minute, ascending, anatropous and arranged in several series on the placental ridge in the centre of the ovary. Each ovule is narrow, elongate and slightly fusiform. It consists of two coats or indusial coverings, the primine and secundine, the former of which is greatly elongated in the micropylar region into a micropylar funnel or canal with oblique mouth. Posteriorly this layer is also greatly prolonged into a tapered chalazal tail. The testa and tegmen surround the centrally-placed nucellus or megasporangium that is oval to ovate in shape.

Fruit and seeds (Frucht und Samen). A period of 6—8 weeks elapses between pollination and fruit-maturation. Alike from study of herbarium material, and artificially pollinated inflorescences in our stove houses, one gathers that the greater number of the pistillate flowers are pollinated and mature fruit. Each ripe fruit is a capsule of fusiform to ovate shape, is of leathery to woody consistence, and it ranges in color from gray to reddish-brown. In some species the covering of hairs that was present over the ovary persists up to the time of capsular dehiscence, but more frequently this is shed during maturation of the capsule, which thus becomes glabrous when ripe. If long strong hairs were present over the ovary, and become shed during ripening, the capsule may have a punctate aspect, from scars left by the hairs. The stigma of the pistil persists and even enlarges during fruit-maturation, so as to form a dark quadrangular or nearly circular knob above the fruit, or above its short style when such is developed. Each fruiting stigmatic lobe may be simple, or more or less deeply divided. When ripe the capsule dehisces longitudinally and loculicidally into 4 — or rarely 3 — valves, that slightly diverge from each other above, but remain more or less attached or approximated below (Fig. 11 *C*). The long thin filiform seeds gradually dry, spread apart, and at length separate from their placental attachments.

The number of seeds matured in a capsule may vary from 100 to close on 500, according to countings made by the writer. Thus two capsules of *N. alata* showed

respectively 191 and 209, two of *N. melamphora* showed 197 and 167, one of *N. khasiana* 425. In all species except *N. Pervillei* the seeds are light filiform spindles that may be from 3 to 25 mm long, and that vary in color from silvery yellow to dark brown, according to the species. The cells of the greatly elongated testa are thin-walled, but are thickened internally by spiro-annular bands that become specially strong around the endosperm region in the middle of the seed. The tegmen consists of thin-walled cells surrounding the distended nucellus and endosperm. The endosperm cells contain oil, starch, and protein material, and surround a minute triangular embryo, the greater bulk of which consists of the cotyledons. For successful germination the seeds must fall on a moist porous surface, and must be surrounded by a moist atmosphere. Subsequent changes have been already described.

Hybridization (Bastardbildung). All of the cultivated species of *Nepenthes* hybridize readily with each other, and the resulting hybrids are fertile to a high degree, alike between themselves, and when crossed by other species. A large series of artificial hybrids is therefore in cultivation at the present day, the parentage of which is accurately known. These exhibit, to a marked degree, the blended peculiarities of their parents, alike in macro- and microscopic characters. They may also inherit commendable qualities from both parents that render them more acceptable to growers than the parents. Thus *N. Mastersiana* pitchers as freely, is as easily grown, and can be as easily propagated by cuttings, as the one parent *N. khasiana*, while the pitchers are often as richly colored as, and the plant shortens its habit toward, the other parent *N. sanguinea*. Again *N. mixta* is more amenable to cultivation than are the parents *N. Northiana* and *N. maxima* (*Curtisii*), while *N. Tiveyi* is a superior type of plant to *N. maxima* and *N. Veitchii*. When such results have been secured readily under cultivation, it might reasonably be expected that natural hybrids would be formed in the native haunts of the species. Such seems clearly to be the case. Thus Burbidge's *N. Harryana* (p. 54) may with almost complete certainty be regarded as a hybrid between *N. villosa* and *N. Edwardsiana*, alike from habitat, structure, and stature. *N. cincta* from Borneo exhibits the blended characters of *N. Northiana* and *N. albomarginata*. Even *N. Hookeriana*, which the writer has temporarily accepted as a species, since it has thrice been found wild, shows all the blended characters of *N. ampullaria* and *N. Rafflesiana*. The two last species have been found in the regions where the supposed hybrid occurs. More critical study of these plants in their native haunts will almost surely reveal that natural hybrids of *Nepenthes* are not unfrequent in the wild state.

Geographical Distribution (Geographische Verbreitung). The *Nepenthaceae* are now mainly restricted to the "indisches Monsungebiet", and have their headquarters in N. Borneo, with Mount Kina Balu as a centre. This mountain alone possesses the most striking species, including *N. bicalcarata*, *N. Boschiana*, *N. Edwardsiana*, *N. Lowii*, *N. rajah*, *N. Veitchii* and *N. villosa*. It is noteworthy also that while some of the species like *N. bicalcarata*, *N. echinostoma*, *N. gracilis* and *N. neglecta* grow in Borneo at low levels and in hot moist situations, others like *N. ampullaria*, *N. hirsuta* and *N. Veitchii* grow commonly at an altitude of 600—700 m, while *N. Edwardsiana*, *N. Lowii*, *N. rajah* and *N. villosa* reach an elevation of 1500—3000 m. The last group and in particular *N. rajah* are almost continuously exposed to a moist dripping atmosphere (Fig. 12) owing to the hot wind currents from the plains round Kina Balu meeting the cold currents from the upper regions of the mountain. The extremely light seeds, combined with their relatively large surface of exposure to wind, favor wind-dissemination to a marked degree. This probably explains in part the distribution of the species in radial manner from Borneo as a focal centre. At least twenty species have been recorded from this island. From the adjacent island of Sumatra eleven species have been recognised of which four are peculiar to it and the

remainder are common to Borneo, Malaya and even more distant parts. Eight species occur in the Malay Peninsula, of which two are alone restricted to that area. Eight to ten species are reported from N. Australia, but as yet only three from New Guinea. A more intimate knowledge of its flora will probably increase the number greatly from the latter island. Some of the older records and determinations are probably incorrect for species from the Philippines, but at least seven to nine are found there of which most are endemic. *N. maxima* is found in the Celebes, Borneo and N. Guinea, *N. Vieillardii* in N. Caledonia, *N. distillatoria* in Ceylon, *N. khasiana* in N. E. Bengal, *N. Smilesii* in Siam, *N. anamensis* in Anam, *N. Pervillei* in the Seychelle Islands, and *N. madagascariensis* — the species most widely removed geographically from the centre of the group at the present day — in Madagascar. The most widely distributed

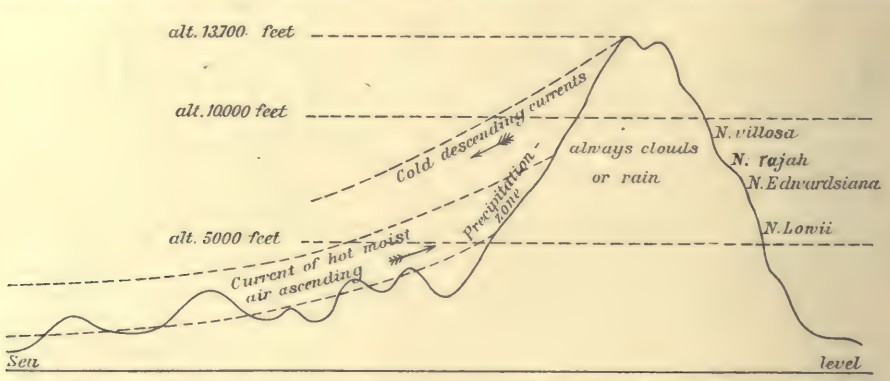

Fig. 12. Diagram showing hot and cold air currents on the sides of Mount Kina Balu in Borneo, meeting and condensing at the Nepenthes zone. (Adapted from Burbidge.)

species is *N. phyllamphora* which ranges from S. E. China to Malaya, Sumatra, Borneo, New Guinea, and in Australia is represented by the closely related geographical species *N. Kennedyana* and *N. albo-lineata*. Rather more restricted in range are *N. gracilis*, *N. ampullaria* and *N. Rafflesiana*.

Systematic Relations (Verwandtschaftliche Beziehungen). The *Nepenthaceae* have been viewed by some botanists as related to the *Cytinaceae* and *Aristolochiaceae*. Thus Brongniart grouped them as a section of the *Cytineae*, and Link as a section of the *Aristolochiaceae*. The incomplete flowers, united stamens, extrorse anthers, radiating sessile stigmas, several-celled ovary and numerous seeds suggested points of morphological agreement. But the morphology of the leaves, the tetramerous or trimerous dioecious flowers, the superior ovary and the albuminous seeds constitute important differences. As successively suggested by Lindley, Eichler, Engler and the writer, very close affinities are shown with the *Sarraceniaceae*, particularly through the genus *Heliamphora* of the latter order. The *Nepenthaceae* and *Sarraceniaceae* again have considerable affinities with the *Droseraceae*, and all of these seem to stand in intermediate relation between the *Papaveraceae* and *Cistaceae*.

Uses (Nutzen). In Borneo the natives utilize the long flexible stems of such species as *N. ampullaria* and *N. Rafflesiana* for cordage in binding the bamboos of bridges. Several Bornean travellers state that the pitchers are used as cooking dishes for rice and other food. The liquid of the more recently opened pitchers seems frequently to be drunk by the natives, as it has also at times been by travellers. As objects of horticultural interest and scientific study, the different species already introduced into cultivation, have had a large sale, but the beautiful hybrids that have been produced artificially have been more extensively grown and sold.

Nepenthes L.

*Nepenthes**) L. [Gen. ed. 1. (1737) 273] Spec. pl. ed. 1. (1753) 955; Endl. Gen. (1836—40) n. 2167; Hook. f. in DC. Prodr. XVII. (1873) 90; Benth. et Hook. f. Gen. III. (1880) 416; Wunschmann in Engler-Prantl, Pflzfam. III. 2. (1891) 260. — *Bandura* Adans. Fam. II. (1763) 75. — *Phyllamphora* Lour. Fl. cochinch. (1790) 606.

Conspectus specierum.

A. Inflorescentia paniculata v. racemoso-paniculata.
  a. Semina parva, testa vix v. breviter caudata.
    α. Sepala 4—3 ± connata, testa vix caudata . . . . 1. *N. Pervillei.*
    β. Sepala 4 distincta, testa breviter caudata . . . . . 2. *N. madagascariensis.*
  b. Semina filiformia, testa utrinque caudata.
    α. Ascidia plerumque globosa, peristomium latum aequale, operculum parvum vel mediocre, intus non vel sparse glandulosum.
      I. Operculum parvum, non glandulosum . . . . . 3. *N. ampullaria.*
      II. Operculum mediocre, sparse glandulosum . . . . 4. *N. Hookeriana.*
    β. Ascidia plerumque globosa, peristomium latum, postice in collum et in calcaria duo decurvata elongatum . 5. *N. bicalcarata.*
    γ. Ascidia ± cylindrico-ventricosa, peristomium angustum, postice leviter elongatum, operculum glandulosum . 6. *N. distillatoria.*

B. Inflorescentia racemosa, pedicelli rarissime triflori, plerumque biflori vel uniflori.
  a. Operculum ascidii intus planum.
    α. Nervi longitudinales laminae 2—4.
      I. Folia sessilia amplexicaulia, non decurrentia.
        1. Peristomium ascidii maturi cylindricum aequale, zona pilorum tomentosa sub insertione exteriore instructum.
          * Nervi longitudinales laminae 2 obscuri . . 7. *N. albo-marginata.*
          ** Nervi longitudinales laminae 3 obscuri. . . 7*. *N. gracillima.*
          *** Nervi longitudinales laminae 3—4, conspicui 8. *N. anamensis.*
        2. Peristomium ascidii maturi cylindricum, sed sine zona pilorum.
          * Plantae pumilae non scandentes.
            † Alae ascidii uniusmodi ciliatae . . . . . 9. *N. Smilesii.*
            †† Alae ascidii inferne angustae non ciliatae, sursum ciliato-dentatae . . . . . 10. *N. Cholmondeleyi.*
          ** Plantae elongatae scandentes.
            † Nervi laminae 2—3, alae ascidii inferne ciliatae, versus os angustatae non ciliatae, pedicelli uniflori . . . . . 11. *N. Blancoi.*
            †† Nervi laminae 3, alae ascidii uniusmodi ciliatae, pedicelli uniflori . . . . . 12. *N. tentaculata.*
            ††† Nervi laminae 4, alae angustae non ciliatae, pedicelli biflori . . . . . 13. *N. trichocarpa.*
            †††† Nervi laminae 4, alae irregulariter serratae v. breviter ciliatae, pedicelli bi- v. triflori. 14. *N. philippinensis.*
        3. Peristomium ascidii maturi latere late expansum, saepe margine exteriore undulatum.

*) Nomen derivatum a νηπενθής (νη sine; πενθος cura), quia liquidum in ascidio collectum recreare dicitur. »Nepenthes« apud auctores antiquos nomen remedii cuiusdam vi curas mitigandi donati (cf. Wittstein, Etym. bot. Handw. p. 613).

* Pedicelli inferne 2—3-flori, capsula elongata.
† Lamina et superficies ascidii glabra, operculum ovatum acutum . . . . . 15. *N. Northiana.*
†† Lamina et superficies ascidii ± pubescens, operculum orbiculare . . . . . 16. *N. sanguinea.*
††† Lamina et superficies ascidii glabra, operculum magnum cordatum basi carinatum. 17. *N. rajah.*
** Pedicelli inferne uniflori (rarissime biflori); capsula brevis lata.
† Folia peltata; columna staminea basi pubescens, antherae ad 8 . . . . . 18. *N. Bongso.*
†† Folia in cirrhum attenuata; columna staminea glabra, antherae 10—12 . . . . 19. *N. singalana.*

II. Folia sessilia amplexicaulia, ± decurrentia.
1. Ascidia pubescentia vel villosa, peristomium distincte striatum, pedicelli uniflori . . . . . 20. *N. Vieillardii.*
2. Ascidia ± hirsuta, peristomium distincte striatum, pedicelli uniflori . . . . . 21. *N. hirsuta.*
3. Ascidia glabra, peristomium obscure striatum, pedicelli biflori . . . . . 22. *N. Reinwardtiana.*

III. Folia petiolata.
1. Costae peristomii tenues numerosae.
* Lamina elliptica apice attenuata . . . . . 23. *N. Copelandii.*
** Lamina obovata v. oblongo-lanceolata, apice ± peltata . . . . . 24. *N. eustachya.*
2. Costae peristomii magnae paucae in lamellas profundas productae.
* Ascidium breve obovatum ± villosum . . . 25. *N. villosa.*
** Ascidium elongatum cylindricum, glabrum . 26. *N. Edwardsiana.*

β. Nervi longitudinales laminae 5—6.

I. Folia sessilia amplexicaulia non decurrentia.
1. Ascidia matura ventricosa, medio valde constricta.
* Os ascidii ellipticum transversum, nervi operculi 3—4 . . . . . 27. *N. ventricosa.*
** Os ascidii ovatum obliquum, nervi operculi 6—7 . . . . . 28. *N. Burkei.*
2. Ascidia matura ampulliformia obconica v. cylindrica, medio non vel leviter constricta.
* Ascidia inferiora ampulliformia superiora cylindrica, margo peristomii longe pectinatus; pedicelli saepe biflori . . . . . 29. *N. melamphora.*
** Ascidia obconica, margo peristomii pectinatus; pedicelli uniflori . . . . . 30. *N. Deaneana.*
*** Ascidia omnia ± cylindrica vel raro inferiora leviter ventricosa, margo peristomii breviter denticulatus.
† Caulis pumilus, cylindricus, non scandens. 31. *N. Alicae.*
†† Caulis elongatus trigonus scandens . . . 32. *N. neglecta.*

II. Folia sessilia amplexicaulia ± decurrentia.
1. Caulis trigonus vel triangulus, ascidium extus sub peristomio tomentosum; glandulae operculi paucae, rarius multae diffusae . . . . . 33. *N. gracilis.*
2. Caulis trigono-cylindricus, ascidium extus sub

peristomio ferrugineo-pubescens, glandulae operculi paucae . . . . . 34. *N. angustifolia.*

3. Caulis cylindricus, ascidium extus sub peristomio glabrum, glandulae operculi multae diffusae . . 35. *N. khasiana.*

III. Folia petiolata.

1. Ascidia tubulosa glabra, peristomium cylindricum in collum non elongatum, margo intus polite denticulatus, ascidium intus usque medium vel sub medio glabrum dein glandulosum . . . . 36. *N. tubulosa.*

2. Ascidia subventricosa ad tubulosa, peristomium cylindricum pectinatum in collum valde elongatum, margo intus pectinatus, ascidium ad medium vel sub medio glabrum dein glandulosum . . . . . 37. *N. Hemsleyana.*

3. Ascidia ventricosa ad infundibuliformia, peristomium latum intus inclinatum, in collum valde elongatum, margo pectinatus, ascidium intus per quartam vel tertiam partem superiorem glabrum dein glandulosum . . . . . 38. *N. Rafflesiana.*

4. Ascidia ventricosa, peristomium angustum cylindricum, in collum non elongatum, ascidium intus per trientem superiorem glabrum dein glandulosum . . . . . 39. *N. Armbrustae.*

γ. Nervi longitudinales laminae 7—10.

I. Ascidia omnia ± cylindrica vel superne cylindrica inferne leviter ventricosa.

1. Folia non vel breviter decurrentia, ascidia viridia et albo-lineata, alae virides inferne angustatae superne ad nervos vel vertices reductae . . . 40. *N. albo-lineata.*

2. Folia non decurrentia, ascidia viridia vel rubro-viridia, alae angustae vel ad nervos prominentes reductae . . . . . 41. *N. phyllamphora.*

3. Folia leviter decurrentia, ascidia viridia rubro-maculata, alae angustae non ciliatae, basi et apice angustatae. . . . . 42. *N. Moorei.*

4. Folia non decurrentia, ascidia rubra, alae rubrae, inferne a basi medium versus ampliatae, dein ad os angustatae . . . . . 43. *N. Bernaysii.*

5. Folia non vel breviter decurrentia, ascidia purpureo-rubra, alae ventrales rubrae, a basi ad os ± sinuosae. . . . . 44. *N. Jardinei.*

6. Folia breviter decurrentia, ascidia rubro-viridia vel rubra, alae ventrales basim versus angustatae, os versus gradatim vel interrupte expansae et ± ciliatae . . . . . 45. *N. Kennedyana.*

II. Ascidia inferiora ventricosa, superiora ventricosa ad infundibuliformia.

1. Folia petiolata non decurrentia.

* Planta pumila non scandens, ascidia monomorphia . . . . . 46. *N. Garrawayae.*

** Planta elongata, ascidia dimorphia . . . . 47. *N. Beccariana.*

2. Folia petiolata ± decurrentia.

* Caulis brevis dense tomentosus, glandulae operculi paucae immersae, perithecioideae . 48. *N. Rowanae.*

** Caulis elongatus glaber, glandulae operculi copiosae emersae . . . . . 49. *N. Treubiana.*

III. Ascidia cylindrica, peristomium in series dentium duas dissectum . . . . . 50. *N. echinostoma.*

b. Operculum ascidii intus basi carina prominente, vel basi carina et apice processu instructum, vel medio carinatum.

α. Operculum basi carina prominente instructum vel medio carinatum.

I. Caulis late alatus, acute triangulus . . . . . 51. *N. Burbidgei.*

II. Caulis leviter alatus, subtrigonus . . . . . 52. *N. Boschiana.*

III. Caulis non alatus, folia spiraliter posita, fere glabra. 53. *N. alata.*

IV. Caulis non alatus, folia disticha villosa. . . . . 54. *N. Veitchii.*

V. Caulis non alatus, folia spiraliter posita fere glabra, carina levi in medio operculi. . . . . 55. *N. stenophylla.*

β. Operculum basi in carinam prominentem et apice in processum attenuatum productum. . . . . 56. *N. maxima.*

c. Operculum ascidii intus setis multis dispersis instructum.

α. Ascidium medio valde constrictum margine planum . 57. *N. Lowii.*

β. Ascidium medio non vel leviter constrictum, margine in peristomio formata. . . . . 58. *N. Macfarlanei.*

1. **N. Pervillei** Blume, Mus. bot. lugd. batav. II. (1852) 10; Hook. f. in DC. Prodr. XVII. (1873) 92; Baker, Fl. Mauritius and Seych. (1877) 299; Dyer in Journ. of Bot. (1878) 103; Watson in Gard. Chron. s. 3. XX. (1896) 239; Hemsley in Cat. North Gall. Kew, ed. 4. (1886) n. 468, 496; Macfarlane in Ann. of Bot. VII. (1893) 431, 443; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 226; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 237. — *N. Wardii* Wright in Trans. Roy. Irish Acad. XXIV. (1871) 576 t. 29 et.30. — Planta prostrata ramis erectis, v. erecta breviter scandens foliis glabris terminata. Caulis prostratus v. suberectus, 0,5—1 m longus × 5—15 mm crassus, ramosus, inferne nudus, superne foliorum basibus viridibus v. marcescentibus dense obtectus, rami erecti 5—7 mm crassi, cylindrici, glabri, purpurei. Folia 10—30 cm longa × 3—12 cm lata, coriacea, sessilia, semiamplexicaulia, obovata v. spathulata, apice acuta v. obtusa, supra viridia, subtus ± rubra, glabra, nervi longitudinales utroque latere 6, rarius 5, omnes a basi laminae orientes vel paria duo intima a triente inferiore costae orientia, par intimum 6—10 mm, par secundum 9—15 mm, par tertium 12—18 mm, par quartum 14—20 mm, par quintum 15—22 mm, par sextum 16 usque 24 mm a costa remotum, nervi transversi 5—6 mm separati, paralleli, a costa crassa radiato-ascendentes; cirrhus in foliis ascidiiferis 2—7 cm longus, in non-ascidiiferis 10—20 cm longus, sursum gradatim in basim ascidii ampliatus; ascidia 4—20 cm longa × 3—7 cm lata, dimorphia, inferiora inferne ± ventricosa, medio leviter constricta, os versus expansa, ascidia superiora infundibuliformia, juventute rufo-pubescentia demum glabra, zonis rufo-tomentosis sub peristomio exceptis, coriacea, purpureo-rubra vel rubro-viridia, alae ventrales evolutae aut ad nervos duos validos approximatos reductae, vel in nervo medio conjunctae, nervo medio superne sub peristomio in nervos laterales disperso, os obliquum; peristomium 4—8 mm latum, cylindricum, aequale, postice sub basi operculi non approximatum, crebre striatum, margine intus denticulatum; operculum 3—7 cm latum, orbiculare, rubroviride v. rubrum, extus glabrum intus glandulis magnis immersis perithecioideis sparse punctatum, glandulae saepe deorsum continuatae ab operculo per superficiem deducentem; calcar 3—5-fidum, rufo-pubescens; ascidium intus per quartam partem superiorem in ascidiis minoribus, v. per dimidium superius in ascidiis majoribus glauco-purpureum, opacum et deducens, inferne nitidum, detinens et glandulis multis discretis obsitum. Inflorescentia 25—35 cm longa; pedunculus paniculae aequilongus ± ferrugineo-sericeus; panicula triangula, rami laxi in cymas

5—12-floras densas scorpioideas parvifloras terminantes. Sepala 4, rarius 3, ± patentia et basi connata, in floribus ♂ oblonga-obtusa, in floribus ♀ deltoidea acuta v. obtusa, extus ferrugineo-sericea, intus glabra, glandulis parvis perithecioideis per basim connatam dispersis. Columna staminea sepalis brevior, glabra, antherae 8, uniseriatae. Ovarium glabrum, obpyramidatum 4—3-angulum, stigma medio depressum, 4—3-lobatum, intus stigmatosum. Capsula 10—12 mm longa, nitida, 4- v. 3-gona. Semina 4 mm longa, fusca, breviter appendiculata.

Malagassisches Gebiet; Seychellen: Insel Mahe, 700—900 m (Pervillé n. 98!, Bouton, Blackburn!, Barkly!); Mahe, "not common, in wet places by the side of running water at an elevation of about 1500 feet" (Horne n. 315!, n. 575!); Insel Silhouettes, auf dem Trois Frères Gebirge (Wright!); auf dem Gebirge (Horne n. 576!)

2. **N. madagascariensis** Poiret, Encycl. méth. Bot. IV. (1797) 459; Willd. Spec. pl. IV. p. 2 (1805) 873; Brongn. in Ann. sc. nat. I. (1824) 45, t. 5 f. 2; Korth. Verh. Nat. Ges. Bot. (1839) 41; Spach, Hist. nat. vég. XIII. (1846) 325; Blume, Mus. bot. lugd. batav. II. (1852) 9; Morren in Belg. Hort. II. (1852) 229; Hook f. in DC. Prodr. XVII. (1873) 92; Masters in Gard. Chron. s. 2. XVI. (1881) 685 cum ic. xyl.; Scott-Elliott in Ann. of Bot. V. (1891) 376; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 226; Drake d. Castillo in Bot. Jahres. XXX. (1902) 547; Dubard in Bull. Mus. d' Hist. nat. XII. (1906) 62; Veitch, Hort. Veitchii (1906) 302. — Planta brevis erecta subscandens. Caulis 0,75—1 m altus × 7—13 mm crassus, cylindricus, juventute dense ferrugineo-pubescens, demum sparse pubescens v. glaber. Folia 12—30 cm longa × 3—8 cm lata, coriacea, petiolata; petiolus 2—5 cm longus, alatus, alae basi expansa decurrentes et fere ad nodum inferiorem attenuatae, superne in laminam gradatim ampliatae; lamina elliptica ovalis v. obovata, juvenilis ± fusco- v. ferrugineo-pilosa, adulta glabra, supra viridis subtus viridi-rubra v. rubra, nervi longitudinales in paria 7, rarius 8 v. 9 dispositi, paria 3—5 intima a medio v. versus basim costae orientia, par intimum 7—14 mm, par secundum 8—19 mm, par tertium 11—23 mm a costa remotum, paria reliqua proportione decrescenti, nervi transversi oblique ascendentes et reticulati; cirrhus 20—30 cm longus, plano-convexus, gradatim versus basim ascidii ampliatus; ascidia 10—15 cm longa × 3—5 cm lata, juventute ferrugineo-pilosa, demum sparse pilosa v. glabra, dimorphia, inferiora ampullacea v. subventricosa, rubra, alae ventrales a basi fere ad os late expansae, ciliatae, os obliquum ovatum vel suborbiculare, postice in collum latum triangulum elongatum; peristomium 5—14 mm latum, cylindricum, crebre striatum, margine intus subtiliter dentatum; operculum 3—5 cm diametro, orbiculari-reniforme, extus ferrugineo-pubescens, intus glandulis paucis magnis circularibus a medio marginem versus minoribus obsitum; calcar 4—6 mm longum, obtusum, decurvatum; ascidium intus fere ad medium glauco-purpureum, opacum et deducens, inferne nitidum glandulosum et detinens; ascidia superiora infundibuliformia, rubro-viridia v. viridia, alae ventrales inferne angustae non ciliatae, superne ad nervos prominentes reductae, os transversum circulare postice non v. vix elongatum; peristomium parte postico-laterali ± expansum; ascidium intus superficie angusta superiore triangula glauco-purpurea, opaca, et deducente, inferne nitidum glandulosum et detinens. Inflorescentia 20—40 cm longa, paniculata; pedunculus 10—12 cm longus; panicula anguste triangula, ramis oblique ascendentibus, in cymas densas scorpioideas terminantibus; pedicelli et sepala ferrugineo-sericea. Sepala ovata, intus glandulis multis minutis obsita. Columna staminea glabra, sepalis brevior, antherae 10, convolutae, subbiseriatae. Ovarium ovatum, 3—4-angulum, dense ferrugineo-sericeum; stigma sessile 3—4-lobum, lobis profunde sulcatis. Capsula 13—15 mm longa, sparse sericea, nitida, ovata, valvis stigmatiferis triangulis bilobis, intus depressis. Semina 6—7 mm longa, brunnea.

Malagassisches Gebiet; Madagaskar: Ohne genauen Standort (Commerson und Chapelier, Humblot n. 400!, Curtis!); Tani-fouci in der Prov. Be-tani-mena (Hilsenberg!); »Central Madagascar« (Baron n. 1707!, 2735!, 5979!); bei Fort Dauphin »peaty soil and sandy, sometimes in marshes« (Scott Elliott n. 2302!)

Einheim. Namen: Kapok, Ponga, Amramatico (Spach).

Nota. Var. *macrocarpa* Scott Elliott a typo differt solum carpellis majoribus. — Var. *cylindrica* Dubard (op. cit.) est forma typica ascidiis inter inferiora et superiora medium tenentibus.

Fig. 13. *Nepenthes ampullaria* Jack. *A* Ascidia e surculo brevi ramuli prostrati orientia, *a* ascid. nondum apertum, *b* folium juvenile cum ascidio rudimentario *c*. *B* Folium ramuli scandentis. *C* Pars inflorescentiae ♂, *C*¹ flos ♂. *D* Pars infloresc. ♀, *D*¹ flos ♀. *E* Capsulae et semina. (Icon. origin.)

3. **N. ampullaria** Jack in Comp. Bot. Mag. I. (1835) 271; Korthals, Verh. Nat. Gesch. Bot. (1839) 39, t. 13; Lambert, Pinus II. (1837) app. t. 8; Spach, Hist. nat. vég. XIII. (1846) 325; Hook. f. in Bot. Mag. (1859) t. 5109; Hook. f. in DC. Prodr. XVII. (1873) 93; André in Ill. Hort. XXIV. (1877) 45, t. 272; Planchon in Fl. des serres XXII. (1877) t. 2325; Burbidge, Gard. of Sun (1880) 40; Beccari, Malesia III. (1886) 8; Hook. f. Fl. Brit. Ind. V. (1890) 69. — *N. ampullacea* Low, Sarawak (1848) 69; Blume, Mus. bot. lugd. bat. II. (1852) 9; Miquel, Fl. Ind. bat. I. p. 1. (1855) 1076, Suppl. 151, 366; Morren in Belg. Hort. II. (1852) 226. — Planta robusta, alte scandens vel prostrata et in laetamine silvarum radicans. Caulis 12—20 m altus × 8—12 mm crassus, juventute ferrugineo-tomentosus, demum glaber, internodiis elongatis vel in ramis prostratis suppressis. Rami prostrati breves vel elongati, saepe copiose radicantes et surculos laterales breves gerentes foliis dense aggregatis et reductis, ascidia magna fasciculata producentibus; rami scandentes foliis magnis in ascidia reducta terminantibus instructi. Folia ramorum prostratorum 3—12 cm longa × 0,5—1,5 cm lata, sub-coriacea, ad $^1/_2$ vel $^2/_3$ amplexicaulia; petiolus brevis v. nullus, lamina reducta, cirrhus 1—5 cm longus brevis curvatus, ascidium 3—10 cm longum × 2—6 cm latum, globosum ad subovatum, pallido-viride ad purpureo-viride, plerumque maculis purpureis ornatum, alae ventrales amplae, herbaceae, fusco-ciliatae, ciliis in series duas divergentibus, os transversum v. leviter obliquum fere circulare; peristomium 5—15 mm latum, extus angustum et recurvatum, intus profundum et oblique inclinatum, anguste striatum; operculum 1,5—4 cm longum × 1—2 cm latum, erectum v. reflexum, oblongo-lanceolatum, glandulae rarissimae v. plerumque nullae; calcar 3—7-fidum v. ciliatum; ascidium intus superne superficie angusta opaca haud efficaci deducente, inferne glandulosum et detinens. Folia ramorum scandentium 12—35 cm longa × 4—9 cm lata, sub-coriacea; petiolus 2—5 cm longus, alatus, semi-amplexicaulis, gradatim in laminam ampliatus; lamina lanceolata usque ovalis vel obovata, ferrugineo-tomentosa demum supra glabra subtus pubescens, nervi longitudinales in paria 4, rarius 3 dispositi, par intimum 15—25 mm, par secundum 18—34 mm, par tertium 20—40 mm, par quartum 22—42 mm a costa remotum, nervi transversi oblique ascendentes paralleli, 2—4 mm inter sese separati; cirrhus 5—8 cm longus, ferrugineo-hirsutus; ascidia 3—5 cm longa × 2—3 cm lata, cylindrica ad infundibuliformia, ceterum ascidiis inferioribus similia at omnibus partibus minora. Inflorescentia 15—35 cm longa, robusta, pyramidata, ferrugineo-tomentosa; pedunculus 4—7 cm longus; pedicelli inferiores saepe bracteolati, in cymas scorpioideas 2—5-floras terminantes, superiores uniflori, omnes ferrugineo-tomentosi. Sepala 4, ovato-oblonga, exteriora majora, extus tomentosa, intus luteo-viridia et glandulosa; glandulae parvae, copiosae. Columna staminea glabra, sepalis brevior; antherae 8—12, uniseriatae v. subbiseriatae. Ovarium tetragonum, ovoideum, fusco-pubescens; lobi stigmatici triangulares. Capsula 2,5—3 cm longa, angusta, ± pubescens. Semina 12—15 mm longa. — Fig. 13.

Von der Malayischen Halbinsel bis Neu-Guinea verbreitet, wächst an sumpfigen Stellen, kommt oft längs der Meeresküste vor, oder steigt bis zu einer Höhe von 1200 m hinauf, häufig in die Kronen von Palmen oder anderen Bäumen kletternd. Jack's Form ist als *N. ampullaria* var. *vittata major* bei den Gärtnern bekannt; diese Form geht allmählich [*N. ampullaria* var. *vittata* in Ill. Hort. XXIV. (1877) 272] in die grüne Form mit kleineren Krügen über, die gewöhnlich kultiviert wird.

Monsungebiet, S.W. Malayische Provinz; Malakka: Paddam Bhatoo und Ayer Punnas bei Malakka (Cuming!, Griffith!); bei Johore (Burbidge); Singapore (Jack!, Wallich n. 2243!, Maingay n. 1322!); Rhio, auf der Insel Bintang (Jack!, Wallich!); Larut in Perak (Kunstler n. 4148!, n. 6222!, n. 1943!, n. 4087!; Wray n. 1794!, n. 600!).

Sumatra: Küste bei Siboga (Teysmann); Westküste (Korthals!); Padangsche Boovenlanden (Burck n. 21!).

Borneo: Ohne genauen Standort (Teysmann!, Barber n. 372!); bei Sarawak (Teysmann!, Low!, Motley!); Sintang (Teysmann!); Kapuas in der Prov. Pontianak (Teysmann!); Labuan (Burbidge!); Kina Balu (Whitehead).

Neu-Guinea: Vanape Valley (Guilianetti und English!).

Einheim. Name: Ketakong-betoel (Filet, Plantkundig Woordenboek).

Var. β. **longicarpa** Beccari, Malesia III. (1886) 8. — »A forma typica differt columna staminea graciliore et longiore, capsulis magis elongatis (4 cm), stigmatis lobis minus crassis, punctiformibus, rotundatis, parum obliquis.«

Neu-Guinea: Bei Ramoi (Beccari!).

Var. γ. **Geelvinkiana** Beccari l. c.—»Capsulis 3 cm longis, stigmatis lobis angustis superficialiter bidentatis.«

Neu-Guinea: Geelvink Bay (Beccari!).

4. **N. Hookeriana** Lindley in Gard. Chron. (1848) 87;? Low, Sarawak (1848) 68; Masters in Gard. Chron. II. (1881) 812 Fig. 157, 813, Gard. Chron. s. 3. XII. (1892) 561 et icon. 557; Hemsley in Garden LXVII. (1905) 269. — *N. Loddigesii* Baxter in Loud. Hort. Brit. Suppl. III. (1850) 593. — *N. Hookeri* Alphand, Prom. de Paris, icon. tantum; Macfarlane in Ann. of Bot. VII. (1893) 421. — *N. Rafflesiana* ex parte, Hook. f. in DC. Prodr. XVII. (1873) 96; Rodigas in Ill. Hort. XLI. (1894) 142; Gentil in Sem. Hort. I. 57; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 147; Miller in Cycl. Amer. Hort. III. (1901) 1073; Veitch, Hort. Veitchii (1906) 483. — Planta robusta, alte scandens. Caulis 15—18 m altus × 8—13 mm crassus, ramosus, cylindricus, juventute dense fulvo-pubescens, demum subglaber, gemmae latentes dense pubescentes. Folia 25—60 cm longa × 6—10 cm lata, subcoriacea, petiolata; petiolus 5—13 cm longus, late alatus, amplexicaulis, basi ad 1—2,5 cm decurrens; lamina lucido-viridis, elliptico-lanceolata, in cirrhum aliquanto abrupte attenuata, supra sparse cinereo-pubescens costis fulvo-puberulis, subtus fulvo-pubescens, margo juventute dense pubescens demum glaber, nervi longitudinales in paria 5 dispositi, par intimum 15—25 mm, par secundum 20—33 mm, par tertium 23—38 mm, par quartum 26—43 mm, par quintum 28—40 mm a costa remotum, nervi transversi radiantes, versus costam angulum fere rectum formantes, paralleli, 3—6 mm distantes; cirrhus 20—40 cm longus, cylindricus, aequalis vel basim ascidii versus ± ampliatus, fulvo-pubescens demum glaber; ascidia 5—15 cm longa × 3—8 cm lata, dimorphia, inferiora ovata vel subglobosa, sparse rufo-pubescentia, pallido-viridia, diffuse purpureo-maculata et marmorata, alae ventrales late expansae, divergentes, basim versus latissimae, os versus ± angustatae, ciliatae, ciliae subbiseriatae, os circulare v. subovatum; peristomium 10—15 mm latum extus crebre recurvatum intus amplum et oblique descendens, margo dentatus, superficie distincte striata, viride v. ± purpureo-striatum, postice non vel vix elevatum; operculum 3—4 cm longum × 2—3 cm latum, rectum v. ± inclinatum, ovale v. ovatum, ut ascidium coloratum, extus sparse rufo- et cinereo-pubescens, intus sparse glandulosum, glandulae in series duas utroque latere lineae mediae dispositae; calcar 10—15 mm longum, filiforme, recurvatum, dense rufo-tomentosum; ascidia superiora infundibuliformia, alae angustae non ciliatae vel ad nervos prominentes reductae, os obliquum, postice in collum 15—20 mm altum elongatum; peristomium 6—10 mm latum, postice elongatum ampliatum ± decurvatum et margine interiore pectinatum. Inflorescentia 30—40 cm longa; pedunculus 10—15 cm longus, juventute dense rufo-tomentosus demum subglaber, racemus subpaniculatus; pedicelli 10—20 mm longi, tomentosi, saepe bracteolati, basi 3- v. 2-flori, apicem versus uniflori. Sepala ovata v. elliptica, extus tomentosa, intus glandulis minutis adspersa. Columna staminea sepalis aequalis, glabra; antherae 14—16 irregulariter biseriatae v. series altera inferior e antheris circ. 12 composita cylindrica, series altera superior e anther. 4—6 composita transverse posita. Ovarium rufo-tomentosum, ovatum; stigma peltatum purpureum, 4-lobatum. Capsula et semina ignota.

S. W. Malayische Provinz; Borneo: Ohne Standort (de Vriese-Teysmann!); Sarawak (Low!); Berg Lambir bei Sarawak (Hose!).

Bangka: Ohne genauen Standort (Horsfield!, Kurz n. 1460!)

Nota. Haec forma valde distincta et frequenter culta adhuc cum *N. Rafflesiana* conjungi solet a qua multis notis gravibus differt. Cum planta pluribus illorum locorum supra

nominatorum statu haud culto occurrat, auctor eam interim pro specie propria habet, dum experimentis institutis de illius plantae positione accuratius judicari possit. Investigationibus macroscopicis et microscopicis auctori persuasum est, *N. Hookerianam* esse hybridam inter *N. Rafflesianam* et *ampullariam*.

5. **N. bicalcarata** Hook. f. in DC. Prodr. XVII. (1873) 97; Burbidge, Gard. of Sun (1880) 126, 341 cum ic. xyl.; Masters in Gard. Chron. s. 2. XIII. (1880) 200 et icon. 201; Burbidge op. cit. 264; Broome op. cit. XX (1883) 472; Ill. Hort. XXVIII. 408; Burbidge in Garden XVII. (1880) 542; Beccari, Malesia II. (1886) 231, III. (1886) 4; Goebel, Pflanzenbiol. Schild. II. (1891) 106; Macfarlane in Ann. of Bot. VII. (1893) 429, 430, 443; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 149; Burbidge in Journ. Roy. Hort. Soc. XXI. (1897) 259; E. B. B. in Gartenwelt X. 241. — *N. Dyak* Moore in Journ. of Bot. XVIII. (1880) 1 t. 206. — Planta robustissima generis, alte scandens, luteo-viridis usque smaragdino-viridis. Caulis 10—15 m longus × 20—30 mm crassus, cylindricus, glaber, superne basibus amplexicaulibus foliorum obtectus, inferne brunneus et cicatricibus irregularibus foliorum notatus. Folia 50—120 cm longa × 10—15 cm lata, coriacea, longe petiolata; petiolus 5—15 cm longus, alatus, alae oblique v. sursum applicatae, basi dilatata, ad $^3/_4$—$^7/_8$ amplexicaulis, dein medium versus angustata, superne in laminam gradatim ampliata, lateribus ± glanduloso-tuberculata; lamina elliptica usque obovata, apice abrupte rotundata et peltata, costa subtus valde prominente, glabra, punctata, subtus ± glandulosa allectans, nervi longitudinales in paria 8—14 dispositi, omnes a basi folii orientes, par intimum 20—25 mm, par secundum 35—45 mm, par tertium 47—60 mm a costa remotum, paria cetera proportione gradatim decrescente, nervi transversi multi, radiantes v. ascendentes paralleli, 2—3 mm distantes; cirrhus 25—50 cm longus, infra aequalis, ascidii altitudine in aream tumidam saepissime fistulosam myrmecophilam 6—20 mm crassam ampliatus, dein versus basim ascidii angustatus, superficies saepe glandulis allectantibus prominentibus tuberculata; ascidia dimorphia, juventute leviter ferrugineo-tomentosa demum glabra, ± nitida, coriacea, luteo-viridia usque puniceo-rubra; ascidia inferiora 8—20 cm longa × 5—10 cm lata, subovata, saepe punicea v. puniceo-viridia, alae ventrales late discretae, ample expansae divergentes marginibus ciliatis, sursum ± angustatae; ascidia superiora ampulliformia ad infundibuliformia, alae ventrales ± angustatae, non ciliatae; os circulare postice in collum altum prolongatum; peristomium 10—20 mm latum, aequale, extus revolutum, intus oblique inclinatum, crebre striatum, et margine serrulatum, postice in lamellas parallelas subpectinatas 2—5 cm longas elongatum, lamellarum apices antice in calcaria duo 2—4 cm longa decurvata producti; operculum 3—7 cm latum, cordatum ad reniforme, extus puberulum ad glabrum, intus glandulis multis minutis fere aequalibus dispersis obsitum, rarissime basi in calcar tertium medium aut carinam productum; calcar 6—15 mm longum, cylindricum, tomentosum, ex collo 8—15 mm sub operculo divergens; ascidium intus explicatum, opacum »deducens« ad 8—15 mm sub peristomio, inferne nitidum glandulosum detinens, glandulae circulares subsessiles. Inflorescentia 70—100 cm longa; pedunculus 8—12 mm crassus, ± glanduloso-tuberculatus; panicula mascula laxe divergens, rami multi elongati simplices radiantes v. ascendentes et in cymas scorpioideas 3—12-floras terminantes. Sepala 4 in paribus inaequalibus (par externum minus quam internum), obovata, intus minute glandulosa. Columna staminea quam sepala brevior, robusta, glabra; antherae ∞, biseriatae, convolutae. Panicula feminea e ramis multis in cymas 1—3-floras terminantibus composita. Sepala ovalia, minute glandulosa. Ovarium dense pubescens, lobi stigmatum 4, radiantes, recurvati. Capsula 12 mm longa, leviter stellato-puberula, valvae lanceolatae stigmatibus recurvatis coronatae. — Fig. 14.

S. W. Malayische Provinz; Borneo: Lawas Fluss (Low!, Burbidge!); Lawas Fluss bei Sintang (Teysmann n. 10957 u. 11161; Herb. hort. bot. Bog.!); Undup in Prov. Batang-Lupar (Teysmann!, Beccari!); N. W. Borneo (Teuscher n. 33!); auf dem Berg Lambir bei Sarawak (Hose!).

6. **N. distillatoria** L. Spec. pl. (1753) 955, et Fl. zeyl. (1748) 321; N. L. Burman, Fl. ind. (1768) 190; Gaertn. de Fruct. II. (1791) 18 t. 83; Willd. spec. pl.

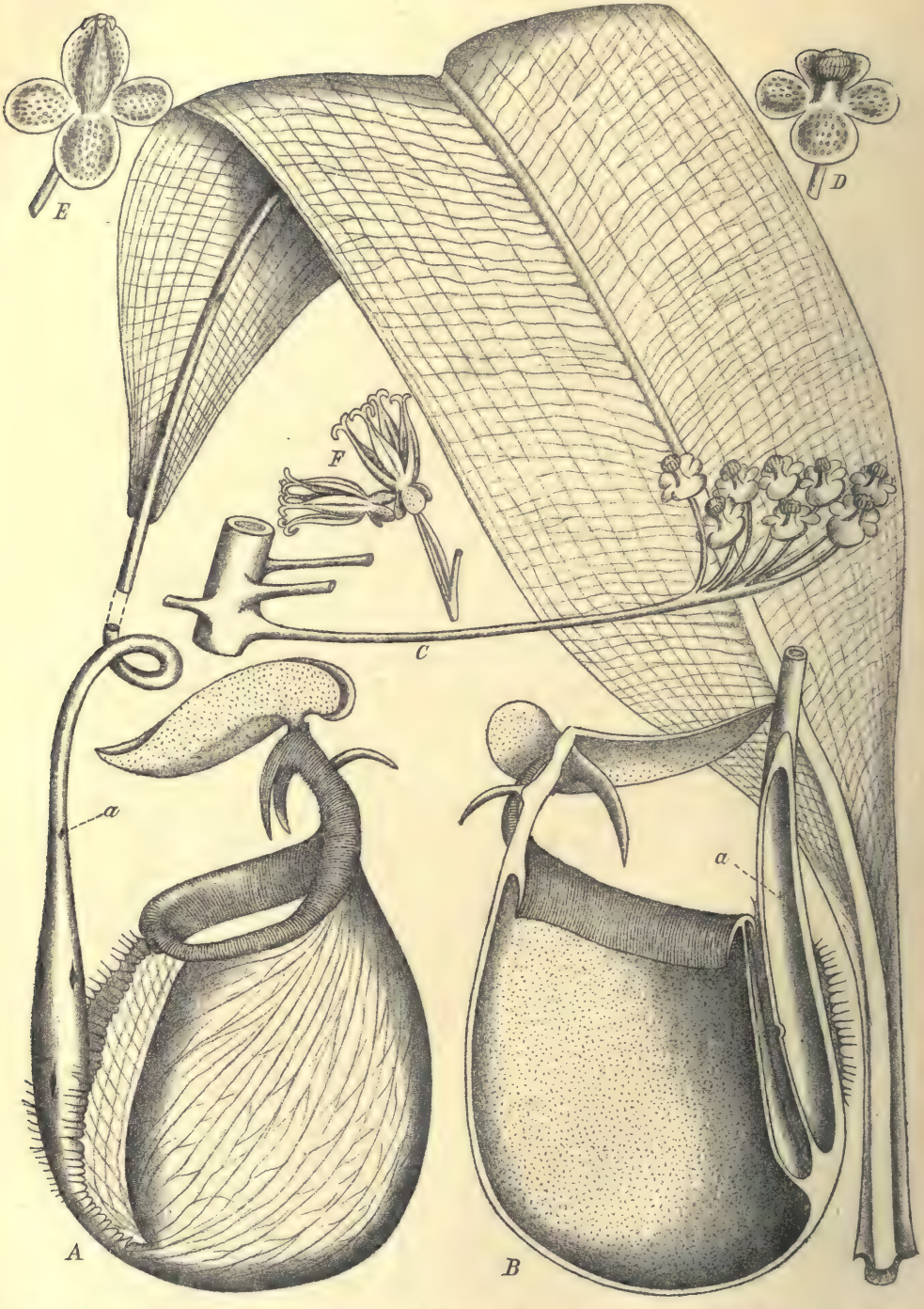

Fig. 14. *Nepenthes bicalcarata* Hook. f. *A* Folium cum ascidio, *a* glandula. *B* Ascid. et cirrhi apex long. secta, *a* cavitas in parte cirrhi incrassata. *C* Inflorescentiae pars. *D* Flos ♂. *E* Flos ♀. *F* Fructus. (*A*, *D*—*F* Icon. orig., reliq. sec. Beccari.)

IV. p. 2 (1805) 873; Korth. Verh. Nat. Ges. Bot. (1839) 42; Loddiges, Bot. Cab. XI (1825) 1017; Spach, Hist. nat. vég. X. (1841) 571; Blume, Mus. bot. lugd. bat. II. (1852) 6; Thwaites, Enum. (1864) 290; Hook. f. in DC. Prodr. XVII. (1873) 93; Faivre in Compt. Rend. LXXXIII. (1876) 1155; Hook. f. Fl. Brit. Ind. V. (1890) 68; Trimen, Handb. Fl. Ceylon III. (1895) 420; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 225. — *N. indica* Poir. in Encycl. Meth. Bot. IV. (1797) 458; Brongn. in Ann. sc. nat. I. (1824) 43; Spach, Hist. nat. vég. XIII. (1846) 323. — *N. Zeylanica* Raf. Fl. Tell. IV. (1836) 101. — *N. hirsuta* var. *glabrescens* Smith in Gard. Chron. I. (1882) 398, 399 f. 59. — *N. rubra* Nicholson, Dict. of Gard. IV. (1886) 439. — *N. Zeylanica* var. *rubra* G. Beck l. c. 226. — *N. Smithii* G. Beck l. c. 188. — *N. speciosa* Hort. ex G. Beck l. c. 226; non *N. distillatoria* Jack in Comp. Bot. Mag. I. (1835) 271 quae? *N. gracilis* est; nec *N. distillatoria* Graham in Edinb. N. Phil. Journ. III. (1827) 371, et in Bot. Mag. LV. (1828) 2798 quae *N. khasiana* sunt; nec *N. distillatoria* Steud. Nom. ed 2. II. (1841) 190 et Macgillivray, Voy. H. M. S. Rattle. I. (1852) 210 quae *N. phyllamphora* sunt. — Planta alta, scandens, lucido-viridis. Caulis 10—15 m altus × 6—10 mm crassus, subcylindricus, juventute fusco-punctatus demum glaber, internodiis inferne brevibus, superne elongatis. Folia 15—35 cm longa × 3—6 cm lata, herbacea v. subcoriacea, petiolata; petiolus 4—6 cm longus, late alatus, basi semiamplexicaulis, non v. leviter decurrens; lamina elliptico-lanceolata, supra et subtus glabra et fusco-punctata marginibus costa et apice exceptis, quae ± albido-pubescentes sunt, costa subtus prominens, nervi longitudinales in paria 5 rarius 6 dispositi, omnia altitudine diversa infra medium costae orientia, par intimum 7—11 mm, par secundum 13—18 mm, par tertium 15—19 mm, par quartum 17—21 mm, par quintum 18—22,5 mm a costa remotum, nervi transversi oblique ascendentes reticulati, primus quisque aut secundus brevior, cum longiore ad marginem excurrente alternans; cirrhus 8—20 cm longus, gracilis, supra planus v. sulcatus, fulvo- v. albido-puberulus usque glaber, in basim recurvatam ascidii aliquanto abrupte ampliatus; ascidia 6—15 cm longa × 2—4 cm lata, dimorphia, pallido-viridia usque rubra, puberula demum glabra, juventute cinctu tomentoso sub peristomio; ascidia inferiora tubuloso-ventricosa, alae ventrales inferne ampliatae, sursum ± angustatae, marginibus ciliatis, os transversum v. leviter obliquum; ascidia superiora cylindrica, alae ventrales ad nervos prominentes reductae, os obliquum, postice in collum breve elongatum; peristomium 2—4 mm latum, cylindricum, graciliter striatum; operculum 1,5—3 cm diametro, cordato-orbiculare, extus fulvo-tomentellum demum glabrum, intus glandulosum, glandulae per medium paucae, magnae, rubroviridis, margines versus gradatim minores; calcar 2—3 mm longum, planum, pubescens, saepe 2—3-fidum; ascidium intus per dimidium superius glauco-viride ad rubrum, opacum et deducens, inferne viride nitidum dense glandulosum et detinens. Inflorescentia 25—60 cm longa; pedunculus 8—20 cm longus, albido-pubescens demum glaber; panicula laxa ramosa in cymas scorpioideas 2—5-floras terminans; pedicelli dense albido-pubescentes. Flores 6—7 mm diametro, viridi-lutei. Sepala 4 extus pubescentia, intus glandulis multis minutis obsita. Columna staminea sepalis brevior, glabra, crassa; antherae 6—8 uniseriatae. Ovarium sessile, albido-pubescens. Capsula 12—16 mm longa × 6 mm lata, brunneo-nitida, puberula, valvae ovales in lobos stigmaticos latos truncatos terminantes. Semina 7—10 mm longa. — Fig. 10.

Ceylon: Vom Meeresstrande bis zu 650 m Höhe verbreitet. — Bei Colombo (Grimm, Hermann, Burman n. 122!, Wichura n. 2682, Trimen); ohne Standort (Wright n. 2508!, J. Fraser n. 109!, Macrae n. 258!, Cuming n. 262!, Walker!, Beccari!).

Einheim. Name: Bandura-wel (Trimen).

7. **N. albo-marginata** Lobb in Gard. Chron. (1849) 580; Hook. f. in Trans. Linn. Soc. XXII. (1859) 422 t. 73; Spencer St. John, Life For. Far East I. (1862) 323; Masters in Gard. Chron. (1872) 542; Hook. f. in DC. Prodr. XVII. (1873) 102; Planchon in Fl. d. serres XXII. (1877) 165, t. 2343—2344; Burbidge in Garden XVI. (1880) 542 et icon. col; Beccari, Malesia III. (1886) 13; Hook. f. Fl. Brit. Ind. V. (1890)

70; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 190. — *N. tomentella* Miq. Fl. Ind. bat. I. p. 1. (1855) 1075, et Ill. Fl. Archip. ind. (1871) 5. — *N. Teysmanniana* Miq. (in Herb. Acad. Rheno-Traiect. n. 530) in parte, et Fl. Ind. bat. I. p. 1. (1855) 1073. — Planta gracilis, elongata, scandens. Caulis 5—10 m altus × 3—7 mm crassus, subcylindricus usque obtuse trigonus, rarius deorsum basibus foliorum decurrentibus leviter jugosus, juventute dense albido- ad fusco- et stellato- pubescens, demum subpubescens usque glaber, internodia supra elongata ad 3—8 cm longa, infra ± reducta. Folia 10—30 cm longa × 1,5—4 cm lata, herbacea ad coriacea, subpetiolata v. in basim ad $^2/_3$ amplexicaulem brevissime decurrentem gradatim angustata, elliptico-lanceolata, apice obtusa v. in cirrhum attenuata, supra sparse stellato-pubescentia demum glabra, infra fusco-pubescentia vel glabra et punctata, margine graciliter ciliata, in sicco valde revoluta, nervi longitudinales in duo paria dispositi, obscuri, par intimum 7—12 mm, par secundum 8—14 mm a costa remotum, nervi transversi pauci irregulariter ascendentes et reticulati; cirrhus saepe brevis non ascidiiferus v. 5—15 cm longus et abrupte in basim recurvatam ascidii ampliatus; ascidia 5—15 cm longa × 1,5—3 cm lata, subdimorphia; inferiora cylindrico-ventricosa, alis ventralibus expansis ciliatis, sursum in fronte peristomii prolongatis; superiora tubulosa, alis ventralibus angustis non ciliatis v. ad nervos prominentes reductis, ± albido- et stellato-tomentosa, sub peristomio zona densa albido-tomentosa instructa, viridi- et purpureo-striata usque diffusa v. tota purpurea, os leviter obliquum, postice in collum breve triangulum elongatum; peristomium 3—4 mm latum, cylindricum, aequale, breviter sed anguste striatum, purpureo-viride ad purpureum; operculum 1,5—2,5 cm latum, ovatum ad orbiculare, extus viride v. albido-viride et purpureo-maculatum, intus glandulosum, glandulae magnitudine a basi ad marginem gradatim reductae; calcar 5—8 mm longum, simplex filiforme v. 2—3-fidum, pubescens; ascidium intus inconstans ab $^1/_8$ ad $^1/_2$ altitudinis glaucum opacum et deducens, infra glandulosum et detinens. Inflorescentia 20—35 cm longa, gracilis, laxiflora; pedunculus stellato-tomentosus, demum subglaber; pedicelli 1—3 cm longi, inferne 2- rarius 3-flori, superne 1-flori, fusco-tomentosi. Sepala oblonga, extus fusco-tomentosa, intus glandulosa, glandulae 10—15. Columna staminea sepalis aequalis, tomentosa; antherae 8—12, ± contortae, uniseriatae. Ovarium ferrugineo-tomentosum. Capsula 2,5—3 cm longa, sparse ferrugineo-puberula, valvae ad apicem attenuatae, truncatae. Semina 12 mm longa, testa circum embryonem transverse undulata.

S. W. Malayische Provinz; Malakka: Bei Perak (Kings Coll. n. 2022!); auf dem Berg Ophir (Hullett!, Lobb!, Whitehead); bei Singapore (Wallich n. 2244!, Lobb!, Walker n. 13!, Hullett n. 163).

Sumatra: Ufer bei Siboga (Teysmann n. 530! ex herb. Blume in Herb. Acad. Rheno-Traiect. sub nom. *N. Teysmanniana*, Teysmann n. 537! ex herb. Blume in Herb. Acad. Rheno-Traiect. sub nom. *N. tomentella* Miq.); Inseln bei Siboga (Micholitz).

Borneo: Auf dem Berg Mattang (Beccari!); Piningiao (Beccari); auf dem Berg Peneyn (Teysmann n. 10967 in Herb. Hort. Bot. Bog.); auf dem Berg Bongsch (Haviland und Hose n. 3303!).

Var. β **villosa** Hook. f. in DC. Prodr. XVII. (1873) 103. — Caulis dense hispido-setosus, folia juvenilia subtus ferrugineo-villosa, ascidia ampulliformia, albida.

Borneo: Ufer bei dem Fluss Lokotan und Tangong-poe.

Var. γ **rubra** Macfarlane var. nov. — Folia et ascidia rubro-purpurea, dense albido-tomentosa v. subglabra.

Ohne genauen einheimischen Standort; kultiviert im botanischen Garten unter dem Namen *N. albo-cincta* var. *rubra*.

7*. **N. gracillima** Ridley in Journ. Linn. Soc. XXXVIII. (1908) 320. — Planta gracilis scandens. Caulis 0,5 m et ultra altus × 2—2,5 mm crassus, gracillimus, trigono-cylindricus, glaber. Folia 5—10 cm longa × 1—1,5 cm lata, sessilia ad $^1/_2$—$^2/_3$ amplexicaulia, coriacea, lanceolata, lamina basim versus gradatim angustata ad apicem in cirrhum attenuata v. rarissime leviter peltata, super et subtus glabra v. axillis sparse

pubescentia, nervi longitudinales in paria 3 dispositi, par intimum 4,5—5 mm, par secundum 5,5—6 mm, par tertium 6—7 mm a costa remotum, nervi transversi irregulariter reticulati; cirrhus basi gracillimus ascidium versus gradatim ampliatus, glaber; ascidia 5—10 cm longa × 1—1,5 cm lata, monomorphia (ut notata), subcylindrica medium versus leviter expansa, sparse pubescentia ad glabra sub peristomio zona densa brunneo (in sicco)-tomentosa instructa, pallido-viridia et longitudinaliter ± copiose purpureo-areolata, alae ventrales in nervos reductae rarius os versus leviter expansae et sparse ciliatae, os obliquum postice in collum triangulum elongatum; peristomium 2—3 mm latum cylindricum aequale, postice in collum 5—10 mm altum elongatum, ut in *N. Reinwardtiana* obscure striatum, pallido-viride et rubro-striatum; operculum 1—1,5 cm latum, late ovatum, ut ascidio coloratum, extus et intus sparse pubescens, intus glandulis magnis circularibus v. ovalibus ± onustum; calcar 2—3 mm longum, planum recurvatum pubescens; ascidium intus per dimidium superius glauco-purpureum et deducens, dein nitidum glandulosum, glandulae superne immersae inferne ± expositae. Inflorescentia 12—20 cm longa; pedunculus quam racemus longior; racemus laxiflorus; pedicelli uniflori graciles ± pubescentes, sub medio bracteolati. Sepala ovalia, extus et per basim et marginem intus dense tomentosa, intus apicem versus minute glandulosa. Columna staminea sepalis aequilonga, basi pubescens superne glabra; antherae 6—8 uniseriatae. Flores ♀ ignotae. Capsula 14—15 mm longa, fusiformia, valvae lanceolatae sparse pubescentes lobis stigmatibus triangulis depressis coronatae.

Malayische Halbinsel: Auf dem Berg Gunong-Tahan im Staate Pahang, 1000 m (**Robinson-Wray n. 5309!**).

Nota. Species valde affinis *N. albo-marginatae.*

8. **N. anamensis** Macfarlane n. sp. — Planta gracilis scandens. Caulis 2 dm et ultra longus × 3—4 mm crassus, cylindricus, juventute fulvo-pubescens demum glaber, punctatus, pallido-viridis v. viridis et purpureo-maculatus. Folia 12—20 cm longa × 2,5—3 cm lata, subcoriacea, sessilia v. subpetiolata, basi ad $^2/_3$—$^3/_4$ amplexicauli, oblique inserta, leviter decurrente, superne gradatim in laminam lanceolatam ampliata, apice in cirrhum longe attenuata, costa supra luteo-viridis v. purpureo-viridis et sparse pubescens, infra fusco-pubescens demum punctata, nervi longitudinales in paria 3—4 dispositi, par intimum 5—7 mm a costa remotum et oblique ab ea juxta v. infra medium oriens, par secundum 2 mm ab intimo remotum et fere a basi costae oriens, par tertium 1—1,5 mm a secundo, par quartum 0,5—1 mm a tertio remotum, nervi transversi oblique ascendentes et reticulati; cirrhus 5—10 cm longus, supra concavus et pubescens, infra sparse pubescens demum punctatus, abrupte in basim ascidii ampliatus; ascidia 6—8 cm longa × 2—2,5 cm lata, dimorphia; inferiora ampulliformia supra medium leviter contracta, minute pubescentia, zona dense tomentosa sub peristomio instructa, alae ventrales 3—4 mm latae, aequales, fere a basi ad os prolongatae, longe ciliatae, os circulare ad subovatum, postice in collum breviter elongatum; peristomium 1,5—2 mm latum, cylindricum, oblique striatum, striae tenues breves; operculum ovale ad ovato-cordatum, extus pubescens et punctatum, circum marginem interiorem dense tomentosum, intus glandulosum, glandulae parvae discretae nisi marginem versus; calcar 2—2,5 mm longum, recurvatum; ascidii superficies infra pallido-viridis usque purpureo-viridis, viridi-purpurea usque purpurea per partem superiorem, alas et operculum; ascidium intus per dimidium superius glauco-purpureum, opacum, deducens, per inferius viridi-luteum nitidum glandulosum et detinens, glandulae aliquanto discretae, profunde immersae; ascidia superiora cylindrica, alae ventrales latae v. anguste expansae v. ad nervos longitudinales non ciliatos reductae, peristomium 4—5 mm latum, purpureo-viride ad viride, aliomodo ac ascidia inferiora. Flores et fructus ignoti.

Hinterindisch-ostasiatische Provinz; Anam: Lang Bean, 1500 m (**Micholitz!**).

Nota. Exemplaria hujus speciei novae a cl. W. Micholitz anno 1903 lecta et ad cl. Sander missa sunt, qui ea Herbario Kewensi donavit anno 1905. Characteribus foliorum haec

species valde affinis est *N. distillatoriae*; forsan haec positio e floribus adhuc nondum notis serius affirmari potest.

9. **N. Smilesii** Hemsley in Kew Bull. (1895) 116. — Planta brevis erecta non scandens. Caulis brevis 2 dm et ultra altus, basibus foliorum dense circumdatus. Folia 8—15 cm longa × 1,5—2 cm lata, herbacea, sessilia, lineari-lanceolata, basi ad $^1/_2$—$^2/_3$ amplexicaulia, basim versus leviter angustata, apice in cirrhum attenuata, juvenilia ± pubescentia, margine ciliata, nervi longitudinales in paria 3 rarius 4 dispositi, par intimum 3—4 mm a costa remotum et a ea v. versus medium costae oriens, par secundum 5—7 mm a costa remotum et a quarta parte inferiore costae oriens, par tertium 6—8,5 mm, par quartum 7—10 mm a costa remotum, utrumque a basi folii oriens, nervi transversi irregulariter et oblique ascendentes; cirrhus 2—5 cm longus, puberulus v. glaber, aequalis, in basim ascidii abrupte expansus; ascidium 6—10 cm longum × 1,5—2 cm latum, cylindrico-ventricosum v. cylindricum, viride, juventute dense fusco-pubescens demum fere glabrum, alae ventrales aliquanto approximatae, angustae, ciliatae, os ovatum obliquum; peristomium cylindricum rubrum, crebre striatum, margine interiore leviter serratum; operculum 1,5—2 cm latum, ovatum v. orbiculare, rubrum, extus ± puberulum, intus glandulis multis parvis similibus obsitum. Inflorescentia 25 cm longa; pedunculus striatus puberulus; racemus simplex; pedicelli breves uniflori. Sepala ovalia. Antherae 8 uniseriatae. Flores pistilliferi et fructus ignoti.

Hinterindisch-ostasiatische Provinz; Siam: In der nördlichen Region "on grass lands on the ground at Baw Saw, Kawng (Smiles!)".

10. **N. Cholmondeleyi** F. M. Bailey in Queensl. Agric. Journ. VII. (1900) 441 pl. 59. — Planta nana erecta, non scandens. Caulis inferne repens, ± nodosus, superne 12—15 cm longus × 3—4 mm latus, foliorum basibus imbricatis dense circumdatus. Folia 3—6 cm longa × 0,5—1 cm lata, lanceolata, sessilia, ad $^1/_2$—$^2/_3$ amplexicaulia, sparse pubescentia, marginibus ciliato-dentatis, nervi longitudinales in paria 4 v. 3 dispositi, par intimum 1,5—2 mm, par secundum 2,5—3 mm, par tertium 3—4 mm a costa remotum; cirrhus 0 v. ad 4 cm longus, tenuis, a basi ad apicem aequalis; ascidia 2—3 cm longa × 0,75—1 cm lata, cylindrica, inferne leviter ventricosa, alae ventrales inferne attenuatae sursum expansae et ciliato-dentatae; peristomium 1—1,5 mm latum, obliquum; operculum 5—8 mm diametro, ovato-orbiculare; calcar basi latum, apice attenuatum recurvatum, saepe processibus duobus lateralibus instructum. Flores et fructus ignoti.

Austr.-malayische Provinz: Cape York Halbinsel von N. O. Australien (Jardine!).

Nota. Forsan *N. Smilesii* et species supra descripta formae pumilae speciei majoris probabiliter *N. phyllamphorae* sunt. Quae auctores de specie indicant, interim accipienda esse puto, dum flores accuratius sint noti.

11. **N. Blancoi** Blume, Mus. bot. lugd. batav. II. (1852) 10. — *Nepenthes* sp. Blanco, Fl. Filip. ed. 1. (1837) 808, ed. 2. (1845) 556, ed. 3, III. (1879) 215. — Sp. non sat. not. Hook. f. in DC. Prodr. XVII. (1873) 105; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 222. — *N. melamphora* Villar in Flor. Filip. ed. 3. IV. (1880) app. 173. — Planta tenuis erecta v. breviter scandens. Caulis 3—6 dm altus × 4—5 mm crassus, obtuse trigonus, juventute sparse fulvo-puberulus demum glaber, punctatus. Folia 15—25 cm longa × 1,5—2,5 cm lata, herbacea v. subcoriacea, subpetiolata v. vulgo lamina sessilis gradatim basim versus angustata, ad $^1/_2$—$^2/_3$ amplexicaulis, linearis usque oblanceolata, apice rotundata v. in cirrhum attenuata, supra glabra, subtus brunneo-punctata, nervi longitudinales in paria 2—3 dispositi, par intimum 7—10 mm a costa remotum et ab ea circiter triente a basi oriens, par secundum 1,5—2 mm ab intimo remotum et prope basim laminae oriens, par tertium 1 mm a secundo remotum et a basi laminae oriens, nervi transversi valde obliqui et irregulariter inter se et nervos intimos longitudinales confluentes; cirrhus 7—20 cm longus, tenuis, gradatim in basim recurvatam ascidii expansus, leviter ferrugineo- v. rufo-puberulus; ascidia 10—15 cm longa × 3—6 cm lata, monomorphia v. subdimorphia, rubro-viridia, sparse puberula,

brunneo-punctata; ascidia inferiora cylindrico-ventricosa, alae ventrales a basi ad peristomium productae, ciliatae, ciliae 5—6 mm longae, os ± obliquum postice in collum 1—2,5 cm longum productum; ascidia superiora cylindrica v. basi leviter subventricosa, alae ventrales inferne leviter expansae et ciliatae, superne in cristas non ciliatas reductae, os obliquum postice non v. leviter elongatum; peristomium 5—7 mm latum, cylindricum, crebre sed anguste striatum, margine intus serrulato; operculum 3—4,5 cm × 2—4 cm, ovatum v. ovato-cordatum, submembranaceum, extus rubro-maculatum, intus per medium costatum, per totum glandulosum, glandulae in medio paucae magnae, perithecioideae, latus versus glandulae multae parvae ovales; calcar 4—5 mm longum, ferrugineo-pubescens; ascidium intus per dimidium superius glauco-purpureum, opacum et deducens, inferne glandulosum et detinens, glandulae superne parvae immersae, approximatae, inferne mediocres ± expositae, magnae et diffusae. Inflorescentia 30—40 cm longa; pedunculus 25—30 cm longus, juventute rufo-tomentosus demum glaber; racemus simplex laxiflorus; pedicelli 4—5 mm longi, ferrugineo- v. fusco-tomentosi. Sepala 4 lanceolata v. spathulata, extus et per marginem interiorem tomentosa, intus per dimidium inferius glabra, per superius glandulis parvis obsita. Columna staminea ± ferrugineo-tomentosa; antherae 16, quarum 12 inferiores et uniseriatae 4 superiores et transversae sunt. Ovarium breviter stipitatum, dense pubescens, lobis stigmatum sessilibus, prominentibus bilobis, leviter recurvatis. Capsula 15—17 mm longa, fusiformis, ± puberula et nitida, stigmata plana, obscure biloba.

Provinz der Philippinen: Ins. Cebu (Blanco); Ins. Benguet (Cabeza); Ins. Culion (Merrill n. 516!).

Einheim. Namen: Sulud-sulud, Sogon-sogon.

12. **N. tentaculata** Hook. f. in DC. Prodr. XVII. (1873) 101; Beccari, Malesia III. (1886) 13; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 188; Burbidge in Gard. Chron. n. s. XVII. (1882) 56. — Planta gracilis ramosa scandens. Caulis 1—3 m altus × 2—5 mm crassus, glaber, flexuosus, saepe ± spiraliter tortus, juvenilis triangulus demum trigonus, internodiis ± elongatis. Folia 6—15 cm longa × 1,5—3,5 cm lata, herbacea v. subcoriacea, lanceolata v. elliptico-lanceolata, sessilia et oblique auriculato-amplexicaulia, apice acuto v. obtuso, supra et subtus glabra, nervi longitudinales in paria 3 v. in foliis magnis 4 dispositi, omnes a basi orientes, in auriculas basales curvati dein per laminam prolongati, par intimum 4—7 mm, par secundum 6—12 mm, par tertium 7—14 mm, par quartum 7,5—15 mm a costa remotum, nervi transversi irregulares, versus costam fere rectangulares v. oblique ascendentes, rarius ± descendentes, omnes furcati et reticulati; cirrhus 9—17 cm longus, gracilis, concavus et supra fusco-pubescens, aliquanto abrupte in basim ascidii ampliatus; ascidia 8—12 cm longa × 2—4,5 cm lata, membranacea, juventute rufo- v. fusco-pubescentia demum glabra v. sparse pubescentia, dimorphia; ascidia inferiora ampulliformia v. ovata, rubro-purpurea, alae ventrales breves, a basi ad os continuatae, ciliatae, os ovatum obliquum; peristomium 3—4 mm latum, cylindricum, tenerum, remote striatum, non v. in collum leviter elongatum; operculum 2—4,5 cm longum × 1—2,5 cm latum, ovato-oblongum, membranaceum, extus minute brunneo-punctatum, sparse longe tentaculatum circum marginem v. per totum, intus glandulis multis minutis dispersis obsitum; calcar 8—10 mm longum, raro simplex plerumque multifidum v. ciliato-fasciculatum; ascidium intus per dimidium superius glauco-purpureum, opacum et deducens, inferne nitidum glandulosum et detinens, glandulae multae, circulares, discretae, expositae; ascidia superiora cylindrica v. ad basim leviter dilatata, purpureo-viridia, alae ventrales angustae non v. ± ciliatae, os leviter obliquum v. transversum; operculum ovatum; ascidium intus per duas partes superiores opacum, inferne glandulosum. Inflorescentia 5—6 cm longa, saepe 2—4 ex axillis bracteārum adjacentium orientes; pedunculus 1—3 cm longus, saepe curvatus, puberulus; pedicelli in floribus ♂ 1—2 mm longi, in floribus ♀ 4—5 mm, uniflori, puberuli v. subglabri. Sepala oblonga, extus margine pubescentia, intus glandulis minutis adspersa. Columna staminea sepalis aequalis glabra; antherae 4—6 uniseriatae. Ovarium sessile, brunneo-pubescens, lobi stigmatis distincti, duo. Capsula 27—28 mm longa × 5—6 mm lata,

Fig. 15. *Nepenthes tentaculata* Hook. f. *A* Apex ramuli pl. ♂ cum infloresc. tribus, *a* ascidia abortiva. *B* Apex folii majoris. *C* Ascidium inferius vel basale, *a* operculi »tentacula«. *D* Ascid. superius vel caulinum. *E* Ramulus fructifer. (Icon. origin.)

lanceolata, nitida, valvae externe sulco medio instructae. Semina 15 mm longa, testa circum embryonem brunnea, alae argenteae. — Fig. 15.

S. W. Malayische Provinz; Borneo: Im Gebirge bei Sarawak, 800—1500 m (Lobb n. 38; Hullett n. 354!); auf dem Berg Poe, 1800 m (Beccari n. 2422!): Borneo, ohne genauen Standort (v. Martens!).

Var. β. **imberbis** Beccari l. c. 13. — Operculum non tentaculatum, calcar simplex v. leviter ramosum.

Borneo: Auf dem Berg Mattang, 800 m (Beccari n. 2930!).

Var. γ. **tomentosa** Macfarlane var. nov. — Ascidia ferrugineo- v. fusco-tomentosa, os et peristomium postice in collum 5—10 mm altum elongata.

Borneo: Auf dem Berg Kina Balu, 2500 m (Burbidge!).

13. **N. trichocarpa** Miq. Fl. Ind. bat. I. p. 1. (1855) 1072 Suppl. 151, et Journ. d. Bot. Néerl. I. (1861) 275 t. II.; Hook. f. in DC. Prodr. XVII. (1873) 104; Beccari, Malesia III. (1886) 14; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 149. — Planta gracilis ramosa scandens. Caulis 2 m et ultra longus × 6—7 mm crassus, obtuse tri-tetragonus, juventute rufo-tomentosus. Folia 10—25 cm longa × 2,5—3,5 cm lata, subcoriacea, lanceolata v. lineari-lanceolata, sessilia, ad $^2/_3$—$^3/_4$ amplexicaulia, non v. leviter decurrentia, apice gradatim in cirrhum attenuata, supra per costam et subtus per totum sparse stellato-puberula, nervi longitudinales in paria 4 dispositi, omnes a basi laminae orientes, par intimum 4—5 mm, par secundum 6—8 mm, par tertium 7,5—10 mm, par quartum 8,5—11,5 mm a costa remotum, nervi transversi irregulariter ascendentes et reticulati; cirrhus 20—30 cm longus, gracilis, in basim recurvatam ascidii aliquanto abrupte expansus; ascidia 7—12 cm longa × 3—4 cm lata cylindrico-infundibuliformia, pallido-viridia et irregulariter purpureo-maculata, minute puberula, alae ventrales angustae non ciliatae, sursum peristomium versus ad nervos prominentes reductae, os ovale; peristomium 3—4 mm latum, cylindricum, marginibus sub basi operculi discretis, superficie crebre striatum; operculum 2,5—3,5 cm longum × 2—2,5 cm latum, oblongo-orbiculare, intus glandulis paucis perithecioideis irregulariter dispersis obsitum; ascidium intus per dimidium superius glauco-purpureum opacum et deducens, inferne nitidum, glandulosum et detinens, v. per totum inde ab peristomio glandulosum, glandulae superne plerumque remotae, inferne approximatae. Inflorescentia (♀) 15—20 cm longa breviter pedunculata, cinereo- ad brunneo-pubescens; racemus subdensiflorus; pedicelli 12—15 mm longi, plerumque biflori, hirsuto-pubescentes. Sepala elliptico-ovata, extus brunneo-tomentosa, intus glandulis multis minutis per totum dispersis obsita. Inflorescentia ♂ ignota. Ovarium oblongo-ovatum, 3—4-carpellatum, dense cinereo-pubescens; stylus brevis; stigma profunde 3—4-lobatum, lobi leviter sulcati. Capsula 15—18 mm longa, basi dense ferrugineo-pubescens, sursum per valvas valde puberulo-nitida, valvae lanceolatae, lobis stigmaticis prominentibus planis bilobis. Semina 2—3 mm longa, tenuia, testa per embryonem et caudam alteram lurido-fusca, per caudam alteram pallido-lutea.

S. W. Malayische Provinz; N. W. Sumatra: Siboga, am Meeresufer (Teysmann n. 532!, n. 533!)

Nota. Specimina in Herb. Rheno-Traiect. asservata sola ad hanc speciem pertinent. Specimina a cl. Miquel distributa in herbariis diversis asservata pro maxima parte ad *N. gracilis* pertinent, v. cum *N. trichocarpa* vera intermixta sunt.

14. **N. philippinensis** Macfarlane sp. nov. — Planta robusta scandens. Caulis 6—10 m altus × 7—10 mm crassus, glaber, minute brunneo-punctatus. Folia 15—25 cm longa × 2,5—5 cm lata, sessilia, coriacea, lanceolata v. elliptico-lanceolata, inferne in basim latam leviter v. vix decurrentem ad $^1/_2$—$^2/_3$ amplexicaulem gradatim angustata, apice in cirrhum attenuata, supra et subtus glabra, margo statu juvenili pubescentia caduca ferruginea instructus, nervi longitudinales in paria 4 dispositi, par intimum oblique a medio costae vel prope medium costae oriens, par secundum a triente inferiore costae oriens, paria tertia et quarta a basi folii, par intimum 6—12 mm, par secundum 8—17 mm, par tertium 10—21 mm, par quartum 11—24 mm a costa

remotum, nervi transversi oblique ascendentes; cirrhus 15—20 cm longus tenuis, inferne concavo-convexus, ± puberulus, superne in basim ascidii recurvatam gradatim ampliatus; ascidium 8—12 cm longum × 2—3,5 cm latum, monomorphium v. subdimorphium; ascidia inferiora tubuloso-ventricosa, alae ventrales 4—5 mm latae, fere a basi ad os extensae et longe ciliatae; ascidia superiora tubulosa v. inferne leviter ventricosa, alae ventrales 1—2 mm latae, distantes et irregulariter serratae v. breviter ciliatae, superficie inferiore viridi v. rubro-viridi, superiore saepissime rubra, juventute dense ferrugineo-pubescente demum ± ferrugineo-puberula, os ovatum obliquum, postice in collum breve elongatum; peristomium 6—7 mm latum cylindricum, aequale, crebre striatum, margo interior tenuiter serratus, postice in collum elevatus, superficiebus parallelis oppositis; operculum 2—2,5 cm longum, ovato-cordatum, viridi-rubrum v. rubrum, extus puberulum intus glandulis multis circularibus in series duas utroque latere lineae mediae dispositis, et glandulis magnis paucis perithecioideis prominentibus basim versus v. ± diffusis obsitum; calcar 4—5 mm longum aliquanto crassum; ascidium intus per dimidium superius glauco-purpureum v. rubro-purpureum opacum et deducens, inferne nitidum et glandulis ± remotis subsessilibus obsitum. Inflorescentia (♂ solum nota) 45—55 cm longa; pedunculus 20 cm longus, dense ferrugineo-pubescens demum glaber; racemus angustus elongatus densiflorus; pedicelli 8—10 mm longi, raro bracteolati, biflori rarius basim versus 3-flori, dense ferrugineo-pubescentes, flores 6 mm diametro. Sepala 4 in paria inaequalia disposita, par externum late ovale, internum ellipticum, extus dense ferrugineo-pubescentia, intus viridi-lutea, et glandulis multis parvis nectariferis instructa. Columna staminea cum basibus sepalorum inferne sparse pubescens, superne glabra; antherae 8 uniseriatae. Flores pistilliferi et fructus ignoti.

Provinz der Philippinen: Auf dem Berg Victoria, Ins. Palawan, 350 m (Foxworthy n. 721! spec. typ. in Herb. Sc. Manilla); auf dem Berg Pulgar, Ins. Palawan, 1300 m (Curran n. 3896!).

15. **N. Northiana** Hook. f. in Gard. Chron. II. (1881) 717 f. 144; Burbidge in Garden XXIII. (1883) 492, f. 496; Wittmack in Gart. Zeitg. I. (1882) 64 cum fig. 14, 15; in Rev. d'Hort. et Et. XXI. 271; Gentil in Sem. Hort. I. (1897) 75 et icon. 107; North Recoll. of Happy Life I. (1892) 251; Hemsley in Cat. North Gall. Kew ed. 4. (1886) n. 561: G. Beck in Wien. Ill. Gart. Zeitg. (1895) 142; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 236, f. 46; Masters in Gard. Chron. s. 3. XXXIV. (1903) 272, XXXVI. (1904) 97. — *N. spuria* Beck in Wien. Ill. Gartenzeitg. (1895) 187. — Planta robusta ramosa scandens lucido-viridis. Caulis 4—6 m longus × 6—8 mm crassus, cylindricus, glaber, internodiis inferne brevibus, foliorum basibus latis amplexicaulibus dense obtectus. Folia 15—35 cm longa × 3—10 cm lata, crassa, herbacea v. subcoriacea, elliptica ovalia v. obovata, inferne in basim late alatam semiamplexicaulem gradatim angustata, alae per internodia duo decurrentes, superne in apicem obtusum v. peltatum rotundatae, supra glabra margine pellucida, subtus glandulis multis (30—60) nectariferis punctata, nervi longitudinales obscuri in paria 4 dispositi, par intimum 15—20 mm, par secundum 22—30 mm, par tertium 25—36 mm, par quartum 27—40 mm a costa remotum, omnes a basi laminae orientes, nervi transversi valde obscuri, paralleli, oblique ascendentes, 2—3 mm separati; cirrhus 10—60 cm longus, gradatim v. aliquanto abrupte in ascidium expansus; ascidia 6—40 cm longa × 3—12 cm lata, dimorphia, crassa, glabra, herbacea, v. sub-coriacea, pallido-viridia maculis purpureis; ascidia inferiora ampulliformia v. subovata, ± purpureo-maculata, alae ventrales a basi ad os continuatae, inferne angustae, in medio latae, sub os abrupte et oblique truncatae, membranaceae, dentato-ciliatae v. fimbriatae, os ovatum valde obliquum; peristomium 10—50 mm latum, in ascidiis junioribus subcylindricum, in maturis late expansum, margine externo undulatum, antice et postice ± angustatum, ad latus late expansum, margine intus denticulatum, superficie crebre et distincte striata, luteo-viridi- et purpureo-fasciata; operculum 3—14 cm longum × 2—10 cm latum, ovato-oblongum apice acutum, fere transversum, pallido-viride et purpureo-maculatum; ascidia superiora infundibuliformia, basi recurvata et gradatim in cirrhum angustata, alae ventrales a basi

recurvata ad os continuatae, angustae, ciliatae; peristomium et operculum angustiora quam in ascidiis inferioribus; ascidium intus per triangulum posterius v. ad trientem ascidii glaucum v. glauco-purpureum et purpureo-maculatum, inferne nitidum glandulosum. Inflorescentia 25—35 cm longa, laxiflora; racemus triangulus; pedicelli 2—4 mm longi, graciles, saepe ad v. sub medio bracteolati uni- v. biflori, flores 6—7 mm lati. Stamina, pistillum et fructus ignoti.

S. W. Malayische Provinz; Borneo: Auf einem Berge bei Jambusam (Marianne North, icon. col. in North Gallery, Kew; Curtis!).

Nota. Species haec pulchra adhuc uno ex loco comperta est. Quamquam abhinc quinque et viginti annos in culturam introducta flores saepe peperit, eos nemo satis curiose scrutatus est.

N. Northiana × **albo-marginata** Masters. — *N. cincta* Masters in Gard. Chron. s. 2. XXI. (1884) 576 et icon., s. 3. VIII. (1890) 48, s. 3. XIII. (1893) 46; Nicholson, Ill. Dict. Gard. II. (1885) 435; Gentil in Rev. Hort. Belg. et Etr. XXI. (1895) 268 et icon. 269; Miller in Cycl. Amer. Hort. III. (1901) 1073; Veitch, Hort. Veitchii (1906) 301, 486. — Planta robusta, scandens. Caulis 6—8 m altus × 5—10 mm crassus, internodiis inferne brevibus superne elongatis. Folia 15—35 cm longa × 2—8 cm lata, crassa subcoriacea elliptica, in basim subpetiolata v. ± dilatata, ad $^1/_2$—$^2/_3$ amplexicaulia et decurrentia apice obtusa v. subpeltata, nervi longitudinales in paria 3 rarissime 4 dispositi; ascidia 8—30 cm × 3—8 cm, cylindrico-ventricosa, ± dimorphia, viridia et rubro-erubescentia maculis purpureis ornata, alae ventrales expansae continuatae sub os truncatae longe ciliatae, os obliquum; peristomium 10—30 mm latum, antice et postice ± angustatum, ad latus expansum undulatum, purpureo-viride v. purpureo-striatum; ascidium sub peristomio zona densa albido- v. remisso-tomentosa instructa; operculum ovato-orbiculare; calcar 6—10 mm longum simplex v. bifidum; ascidium intus pallido- et glauco-viride purpureo-maculatum.

Samen dieses interessanten Bastards sammelte Burke 1884 in Borneo von einem Exemplar von *N. Northiana*, das in der Nähe einer Pflanze von *N. albo-marginata* wuchs. Diese Samen keimten in den Gärten der Firma Veitch und brachten Pflanzen hervor, die eine Kombination der Merkmale oben genannter Arten aufwiesen.

16. **N. sanguinea** Lindl. in Gard. Chron. (1849) 580 f. 2; Griffith, Notulae IV. (1854) 348; Masters in Gard. Chron. (1872) 542; Hook. f. in DC. Prodr. XVII. (1873) 100; Masters in Gard. Chron. II. (1874) 715; W. G. Smith, Flor. Mag. (1874) t. 128; Planchon in Fl. d. serres XXII. (1877) 166 f. 2343; Masters in Gard. Chron. n. s. XI. (1879) 13; Burbidge in Gard. Chron. n. s. XVII. (1882) 56; Beccari, Malesia III. (1886) 4; Hook. f. Fl. Brit. Ind. V. (1890) 70; Whitehead, Explor. Kina Balu (1893) 16; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 185; Masters in Gard. Chron. s. 3. XXXVI. (1904) 97; Veitch, Hort. Veitchii (1906) 303. — *N. pumila* Griff. Notulae IV. (1854) 349. — non *N. sanguinea* in Gard. Chron. II. (1882) 809 quae *N. Veitchii* est. — Planta terrestris v. epiphytica, scandens, lucido-viridis. Caulis 2—7 m longus × 8—10 mm crassus, trigonus, glaber apice excepto quo ± ferrugineo-pubescens, foliosus, ramosus. Folia 12—45 cm longa × 3—6 cm lata, sessilia, ad $^3/_4$ amplexicaulia, crasse herbacea v. subcoriacea, oblongo-lanceolata, apice acuto v. sub-obtuso, gradatim in cirrhum angustato, supra glabra v. juvenilia in axillis foliorum et per costas pubescentia, subtus sparse pubescentia v. glabra costa excepta quae juventute dense demum sparse pubescens est, nervi longitudinales in paria 4 rarius 5 dispositi, obscuri, a basi amplexicauli orientes, par intimum 10—18 mm, par secundum 13—24 mm, par tertium 14—27 mm, par quartum 15—29 mm a costa remotum, nervi transversi obscuri et irregulariter radiato-ascendentes; cirrhus 10—20 cm longus × 1—2 mm crassus ± hirsuto-pubescens; ascidia 10—30 cm longa × 5—8 cm lata, subdimorphia; ascidia inferiora cylindrico-ventricosa plerumque sanguineo-rubra v. viridi-rubra, alae ventrales expansae, ciliatae, os ovatum obliquum; peristomium 10—25 mm latum; ascidia superiora cylindrica v. cylindrico-infundibuliformia, rubro- v. luteo-viridia, alae ventrales angustae leviter v. non ciliatae; peristomium antice et postice angustatum, parte postico-laterali margine exteriore late expansa, margine interiore inflexa denticulata, postice in collum breve elevatum, superficie valde

striatum; operculum 3—11 cm longum × 2—8 cm latum, ovato-cordatum ad orbiculare, extus sparse pubescens, intus glandulis multis rarissime paucis magnis saepe transverse elongatis ovalibus per medium, marginem versus minoribus instructum; calcar 10—30 mm longum, filiforme, saepe bi-trifidum; ascidium intus per trientem v. dimidium superius glauco-albidum v. glauco-purpureum, opacum et deducens, inferne viridi-luteum, nitidum, glandulosum et detinens; ascidia superiora cylindrica v. cylindrico-infundibuliformia, pallido-viridia v. viridia ± purpureo-rubra maculata, alae ventrales angustae non ciliatae v. ad nervos prominentes reductae. Inflorescentia 20—60 cm longa, ♂ quam ♀ longior; pedunculus 10—20 cm longus, sparse pubescens; racemus sublaxiflorus; pedicelli 15—20 mm longi, tenues, dense sericeo-pubescentes, inferne 3—2-flori, ad apicem racemi uniflori, flores 5—6 mm lati. Sepala oblonga, extus ferrugineo-pubescentia, intus purpureo-rubra, siccitate nigra et glandulis magnis ovalibus obtecta. Columna staminea sepalis vix aequalis inferne sericeo-pubescens, superne glabra; antherae 8 uniseriatae. Ovarium ovato-quadrangulare, sericeo-pubescens; stigma 4-lobum, in medio depressum. Capsula 16—25 mm longa, saepe ± curvata, valvae extus sulcatae. Semina 8—12 mm longa, testa circum embryonem undulata.

S. W. Malayische Provinz: Malakka, auf dem Berg Ophir (Lobb n. 169! Ridley n. 3174!, Whitehead); Taiping Hills in Perak (Engler n. 5332!); Goonong Ledang (Griffith n. 4411!); Perak (Wray n. 129!, Burbidge); Larut in Prov. Perak (Kunstler n. 2022!, 2635!, 3307!, 3316!); Gunong Bubu in Perak (Kunstler n. 8018!); Bukit im Staate Selangor (Kensall); Singapore, bei Bubo 1700 m (Murton n. 35!); Kluang Terbang im Staate Pahang (Baring n. 10912!).

Borneo?: Burbidge (Gard. Chron. XVII. (1882) 56) sagt: "*N. sanguinea* is a native of Borneo" und (in Veitch m. s. s.) "only one pitcher brought me by my men". Verf. kennt keine authentischen Exemplare von Borneo.

17. **N. rajah** Hook. f. in Trans. Linn. Soc. XXII. (1859) 421, t. 72 et in DC. Prodr. XVII. (1873) 95; Spencer St. John, Life For. Far East II. (1862) 331, 334; Burbidge, Gard. of Sun (1880) 100, 108, 279; Masters in Gard. Chron. s. 2. XVI (1881) 492 cum icon. xyl. 91, 493; C. Y. in Garden XXII. (1882) 122; Regel in Gartenfl. XXXII (1883) 213; T. Moore in Florist (1883) 166; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 142; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 232; Hemsley in Bot. Magaz. CXXXI. (1905) t. 8017. — Planta robusta brevis erecta non ramosa. Caulis 1—2 m altus × 15—25 mm crassus, cylindricus, internodiis brevibus, juvenilis ferrugineo-hirsutus, demum glaber. Folia 30—60 cm longa × 7—15 cm lata, crasse coriacea, petiolata; petiolus 6—10 cm longus alatus, alae superne angustae, inferne gradatim in basim ad $^3/_4$ amplexicaulem expansae; lamina ovalis apice peltata, supra glabra subtus subscabrida v. minute tuberculata, nervi longitudinales in paria 4 rarius 5 dispositi, par intimum 25—40 mm, par secundum 35—65 mm, par tertium 40—80 mm a costa remotum, paria quarta et quinta proportione decrescente, nervi transversi obliqui irregulares et reticulati; cirrhus 20—50 cm longus × 5—10 mm crassus, sursum gradatim in basim ascidii ampliatus, sparse ferrugineo-hirsutus demum glaber; ascidia juvenilia ampulliformia, os fere transversum postice in collum triangulum elongatum; ascidia matura 15—25 cm longa × 10—15 cm lata ampulliformia, ore lato, juventute hirsuto-pubescentia demum subglabra v. glabra, rubro-purpurea in ascidiis inferioribus usque viridi-rubra in superioribus, alae ventrales inferne angustae superne gradatim ampliatae, v. ut lobi fimbriati 5—12 mm lati a basi ad os productae, os ± obliquum; peristomium 3—6 cm latum, aequale, rubrum v. lurido-purpureum, margo exterior expansus, recurvatus, undulatus, margo interior gradatim v. crebre incurvatus, dentibus pectinatis et oribus prominulis glandularum marginalium immersarum; operculum 10—20 cm latum, cordatum v. cordato-orbiculare, apice rotundato v. emarginato, breviter crasso-pedunculato, suberectum v. inclinatum, extus viridi-purpureum glabrum, intus purpureo-suffusum et striatum, carina media recta v. subauriculata et glandulis multis nectariferis per superficiem totam dispersis; calcar 15—25 mm longum, cylindricum attenuatum; ascidium intus per totum rubrum v. rubro-brunneum nitidum glandulosum, glandulae superne

parvae discretae et immersae, inferne magnae approximatae expositae. Inflorescentia 30—80 cm longa, saepe duae v. quatuor bracteis adjacentibus oppositae productae; racemus ♂ plerumque longior quam ♀; pedunculus 20—40 cm longus × 8—12 mm crassus ± ferrugineo-hirsutus demum glaber; pedicelli 10—30 mm longi biflori, rarius inferne triflori, ad apicem uniflori, ferrugineo-pubescentes, bracteolis linearibus evolutis vel nullis. Flores lurido-rubri, 10—12 mm diametro. Sepala 4 elliptico-oblonga, obtusa, extus et per marginem intus ferrugineo-tomentosa, intus glandulis paucis magnis ovalibus dispersis obsita. Columna staminea sepalis brevior, glabra; antherae 10—16, uni- v. subbiseriatae, serie superiore plerumque transversa. Ovarium subglobosum, ferrugineo-tomentosum; stigma sessile discoideo-depressum 4-gonum. Capsula 15—20 mm longa obovata, sparse ferrugineo-tomentosa demum punctato-glabra, valvae ellipticae stigmatibus bilobis terminatae. Semina 5—6 mm longa, luteo-fusca.

S. W. Malayische Provinz; Borneo: Auf dem Berg Kina Balu, 1500 m (Low!); Kiau und Marie Parie Spur des Berges Kina Balu, 1500—2700 m (Burbidge!); Marie Parie Spur (St. John).

18. **N. Bongso** Korthals, Verh. Nat. Gesch. Bot. (1839) 19 t. 14; Blume, Mus. bot. lugd. bat. II. (1852) 10; Miquel, Pl. Jungh. I. (1851) 167, et Fl. Ind. bat. I. p. 1. (1855) 1070, Suppl. 151; Hook. f. in DC. Prodr. XVII. (1873) 101; Beccari, Malesia III. (1886) 13; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 188. — Planta gracilis scandens, siccitate ± nigra. Caulis 2—3 m altus, × 4—8 mm crassus, leviter v. acute trigonus et striatus, glaber, rufo-punctatus, internodiis et axillis foliorum juvenilibus exceptis quae albido-pubescentes v. subhirsutae sunt. Folia 5—18 cm longa × 1,5—6 cm lata, coriacea, sessilia, semiamplexicaulia, basi leviter expansa et auriculata, elliptico-lanceolata, apice peltata, juventute pubescentia demum glabra, supra lucido-viridia, infra circum apicem peltatum sparse puberula, nervi longitudinales in paria 3—5 dispositi, par intimum 5—10 mm, par secundum 8—15 mm, par tertium 10—18 mm, par quartum 11—20 mm a costa remotum, omnes a basi amplexicauli v. par intimum varia altitudine a costa orientes, nervi transversi radiantes ascendentes; cirrhus 7—20 cm longus, juventute dense pubescens, demum sparse pubescens usque glaber et punctatus, pro rata tenuis, superne gradatim ampliatus et in basim recurvatam ascidii abrupte expansus; ascidia 6—19 cm longa × 2,5—5 cm lata, monomorphia v. subdimorphia, cylindrica v. infundibuliformia, nervi longitudinales basim versus prominentes, sparse pubescentes, brunneo-punctati, zonis densis tomentosis sub peristomio instructa, alae ventrales inferne ± ampliatae, non ciliatae, os versus in nervos prominentes attenuatae, os circulare, transversum v. leviter obliquum, postice in collum breve elongatum; peristomium anguste cylindricum, striis prominentibus obsitum; operculum 2—6 cm latum, orbiculare ad cordatum, extus sparse albido-pubescens, intus brunneo-punctatum et glandulosum, glandulae per medium aliquanto magnae, per marginem minores; calcar breve; ascidium intus sub peristomio glauco-purpureum, opacum et deducens, inferne nitidum glandulosum et detinens, glandulae immersae, superne parvae et approximatae, inferne aliquanto magnae et discretae. Inflorescentia (♂) 5—25 cm, vel (♀) 5—15 cm longa; pedunculus 3—20 cm longus, saepe ± curvatus et flores unilaterales ferens; pedicelli 7—12 mm longi, 1- rarius 2-flori saepe basi ± planati et medium versus bracteolati, albido-pubescentes. Sepala elliptico-ovata, circum marginem dense tomentosa, extus glabra, intus glandulosa. Columna staminea sepalis vix longior, gracilis, inferne sparse pubescens, superne glabra; antherae 5—8 uniseriatae. Ovarium pubescens. Capsula 10—12 mm longa, late obovata, glabra v. sparse puberula, stigmata bilobata. Semina 9—10 mm longa, testa circum embryonem rufa.

S. W. Malayische Provinz; Sumatra: Auf dem Berg Merapi in Menang-Karbau 1500—2000 m (Korthals!); auf dem Berg Loubou Raja (Junghuhn!); auf dem Berg Singalang 1700 m (Beccari n. 183, n. 222, n. 268!).

19. **N. singalana** Beccari, Malesia III. (1886) 12, t. III.; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 185. — Planta terrestris v. epiphytica, ramosa, scandens, saepe siccitate lurido-brunnea v. nigra. Caulis 2—3 m altus × 3—7 mm crassus, 3—4-gonus,

internodiis inferne brevibus, superne ad 7 cm longis, juventute pubescens, demum glaber. Folia 6—20 cm longa × 2,5—4,5 cm lata, sessilia, ad $^2/_3$—$^3/_4$ amplexicaulia, coriacea, elliptico-lanceolata, basi cordata non v. breviter decurrentia, apice in cirrhum gradatim angustata, supra glabra, subtus per costam glabra v. sparse pilosa, juventute basim versus et apice rufo-pilosa, nervi longitudinales in paria 4 rarius 3 v. 5 dispositi, omnia a basi orientia, par intimum 6—10 mm, par secundum 10—16 mm, par tertium 13—20 mm, par quartum 14—22 mm a costa remotum, nervi transversi obscuri versus costam rectangulares v. oblique ascendentes, irregulariter reticulati et areolati; cirrhus 15—25 cm longus × 1—2 mm crassus, proximaliter plano- v. concavo-convexus, superne gradatim ampliatus et in basim recurvatam ascidii ± abrupte expansus; ascidia 10—20 cm longa × 3—9 cm lata, monomorphia v. subdimorphia; inferiora cylindrico-ventricosa, alae ventrales angustae ciliatae v. obscure dentatae; superiora cylindrica, alae ventrales ad nervos prominentes reductae, juventute rufo-pubescentia demum glabra, zonis densis pubescentibus sub peristomio instructa, viridia rubro-maculata v. per totum lurido-rubra, os circulare obliquum, postice in collum triangulum ± elongatum; peristomium 4—12 mm latum, antice cylindricum, latere postico late expansum, superficie valide et aliquanto remote striatum, margine interiore denticulatum; operculum ovato-cordatum v. orbiculare, extus glabrum, intus glandulis multis circularibus ± inaequaliter dispersis obsitum; calcar 2—3 mm longum, planum, obtusum; ascidium intus per dimidium superius glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens, glandulae magnae circulares et remotae. Inflorescentia 10—25 cm longa, saepe 2 v. 3 ex axillis bractearum adjacentium orientes; pedunculus 5—7 cm longus, saepe curvatus, glaber v. puberulus et punctatus; racemus sublaxiflorus; pedicelli 8—12 mm longi, pubescentes uni- rarius bi-flori, saepe medium versus bracteolati. Flores 6—9 mm diametro. Sepala 4 ovata, extus glabra v. basi sparse pubescentia, margine dense tomentosa, intus glandulis multis ovalibus instructa. Columna staminea sepalis longior, glabra; antherae 10—12, uni- v. subbiseriatae. Capsula 15—20 mm longa × 5 mm lata, brunnea, nitida, puberula, v. punctata, valvae lanceolatae, per medium leviter sulcatae, lobi stigmatici crassi, sulcati. Semina 12—15 mm longa, testa circum embryonem undulata.

S. W. Malayische Provinz; Sumatra: Auf dem Berg Singalang, 2880 m (Beccari n. 187!); auf dem Berg Besagi bei Lampong, 2000—2200 m (Forbes n. 1883!, n. 2077!).

Malakka: Auf dem Berge Gunong Tahan im Staate Pahang, 1500 m (Robinson-Wray n. 5411! vergl. Ridley in Journ. Linn. Soc. XXXVIII. (1908) 320, sub nom. *N. Bongso*).

Nota. Haec species *N. Bongso* est magis affinis quam *N. sanguineae*, ut cl. Beccari et Beck putant. A *N. sanguinea* facile distinguenda est glandulis operculis, inflorescentia et capsulis brevibus latis. A *N. Bongso* differt foliis non peltatis, alis latioribus et columna staminea glabra.

20. **N. Vieillardii** Hook. f. in DC. Prodr. XVII. (1873) 104; Zahlbruckner in Ann. K. K. Nat. Hofmus. III. (1888) 271; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 190; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 236; Dubard in Bull. Mus. d'Hist. nat. XII. (1906) 62. — Planta robusta erecta sarmentosa v. scandens. Caulis 1 m et ultra altus × 6—8 mm crassus, obtuse trigonus, glaber, longitudinaliter polite striatus. Folia 10—30 cm longa × 2,5—5 cm lata, coriacea, sessilia v. subpetiolata, semiamplexicaulia, ad 7—20 mm decurrentia, lanceolata, apice acuta v. subobtusa, in cirrhum attenuata, juvenilia villosa v. hirsuta, demum glabra v. subtus per costam sparse villosa, nervi longitudinales in paria 4 v. 5 dispositi, obscuri, omnes a basi folii orientes v. par intimum a triente inferiore costae, par intimum 6—10 mm, par secundum 8—15 mm, par tertium 9,5—18 mm, par quartum 11—21 mm, par quintum 12—23 mm a costa remotum, nervi transversi valde obscuri oblique ascendentes et paralleli; cirrhus 15—30 cm longus versus basim ascidii leviter ampliatus, sparse villosus usque glaber; ascidia 10—15 cm longa × 2,5—4 cm lata, juventute dense albido- v. ferrugineo-pubescentia demum glabra, valde reticulato-nervosa, dimorphia v. subtrimorphia; inferiora ampulliformia v. ventricosa, alae ventrales plerumque ad nervos prominentes inferne reductae

gradatim sursum in alas latas ciliatas expansae; os obliquum postice in collum breve elongatum; ascidia intermedia subcylindrica, inferne leviter ventricosa, medium versus ± contracta, os versus cylindrica, alae angustae ± dentato-ciliatae, os obliquum leviter v. non in collum postice elongatum; ascidia superiora cylindrica v. infundibuliformia, alae ventrales ad nervos prominentes reductae, os transversum leviter obliquum postice non elongatum; peristomium 4—10 mm latum, cylindricum, in ascidiis inferioribus latissimum, crebre et remote striatum; operculum 2,5—4 cm diametro, cordato-orbiculare, extus ± pubescens v. glabrum, intus glandulis paucis v. multis magnis immersis perithecioideis dispersis obsitum; calcar 4—7 mm longum, filiforme, recurvatum; ascidium intus per trientem v. dimidium superius glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens, glandulae profunde immersae. Inflorescentia 20—30 cm longa, ferrugineo-villosa demum fere glabra; pedunculus 5—8 cm longus; racemus anguste elongatus densiflorus; pedicelli 8—12 mm longi uniflori, villosi; flores 8—9 mm diametro. Sepala ovalia, extus et per marginem intus tomentosa, intus glandulis multis parvis obsita. Columna staminea dimidium sepalorum aequans v. brevior, glabra; antherae 8—12, uni- v. subbiseriatae. Ovarium dense sericeo-pubescens, breve, quadratum; stigma sessile 4- rarius 3-lobum, medio depressum. Capsula 18—23 mm longa, sparse albido- v. brunneo-puberula, demum dura brunneo-nitida, punctata, lobis stigmaticis triangulis depressis. Semina 6—7 mm longa, alae inaequilongae, altera longior attenuata, altera brevis obtusa.

Araucarien-Provinz; Neu-Caledonien: Isle of Pines, "growing plentifully in a swampy spot near running water" (Macgillivray!); Isle of Pines, ohne Standort (Paucher n. 423!, Vieillard n. 1121, n. 2161, Germain); Neu-Caledonien: »collines herbeuses situées au Nord de la Conception«, 300 m. alt. (Balansa n. 3079); »collines eruptives de la vallée du Dotio« (Balansa n. 3628); bei Theo (Grunow!); »Mont Roghi, alt. 500 — 800 m. en sol aride« (Brousmiche n. 731); »Hauteur d'Azaro, baie N. Go, terrains ferrugineux« (De Pompery).

Var. β. **Deplanchei** Dubard l. c. — Folia lata, basi ad $^3/_4$ amplexicaulia.

Var. γ. **Montrouzieri** (Dubard l. c., sub titulo speciei). — Capsula 12 mm longa, ovoidea, apice truncata non depressa.

21. **N. hirsuta** Hook. f. in DC. Prodr. XVII. (1873) 99; Beccari, Malesia III. (1886) 4; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 191. — *N. hispida* G. Beck l. c. 187. — Planta humilis scandens. Caulis 2 m altus × 4—5 mm crassus, juvenilis dense adultus ± sparse pilis ferrugineis rigidis saepe patentibus obtectus, inferne dense foliosus internodiis brevibus, superne internodiis 2—4 cm longis. Folia 10—25 cm longa × 2—5 cm lata, subcoriacea, breviter petiolata v. lamina gradatim in basim obliquam ad $^3/_4$—$^7/_8$ amplexicaulem leviter decurrentem transiens, elliptico-obovata, apice in cirrhum attenuata, supra glabra, subtus ± ferrugineo-hirsuta et punctata, nervi longitudinales in paria 4 rarius 5 v. 3 dispositi, a basi folii orientes, par intimum 7—15 mm, par secundum 10—20 mm, par tertium 12—23 mm, par quartum 13—24,5 mm a costa remotum, nervi transversi oblique ascendentes reticulati; cirrhus 15—20 cm longus, inferior saepissime ascidiiferus, superior plerumque haud ascidiiferus, plano- v. concavo-convexus, ferrugineo-hirsutus v. glaber et brunneo-punctatus, in basim ascidii abrupte ampliatus; ascidia 6—20 cm longa × 1—6 cm lata, dimorphia; inferiora ovata v. ventricosa, juventute dense ferrugineo-hirsuta demum ± hirsuta v. fere glabra, viridia purpureo-maculata v. non, alae ventrales 3—5 mm latae, a basi ad os continuatae, ciliatae, os ovatum obliquum, postice in collum breve elongatum; peristomium 3—12 mm latum, cylindricum, antice leviter angustatum, latere postico ± expansum, margine intus dentatum, superficie crebre striatum; operculum ovato-cordatum, extus brunneo-punctatum, intus glabrum glandulis magnis mediis et parvis lateralibus sparsis v. haud sparsis versus marginem; calcar 5—12 mm longum, hirsutum; ascidium intus per trientem v. dimidium superius glauco-purpureum et deducens, inferne nitidum glandulosum et detinens; ascidia superiora cylindracea v. cylindraceo-ovata, alae ventrales angustae ± ciliatae v. non ciliatae, os transversum v. leviter obliquum

vix in collum elongatum; ascidium intus fere v. omnino nitidum, glandulosum. Inflorescentia 10—20 cm longa, juventute et ± adulta ferrugineo-hirsuta; pedunculus 4—6 cm longus; racemus subdensiflorus; pedicelli breves uni- v. biflori. Sepala ovalia, extus et margine interiore ferrugineo-hirsuta, intus glandulosa. Columna staminea villosa demum glabra, sepalis aequalis; antherae 8 uniseriatae. Ovarium sessile, fulvo-hirsutum, stigma sessile. Capsula et semina ignota.

S. W. Malayische Provinz; Borneo: Am Flusse Lawas (Low!, Beccari!, Burbidge!); auf dem Berge Mattang, 600—800 m (Beccari n. 1698!, 2580!); Sarawak, 800 m (Lobb n. 92!); Bakam-Gebirge in Sarawak (Hose!).

Var. α. **typica** Macfarlane. — Caulis et superficies inferior folii pilis longis ferrugineis v. fulvis obsita; folia elliptico-lanceolata, ascidia aliquanto parva (5—8 cm longa), ferrugineo-hirsuta. — *N. hispida* G. Beck l. c.

Borneo: Am Flusse Lawas (Low!, Beccari!, Burbidge!).

Var. β. **glabrata** Macfarlane. — Caulis et superficies inferior folii sparse v. raro hirsuta, adulta rufo-punctata; folia oblanceolata v. obovata, ascidia 10—20 cm longa, sparse hirsuta, rufo-punctata.

Borneo: Sarawak (Lobb!, Hose!).

Nota. Specimina cl. Beccarii in monte Mattang lecta varietates priores conjungunt.

22. **N. Reinwardtiana** Miq. in Pl. Jungh. I. (1851) 168, Fl. Ind. batav. I. p. 1 (1855) 1075, Suppl. (1860) 151, 366, Sumatra (1862) 151, Ill. Fl. Archip. Ind. (1871) 4, pl. 4; Hook. f. in Trans. Linn. Soc. XXII. (1859) 422 (sub nom. *N. Reinwardtii*), et in DC. Prodr. XVII. (1873) 103; Hemsley, Cat. North Gall. Kew ed. 4 (1886) n. 555; Beccari, Malesia III. (1886) 5; Hook. f. Fl. Brit. Ind. V. (1890) 70; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 189. — Planta gracilis ramosa scandens. Caulis 2—3 m altus × 3—7 mm crassus, juventute triangulus demum trigonus v. subcylindricus, angulis duobus alternantibus alatis ab marginibus foliorum decurrentibus. Folia 7—25 cm longa × 1—3,5 cm lata, herbacea v. subcoriacea, sessilia, ad $^1/_2$—$^2/_3$ amplexicaulia, leviter v. per dimidium internodii inferioris decurrentia, lineari-lanceolata, saepe supra basim leviter constricta, apice acuto v. subobtuso, supra et subtus glabra, nervi longitudinales plerumque in paria duo rarius 3 v. 4 dispositi, par intimum 6—12 mm a costa remotum et ad medium v. a medio costae oriens, par secundum 7—14 mm a costa remotum, paria tertia et quarta valde obscura saepe superne cum pari secundo conjuncta et omnia a basi folii orientia, nervi transversi obscuri distantes, irregulariter et oblique ascendentes; cirrhus 15—30 cm longus gracilis, plano-convexus sursum gradatim in basim ascidii recurvatam et nonnunquam abrupte expansam ampliatus; ascidia 10—20 cm longa × 2—4 cm lata monomorphia v. subdimorphia, cylindrica v. subcylindrica, in medio leviter constricta basim versus ± ventricosa aequalia v. os versus ± expansa, glabra, membranacea, pallido-viridia v. purpureo-viridia, alae ventrales reductae, in ascidiis inferioribus 2—3 mm latae, non ciliatae, in ascidiis superioribus ad nervos prominentes reductae, quae gradatim in nervos tenues circum os curvatos solutae sunt, os obliquum ovatum; peristomium 2—4 mm latum cylindricum aequale, obscure striatum; operculum elliptico- v. orbiculari-cordatum, extus glabrum intus glandulis multis minutis per totum dispersis obsitum; calcar 3—4 mm longum simplex gracile; ascidium intus per dimidium v. duas partes superiores glauco-violaceum maculis duabus ovalibus brunneis ad basim areae triangularis posterioris, opacum et deducens, inferne viride v. fuscum, nitidum glandulosum et detinens, glandulae superiores multae parvae immersae, inferiores ovales v. circulares et exsertae. Inflorescentia in planta ♂ 20—45 cm longa, in pl. ♀ 10—15 cm; pedunculus fusco-tomentosus racemo aequilongus; racemus laxiflorus; pedicelli 10—20 mm longi, inferiores biflori, superiores uniflori. Flores 4—5 mm diametro. Sepala elliptico-lanceolata, extus fusco-tomentosa demum glabra, intus glabra et glandulis multis ovalibus per medium obsita. Columna staminea sepalis longior, inferne fusco- v. ferrugineo-tomentosa, superne glabra; antherae 8, uniseriatae. Ovarium dense brunneo-tomentosum; stigma 4-lobatum, concavum. Capsula 25—30 mm longa, fusiformis, tetragona, subglabra nitida, tenuiter

striata, valvae lanceolatae stigmatibus triangularibus. Semina 15—17 mm longa, testa circum embryonem brunnea, alae pallidae.

S. W. Malayische Provinz; Malakka: Singapore (Wallich non n. 2244 Cat. ut Hooker f. indicat quae *N. gracilis* est, sed spec. inscrip. »prope Kuttalam lecta ab amicis Michel«!); Luiggi in Prov. Pahang, 30—60 m (Hullett n. 5693!, 5716!).

Sumatra: »In monte Simur-woasas ca. 1400 m alta«, »in dumetis prope Pugerutang ca. 600 m« (Junghuhn n. 740!); West-Küste (Teysmann n. 325!, 539!); Padangsche Bovenlanden (Burck n. 16!).

Banka (sub nom. *N. Korthalsiana* in Herb. Calc. Teysmann n. 3510, Miq. det.!; Kurz n. 1206!).

Borneo: Auf dem Berg Mooloo, 1000 m (Low!); bei Sarawak (Lobb n. 86!, Beccari!).

Einheim. Namen: Ketakong-Kidjang, akar-taboeng-taboeng.

23. **N. Copelandii** Merrill msc. — Caulis circiter 1 m altus, cylindricus, leviter sulcatus, glaber v. juventute sparse fulvo-puberulus, in axillis foliorum juvenilium ferrugineo-pubescens. Folia 10—15 cm longa × 2—3,5 cm lata, subcoriacea, petiolata; petiolus 2—3 cm longus, basi ad $^1/_3$—$^1/_2$ amplexicaulis, alatus, alae gradatim a basi in laminas ampliatae; lamina elliptica, inferne ± abrupte angustata, superne in cirrhum attenuata, supra glabra nisi basim costae versus quae ± pubescens est, subtus sparse pubescens, nervi longitudinales in paria 3 dispositi, a triente inferiore costae orientes, par intimum 9—11 mm, par secundum 11—13 mm, par tertium 12—14,5 mm a costa remotum, nervi transversi distantes ascendentes et reticulati; cirrhus 10—25 cm longus, juventute dense fulvo-pubescens, gracilis, sursum ampliatus et in basim recurvatam ascidii abrupte inflatus; ascidia 10—13 cm longa × 3—3,5 cm lata, monomorphia v. subdimorphia; inferiora tubulosa v. tubuloso-infundibuliformia; superiora infundibuliformia, nervi longitudinales tenues nervis multis transversis conjuncti, minute fulvo-puberula, sub peristomio dense fulvo-tomentosa, pallido-viridia, purpureo-erubescentia v. maculata, alae ventrales ad nervos longitudinales reductae, os obliquum, postice in collum triangulum 0,5—1,5 cm longum elevatum; peristomium 4—5 mm latum, cylindricum, antice ± angustatum, latere postico ampliatum et sub operculo marginibus convergentibus, postice in collum elevatum, striae crebrae, tenuiores; operculum 3,5—4 cm diametro, cordato-orbiculare, pallido-viride purpureo-maculatum, extus glabrum, intus glandulosum, per lineam basalem mediam tumidum sed non carinatum, glandulae diffusae magnae, circulares v. ovales; calcar 8—10 mm longum, tenue; ascidium intus per trientem superiorem glauco-purpureum, opacum et deducens, inferne glandulosum et detinens, glandulae superiores parvae, ovales, leviter immersae, inferiores ovales v. circulares et exsertae. Inflorescentia 20—30 cm longa; pedunculus 10 cm longus sparse fulvo-pubescens demum glaber; pedicelli inferne biflori, superne uniflori. Sepala ovalia usque obovata, extus dense fulvo-tomentosa, intus glandulosa. Columna staminea sepalis aequalis, inferne tomentella superne glabra; antherae 10—12, uniseriatae ± complanatae. Ovarium ovatum, pubescens, lobis stigmaticis sulcatis purpureis. Capsula 15—20 mm longa × 5—6 mm lata ± puberula brunneo-nitida, lobis stigmaticis prominentibus sulcatis. Semina 8—10 mm longa, tenuia, lutea.

Provinz der Philippinen: Ins. Mindanao, auf dem Berg Apo 1600 m (Copeland n. 1033!).

Nota. Hujus speciei exemplaria mihi missa sunt ab cl. Merrill, qui ea pro specie nova agnovit.

24. **N. eustachya** Miq. Fl. Ind. bat. I. p. 1 (1855) 1074, Suppl. 151, p. 3 t. 3, Fl. de l'Arch. Ind. (1871) 3, pl. III; Hook. f. in DC. Prodr. XVII. (1873) 99; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 217. — Planta gracilis, scandens, siccitate fusconigra. Caulis 3—5 mm crassus, subcylindricus, nitido-glaber, internodiis superne 2—3 cm longis. Folia 15—20 cm longa × 3—5 cm lata, coriacea, petiolata; petiolus 3—5 cm longus alatus, basis leviter expansa, ad $^1/_2$ amplexicaulis, sursum in laminam gradatim ampliatus; lamina obovata v. oblongo-lanceolata, ad apicem ± peltata, rarius

obtusa, per superficiem superiorem costae glabra praeter apicem peltatum ferrugineo-pubescentem, nervi longitudinales in paria 4, rarius 3 dispositi, par intimum 12—15 mm, par secundum 16—20 mm, par tertium 18—22,5 mm, par quartum 19—24 mm a costa remotum, par intimum a triente inferiore costae oriens, paria cetera a basi abeuntia, nervi transversi obscuri ascendentes, paralleli, sinuosi; cirrhus 15—30 cm longus, plano-convexus, tenuis, versus basim ascidii gradatim ampliatus; ascidia 10—15 cm longa × 3—3,5 cm lata, monomorphia, subcylindrica, inferne ± ventricosa, medium versus constricta, os versus ± expansa, glabra zona angusta ferrugineo-tomentosa sub peristomio excepta, alae ventrales angustae ad nervos non ciliatos reductae, os obliquum rotundatum v. ovatum; peristomium 2—3 mm latum, cylindricum aequale crebre striatum; operculum 2,5—3,5 cm latum, cordato-orbiculare, intus zona marginali fusco-tomentosa et glandulis multis minutis diffusis instructum; calcar 4—5 mm longum; ascidium intus per dimidium superius vel profundius glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens, glandulae superiores parvae immersae, inferiores magnae circulares exsertae. Inflorescentia 20—40 cm longa; racemus laxus fusco-puberulus; pedicelli tenues, inferne biflori, superne uniflori. Sepala ovalia, extus fusco-tomentosa, intus glandulis minutis obsita. Columna staminea gracilis, sepalis longior; antherae 8 uniseriatae. Flores foeminei et fructus ignoti.

S. W. Malayische Provinz; Sumatra: Westküste bei Siboga (Teysmann n. 529!).

Einheim. Name: Katoepat-baroek (Filet, Plantkundig Woordenboek).

25. **N. villosa** Hook. f. Icon. pl. (1852) t. 888, et in Trans. Linn. Soc. XXII. (1859) 420 t. 69; Spencer St. John, Life For. Far East I. (1862) 285, 345 cum icon. col.; Hook. f. in DC. Prodr. XVII. (1873) 94; Burbidge, Gard. of Sun (1880) 100, 280, 344, et in Gard. Chron. s. 2. XVII. (1882) 56; Macfarlane in Ann. of Bot. VII. (1893) 426; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 183; Veitch et Burbidge in Journ. Roy. Hort. Soc. XXI. (1897) 232, 258. — Non *N. villosa* Hook. f. in Bot. Magaz. LXXXIV. (1858) t. 5080, et Lemaire in Ill. Hort. XVI. (1869) 46 icon. 45, quae *N. Veitchii* sunt. — Planta terrestris inter suffrutices vagans v. scandens. Caulis 2—3 m longus × 6—10 mm crassus, subcylindricus, internodia ± elongata, juventute dense fusco-villosus, demum glaber. Folia 15—25 cm longa × 6—8 cm lata, coriacea, petiolata; petiolus 3—7 cm longus, crassus, anguste alatus, basi expansa ad $^1/_2$—$^3/_4$ amplexicaulis, sursum in laminam abrupte ampliatus, ± fusco-villosus; lamina elliptica, apice inaequaliter biloba v. peltata, supra glabra v. per costam ± villosa, subtus villosa v. glabra, nervi longitudinales in paria 3 rarius 4 dispositi, par intimum 25—30 mm, par secundum 29—35 mm, par tertium 31—37 mm a costa remotum, omnia ad apicem in cirrhum curvata, nervi transversi 2—3 mm separati oblique radiantes; cirrhus 30—50 cm longus × 4—5 mm crassus, aequale, in basim ascidii abrupte expansus; ascidia 10—18 cm longa × 8—10 cm lata, monomorphia, obconica v. subpyriformia, os versus leviter constricta, ± fusco-villosa v. subglabra, inferne viridia, superne rubra v. rubro-persicina, alae ventrales basi ad nervos prominentes reductae, sursum gradatim ampliatae et non ad medium ciliatae, dein os versus in alas latas ciliatas expansae, quae ante os prolongatae sunt, os circulare, postice in collum 3—5 cm altum elongatum; peristomium (simile *N. Edwardsianae*) 1,5—2 cm latum, obliquum, postice in collum elevatum, superficie in lamellas magnas transversas 6—8 mm profundas 4—8 mm separatas expansa, lamellae extus recurvatae, intus decurvatae et in dentes pallido-rubros longos deflexae; operculum 5—9 cm latum cordato-orbiculare, per medium viride v. rubrum, extus villosum intus carinatum et glandulis multis adspersum; calcar 8—12 mm longum, filiforme, hirsutum; ascidium intus per collum triangulum postice et sub peristomio glaucum opacum et deducens, dein per zonam angustam nitidam non glandulosam, inferne nitidum glandulosum et detinens, glandulae superiores parvae, discretae, immersae, inferiores magnae, approximatae ± exsertae. Inflorescentia 25—50 cm longa, dense fusco-villosa; pedunculus 15—30 cm longus × 7—8 mm crassus; racemus densiflorus; pedicelli 8—10 mm longi, uniflori, ferrugineo-hirsuti, basi v. sub flore bracteolati.

Sepala oblonga, extus per medium ferrugineo-villosa, per marginem glabra, intus glandulis per medium dispersis. Columna staminea sepalis brevior, glabra; antherae 8—12 uni- v. subbiseriatae. Ovarium ovatum ferrugineo-tomentosum; stigma 4-lobum medio depressum, lobi sulcati. Capsula sessilis, brevis, crassa, dense villoso-tomentosa. — Fig. 9.

S. W. Malayische Provinz; Borneo: Auf dem Berge Kina Balu 2700—3000 m (Low!); »Low Gully«, Kina Balu, 1500—2500 m (Spencer St. John); Kina Balu, 3000—3100 m (Burbidge!); Kiau bei dem Tampassug-Flusse (Whitehead).

Nota. *N. villosa* et *N. Edwardsiana* inter sese species simillimae ut pro varietatibus unius eiusdemque speciei possint haberi. Examinatione microscopica probatur, illas species distinctas esse. Atque Burbidge demonstravit *N. villosam* more crescendi terrestri et situ altiore a *N. Edwardsiana* prorsus differre. Utraque species loco natali inter se hybridas procreare videntur (v. p. 54).

26. **N. Edwardsiana** Hook. f. in Trans. Linn. Soc. XXII. (1859) 420 t. LXX; Spencer St. John, Life in For. Far East I. (1862) 335 t. 336; Burbidge, Gard. of Sun (1880) 100, 108, 280, 284, 344, et in Gard. Chron. ser. 2. XVII. (1882) 56; Macfarlane in Ann. of Bot. VII. (1893) 433; Stapf in Trans. Linn. Soc. Bot. IV. (1894) 69; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 183; Burbidge in Journ. Roy. Hort. Soc. XXI. (1897) 258. — *N. Edgeworthii* Reichb. f. herb. ex G. Beck l. c. 183. — Planta saepe epiphytica, Casuarineas et arbores alias ascendens. Caulis 3—9 m longus × 8—12 mm crassus, cylindricus v. ± trigonus, juventute ferrugineo-puberulus demum glaber. Folia 20—30 cm longa × 6—10 cm lata, coriacea, petiolata; petiolus 6—10 cm longus, validus, alatus, basis ad $^2/_3$ amplexicaulis, alae non v. leviter decurrentes pilis longis fuscis sparsis obsitae; lamina elliptica v. oblonga inferne in petiolum angustata, ad apicem rotundata v. in cirrhum attenuata, supra glabra subtus glabra et punctata, marginibus et costa ± hirsuta, nervi longitudinales 4—5 obscuri, par intimum 25—35 mm, par secundum 29—40 mm, par tertium 30—44 mm, par quartum 31—43 mm a costa remotum, nervi transversi radiantes v. ascendentes, 2—3 mm

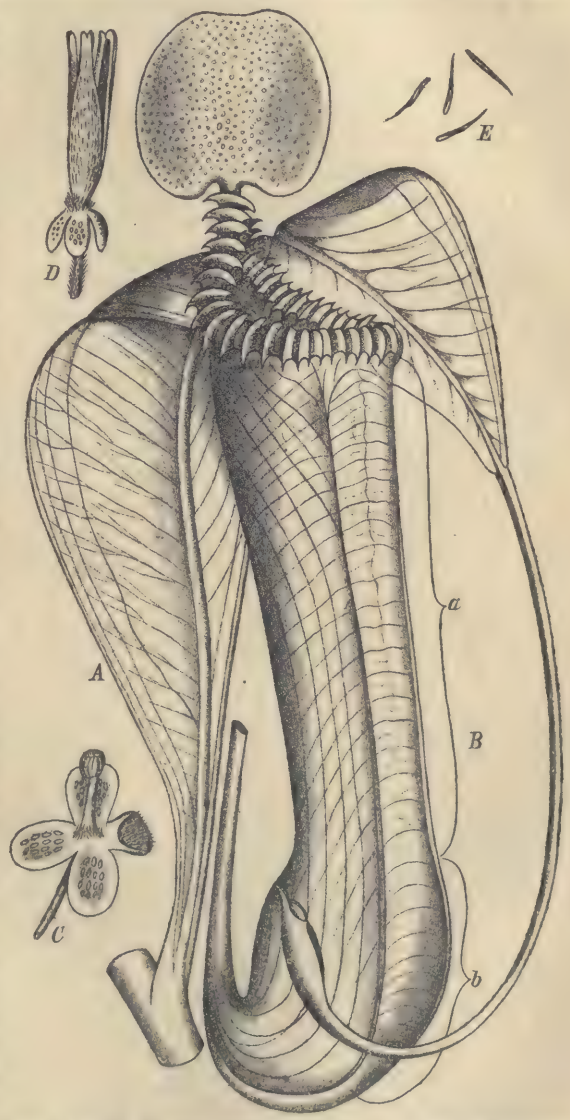

Fig. 16. *N. Edwardsiana* Hook. f. *A* Folium caulinum cum ascidio abortivo. *B* Ascidium; *a* area deducens, *b* area detinens. *C* Flos ♂. *D* Fructus. *E* Semina. (Icon. origin.)

inter se separati; cirrhus 30—60 cm longus × 3—6 mm crassus, cylindricus, in basim ascidii recurvatam abrupte ampliatus, juventute dense ferrugineo-pubescens demum glaber; ascidia 20—50 cm longa, × 4—7 cm lata, monomorphia, ± puberula v. glabra, dimidio inferiore leviter ventricosa et coeruleo-viridia, dimidio superiore cylindrica, rubra, alae ventrales 0, v. a basi sursum gradatim ampliatae et ± ciliatae, os subcirculare; peristomium magnum 1,5—2 cm latum, obliquum, postice in collum 3—5 cm altum elongatum, caro tinctum, superficie in lamellas transversas 6—8 mm profundas et 4—8 mm inter se separatas elevata, margo exterior recurvatus, interior in dentes magnos deflexus; operculum 6—10 cm longum × 5—9 cm latum, cordato-ovatum v. cordato-orbiculare, extus glabrum intus glandulosum, glandulae multae, parvae, dense aggregatae; ascidium intus per dimidium superius v. profundius glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens, glandulae superne parvae discretae profunde immersae, inferne magnae approximatae et subexsertae. Inflorescentia 30—40 cm longa, rufo-tomentella; pedunculus 15—25 cm longus validus; racemus ± densiflorus; pedicelli 1,5—2 cm longi uniflori. Flores 7—12 mm lati, ♂ minores quam ♀. Sepala elliptica v. obovata, extus ferrugineo-pubescentia, intus glandulis paucis parvis mediis adspersa. Columna staminea 3 mm longa, inferne ferrugineo-pubescens superne glabra; antherae 8—12, uniseriatae v. antheris duabus superioribus transversis. Capsula 20—22 mm longa × 5 mm lata, fusiformis, breviter pedunculata, ferrugineo-puberula v. brunneo-nitida, valvae stigmatibus obtusis triangulis terminatae. Semina tenuia, 8—9 mm longa. — Fig. 16.

S. W. Malayische Provinz; Borneo: Auf der nördlichen Seite des Berges Kina Balu bis 2000 m (Low!); "on the sunny southern spur" up to 2700 m (Burbidge!); auf dem Kiau-Rücken, 1500 m (Burbidge!); "spur of Kina Balu" (Spencer St. John).

N. Edwardsiana × villosa Burbidge. — *N. Harryana* Burbidge in Gard. Chron. I. (1882) 56, etiam in litt. ad Hook. f. in Herb. Kew. et ad auctorem. — Ascidia sparse villosa, alae ventrales elongatae, aliquanto angustae, ciliatae; magnitudine et forma operculi, altitudine et spissitudine zonae deducentis intermedia.

Borneo: "South spur of Kina Balu" about 3000 m (Burbidge!).

Nota. Plantae duae epiphyticae ejus hybridae a Burbidge loco natali in vicinia parentis utriusque lectae sunt. Cl. Burbidge characteres intermedios observavit, et nomen supra citatum in honorem cl. Harry Veitch proposuit. Hanc sententiam auctor materiem microscope scrutatus sequitur.

27. **N. ventricosa** Blanco, Fl. Filip. ed. 1. (1837) 807, ed. 2. (1845) 556, ed. 3. III. (1879) 215, IV. (1880) app. 173: Blume, Mus. bot. lugd. batav. II. (1852) 10; Hook. f. in DC. Prodr. XVII. (1873) 100; Rolfe in Gard. Chron. ser. 3. XXIII. (1898) 380; Masters in Gard. Chron. ser. 3. XXX. (1901) 312 cum ic. xyl. 313; Veitch, Hort. Veitchii (1906) 486. — Planta terrestris v. epiphytica, humiliter scandens, luteo-viridis v. viridis. Caulis 1—2 m altus × 7—9 mm crassus, cylindricus usque obtuse trigonus, glaber, internodiis brevibus. Folia 15—25 cm longa × 2—3 cm lata, crassa, herbacea usque subcoriacea, circum caulem approximata, sessilia, ad $^2/_3$ amplexicaulia, breviter decurrentia, inferiora linearia usque lineari-lanceolata basi leviter dilatata, superiora elliptico-lanceolata basim versus ± angustata, glabra, nervi longitudinales in paria 6 raro 5 dispositi, obscurissimi, par intimum 3—5 mm, par secundum 5—8 mm, par tertium 7—11 mm, par quartum 8,5—13 mm, par quintum 9,5—14 mm a costa remotum, par sextum tenellum intramarginale, omnia a basi folii orientia, nervi transversi obscuri, irregulariter et oblique ascendentes; cirrhus 10—20 cm longus, gracilis, fere plano-convexus, versus basim ascidii rotundatus, glaber; ascidia 10—16 cm longa × 3—6 cm lata monomorphia v. subdimorphia, inferiora cylindrico-ventricosa, superiora inferne valde ventricosa, in medio constricta, os versus late expansa, crassa, sub-succulenta, glabra v. minute puberula, pallido- ad albido-viridia, saepe ± rubro-erubescentia, alae ventrales ad nervos leviter prominentes reductae, os ellipticum, transversum; peristomium 10—25 mm latum, rubrum v. viridi-rubrum, margo externus amplus, expansus, reflexus, undulatus, margo internus

aequaliter denticulatus, per totam superficiem conspicue striatus; operculum 4—5 cm × 2—2,5 cm ovato-cordatum, herbaceum v. sub-membranaceum, margine interiore ascidii multo minus, viride ad viridi-rubrum, extus glabrum v. minute puberulum, intus glandulis circularibus irregulariter et sparse diffusis obsitum, nervi laterales in paria 3—4 dispositi; calcar 5—10 mm longum, truncatum; ascidium intus ab ore deorsum nitidum glandulosum et detinens, inferne rubro-viride v. rubrum, glandulae superne multae, minutae, profunde immersae, inferne magnae, exsertae, approximatae et ovales v. circulares. Inflorescentia 30—60 cm longa, ♂ longior quam ♀, laxiflora, ferrugineo-puberula; pedunculus 15—20 cm longus; pedicelli 12—25 mm longi, capillares, uniflori. Sepala elliptica v. obovata, extus ferrugineo-puberula intus purpurea et glandulis multis minutis dispersis obsita. Columna staminea sepalis longior, basis ferrugineo-puberula, superne glabra; antherae 8, uniseriatae. Ovarium breviter pedunculatum, ferrugineo-pubescens. Capsula 17—20 mm longa, fusiformis, stipitata, sparse puberula v. brunneo-nitida, valvae ellipticae lobis stigmaticis inconspicuis divergentibus. Semina 7—8 mm longa.

Provinz der Philippinen: Insel Luzon, ohne Standort (Cuming n. 947); Piddig, Balanga, Bongabong, S. Mateo (Blanco); Montalban (Loher n. 417!); Isarog, S. Mateo, Siniloan, Benguet, Piddig, Balanga, Bongabong (Vidal!); Ins. Visayas (Blanco).

28. **N. Burkei** Masters in Gard. Chron. ser. 3. VI. (1889) 492 f. 69 et 566, ser. 3. VIII. (1890) 184; Veitch, Hort. Veitchii (1906) 300, 486. — Aspectus ut in *N. ventricosa*. Folia 20—25 cm longa × 3—3,5 cm lata, crassa, herbacea ad coriacea, linearilanceolata, basim versus leviter angustata dein deorsum expansa, ad $^1/_2$—$^2/_3$ amplexicaulia, ± decurrentia, glabra et brunneo-punctata, nervi et cirrhus ut in *N. ventricosa*; ascidia 10—20 cm longa × 3—7 cm lata, subdimorphia; inferiora cylindrica inferne leviter ventricosa; superiora leviter v. satis valde prope v. supra medium constricta, inferne ± ventricosa, os versus leviter ampliata, glabra v. sparse pubescentia et brunneo-punctata, inferne viridia v. rubro-viridia maculis rubris, superne late viridi- et rubro-maculata, alae ventrales ut in *N. ventricosa*, os ovatum, oblique directum; peristomium 15—25 mm latum, rubrum v. obscure purpureum, margo exterior amplus, expansus, reflexus, undulatus, margo interior denticulatus, superficie crebre striata; operculum 5—8 cm longum × 3—5 cm latum, ovato-cordatum, orificio ascidii multo majus, per superficiem pallido-viridem, rubro- v. purpureo-maculatum, extus minute pubescens, intus glandulis circularibus in duas series latere utroque lineae mediae dispositis obsitum, nervi laterales 6—7-paria; calcar 7—10 mm longum; ascidium intus ad $^1/_6$—$^1/_2$ glauco-purpureum v. rubrum, opacum et deducens, inferne viridi-rubrum v. rubrum, glandulosum et detinens, glandulae ut in *N. ventricosa*. Inflorescentia et flores ut in proxima, sed antherae 8—10, uniseriatae v. subbiseriatae.

Provinz der Philippinen: Ohne Standort (Burke!); Insel Mindoro, auf dem Berge Dulangan, 1600 m (Whitehead!); auf dem Berge Halcon, 1300 m (Merrill n. 4392!).

Nota. Species valde affinis *N. ventricosae*, quacum forsan serius speciminibus numerosioribus allatis loco varietatis bene distinctae conjungenda erit. Characteres speciei certe satis multi et constantes sunt: consistentia foliorum tenuior, basis eorum saepe contracta, os ovatum non ellipticum et transversum, operculum majus nervis in paria 6—7 (nec solum 3—4) dispositis, ascidia maculata, peristomium fusco-purpureum, superficies deducens satis alta, antherae majores.

Var. *β.* **excellens** Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 233, Hortus Veitchii (1906) 300. — Ascidia pro rata brevia, lata, rubro-viridia usque rubro-purpurea, maculis densis purpureis late diffusis, peristomium per marginem exteriorem strictum undulatum.

Ohne Standort (ex Hort. Veitch.).

Var. *γ.* **prolifica** Mast. in Gard. Chron. ser. 3. VIII. (1890) 184. — Folia quam in forma typica angustiora, dense congesta, ascidia copiose producta, pallido-viridia, maculis parvis rubris.

Ohne genauen Standort (ex Hort. Veitch.).

29. **N. melamphora** Blume, Cat. Hort. Buitenz. (1823) 111 et Mus. bot. lugd. batav. II. (1852) 8 t. 1; Hook. f. in Trans. Linn. Soc. XXII. (1859) 423 et in DC. Prodr. XVII. (1873) 101; Beccari, Malesia III. (1886) 13; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 186; Hemsley in Cat. North Gall. Kew. ed. 4. (1886) n. 662. — *N. gymnamphora* Reinw. in litt. ad Nees v. Esenbeck in Ann. sc. nat. III. (1824) 365, t. 19, 20 f. 1; Korth. Verh. Nat. Gesch. Bot. (1839) 32 t. 3; Miq. Pl. Jungh. (1851) 169 et Fl. Ind. batav. I. p. 1 (1855) 1072; Massart in Bull. Soc. Roy. Bot. Belg. XXXIV. (1895) 253; Heinricher in Ann. Jard. Bot. Buitenz. ser. 2. V. (1906) 277. — Non *N. melamphora* Villar in Fl. Filip. ed. 3. IV. (1880) 173 quae *N. Blancoi* est. — Planta robusta ramosa scandens. Caulis 2—3 m altus × 7—10 mm crassus, ascendens v. prostratus nodosus subrhizomatosus et ramos ascendentes ferens, rami prostrati ad nodos radicantes et fasciculos ascidiorum circiter 5—10 gerentes ut in *N. ampullaria*, rami ascendentes obscure trigoni glabri v. sparse hirsuti. Folia ramorum prostratorum 4—5 cm longa × 1—1,5 cm lata, sessilia, fasciculata; folia ramorum ascendentium 20—35 cm longa × 5—8 cm lata, remota, lanceolata v. obovata, sessilia, basim versus angustata v. in petiolum breviter alatum producta, $^1/_2$-amplexicaulia, non v. raro leviter decurrentia, supra glabra subtus ferrugineo-puberula demum brunneo-punctata, nervi longitudinales in paria 5 rarius 4 dispositi, par intimum 9—12 mm a costa remotum et a medio v. infra medium costae oriens, par secundum 13—17 mm a costa remotum et a quarta inferiore costae oriens, par tertium 14,5—19 mm a costa, par quartum 15—20 mm a costa, par quintum 15,5—21 mm a costa, tria ultima a basi folii orientia, nervi transversi obliqui ascendentes; cirrhus 10—20 cm longus plano- v. concavo-convexus, ferrugineo-pubescens v. glaber, ascidia 8—16 cm longa × 2,5—6 cm lata, semimembranacea, dimorphia, inferiora (terrestria) saepe fasciculata, ampulliformia v. ovata, ferrugineo-hirsuta v. subglabra, rubro-viridia maculis magnis purpureis et superficiebus irregularibus diffusis, alae ventrales 6—8 mm latae, longe ciliatae, os obliquum, postice in collum triangulum elongatum; peristomium 6—15 mm latum, antice cylindricum et ± angustatum, postice ± transverse expansum et in collum sursum elongatum, crebre striatum, margine intus longe (2—5 mm) pectinatum; operculum 4—6 cm longum × 3—4,5 cm latum, ovatum, basi leviter cordatum, extus purpureo-maculatum et ± ferrugineo-pubescens, intus glandulis parvis magnis ovalibus per medium obsitum; calcar 7—10 mm longum filiforme simplex v. 2—3-fidum, pubescens; ascidium intus per quadrantem v. trientem superiorem glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens; ascidia superiora aliquanto rara, cirrhi foliorum saepissime ascidiis abortivis terminati, ascidia cylindrica v. infundibuliformia, alae ventrales angustae ± ciliatae, v. ad nervos prominentes reductae, os leviter obliquum in collum breve elongatum; peristomium aequale; operculum cordato-orbiculare, 3—5 cm latum, intus ad duarum partium spatium glauco-purpureum opacum et deducens, inferne fusco-purpureum glandulosum et detinens. Inflorescentia 25—40 cm longa, ferrugineo-hirsuta demum inferne glabra; pedunculus 10—25 cm longus, racemus ± laxiflorus; pedicelli 12—20 mm longi biflori v. superne uniflori, saepe bracteolati. Sepala ovalia, extus et per marginem interiorem ferrugineo-tomentosa, intus copiose glandulosa. Columna staminea sepalis aequilonga v. longior, ferrugineo-puberula demum superne glabra; antherae 8, rarius 6, uniseriatae. Ovarium ovatum, breviter pedunculatum, ferrugineo-pubescens; stigmata 4 crassa, prominentia, leviter sulcata. Capsula 30—35 mm longa, pedunculata, parce pubescens v. hirtella, valvae lanceolatae, stigmatibus leviter inclinatis obscure bilobis. Semina 15 mm longa, gracilia attenuata.

S. W. Malayische Provinz; Java: Mahe, in der Nähe von Solfatar Kawaspanda, 1500 m (Reinwardt!); auf dem Berge Pangerango bei Tapos, 1600 m (Junghuhn n. 564!); im westlichen Teile von Java (Blume!, Kuhl!, van Hasselt, Korthals!); bei Tjibodas (Fleischer!, Engler n. 4844!); Pangerango bei Tjibodas, 2500—2700 m (Beccari!, Kurz!); auf dem Berge Malabar, 1200—2200 m (Anderson n. 280).

Var. β. **haematamphora** Miq. Pl. Jungh. (1851) 169. — Folia acuta lanceolata, ascidia lurido-rubra.

Java: Auf den Bergen Patoua und Merapi, 800—1200 m (Junghuhn!).

Var. γ. **tomentella** Beccari, Malesia III. (1886) 13. — Folia infra, costae, cirrhi et gemmae dense ferrugineo-pubescentes.

Sumatra: Auf dem Berge Singalan, 1600 m (Beccari n. 48!, Curtis!, Forbes!).

Einheim. Namen: Daoen-kendi, Pakoe serok radja.

30. **N. Deaniana** Macfarlane sp. nov. — Planta pumila, per innovationes dispersa, non v. leviter scandens. Caulis 2—3 dm altus × 4—5 mm crassus, glaber, foliorum basibus amplexicaulibus obtectus. Folia 6—12 cm longa × 3,5—4 cm lata, coriacea, obovato-lanceolata, sessilia v. subpetiolata, in basim late ad $^1/_2$—$^2/_3$ amplexicaulem gradatim angustata, sursum in cirrhum attenuata, supra glabra, subtus glabra et brunneo-punctata, costa excepta quae pilis longis diffusis adpressis obsita est, nervi longitudinales in paria 5—6 dispositi, par intimum a triente superiore costae oriens, par secundum a dimidio inferiore costae, par tertium et paria succedentia a basi v. prope basin laminae orientia, par intimum 4—6 mm, par secundum 6—8 mm, par tertium 8—9,5 mm a costa remotum, paria cetera proportione decrescente, nervi transversi valde obscuri, irregulariter reticulati; cirrhus 10—15 cm longus, plano- v. concavo-convexus, juventute supra dense ferrugineo-hirsutus demum sparse puberulus, infra glaber, in basim ascidii abrupte ampliatus; ascidia 6—9 cm longa × 2,5—3,5 cm lata, obconica, membranacea, juventute ferrugineo-hirsuta demum glabra, zona densa ferrugineo-pubescente sub peristomio instructa, alae ventrales angustae v. ad 3 mm latae, longe ciliatae, os transversum v. leviter obliquum, postice in collum ad 1—1,5 cm longum elevatum; peristomium 5—8 mm latum, cylindricum, crebre striatum, margo interior pectinatus, postice elevatus, leviter angustatus et sub operculo parallelus; operculum 1,5—2,5 cm diametro, ovatum ad cordato-orbiculare, extus et margine interiore puberulum, intus glandulis parvis circularibus obsitum, glandulae medio copiosissimae; calcar 2 mm longum, filiforme; ascidium intus per collum posterius glauco-purpureum, opacum et deducens, ab ore deorsum nitidum glandulosum et detinens, glandulae parvae discretae et immersae. Inflorescentia ♂ 20 cm longa, juventute ferrugineo-pubescens, demum glabra; pedunculus et racemus aequilongus; pedicelli 8—12 mm longi, basim versus dilatati et compressi, sub medio bracteolati, ferrugineo-pubescentes usque glabri, uniflori. Flores 5—6 mm diametro. Sepala ovalia, extus dense ferrugineo-pubescentia, intus glandulis multis minutis nectariferis tecta. Columna staminea fere sepalis aequalis, glabra; antherae 8, uniseriatae. Flores pistiliferi et fructus ignoti.

Philippinen: Häufig auf der Spitze des Berges Pulgar, auf der Insel Palawan, 1300 m (Curran n. 3891; spec. typica in Herb. Manilla!).

Nota. Nominata in honorem cl. Dean C. Worcester, Secretarii interioris et exploratoris indefatigabilis illius regionis.

31. **N. Alicae** F. M. Bailey in Queensl. Agric. Journ. III. (1898) 355 pl. 60. — Planta pumila non scandens. Caulis ascendens, 1—3 dm longus × 3—5 mm crassus, tenuis, erectus, ex rhizomate brevi repente oriens, internodiis brevibus. Folia 4—10 cm longa × 1—2 cm lata, sessilia, ad $^1/_2$—$^2/_3$ amplexicaulia, linearia ad lanceolata, gradatim basim versus angustata, apicem versus attenuata, supra et subtus glabra, nervi longitudinales in paria 5 dispositi, par intimum 3 mm, par secundum 5 mm, par tertium 6,5—7 mm, par quartum 8—8,5 mm, par quintum 8,5—9 mm a costa remotum, nervi transversi radiantes, ramosi et sinuosi; cirrhus 5—8 cm longus, tenuis, aequus, aliquanto abrupte in basim ascidii recurvatam ampliatus; ascidia 5—7 cm longa × 1—1,5 cm lata, subcylindrica, inferne leviter ventricosa, supra medium leviter constricta, glabra, alae ventrales basim versus 1—2 mm latae, os versus in nervos prominentes angustatae, os obliquum; peristomium 2 mm latum, aequum, cylindricum, striatum, striae paullo obscurae; operculum 1—1,75 cm latum, orbiculare, extus glabrum, intus purpureum et glandulosum, glandulae per medium paucae magnae aequaliter dispersae, marginem versus minores et copiosae; calcar 3 mm longum, planum, recurvatum;

ascidium intus per dimidium superius glauco-purpureum, opacum et deducens, inferne glandulosum, glandulae profunde immersae. Flores et fructus ignoti.

Austr.-malayische Provinz; Cape York Peninsula in N. O. Australien (F. L. Jardine!).

32. **N. neglecta** Macfarlane ex Icon. Beccarii. — Caulis 4—6 mm crassus, elongatus, trigonus, anguli a marginibus folii superioris continui, superne ± pubescens, juvenilis fusco-tomentosus. Folia superiora (solum visa) 18—25 cm longa × 3—4 cm lata, sessilia, ad $^1/_2$ v. $^2/_3$ amplexicaulia, non decurrentia, obovato-lanceolata, apice in cirrhum attenuata, supra glabra, costa excepta quae ± fusco-pubescens est, subtus fere glabra v. per costam sparse puberula, nervi longitudinales in paria 6 rarius 5 dispositi, par intimum 5—8 mm, par secundum 8—13 mm, par tertium 10—15 mm a costa remotum, paria cetera proportione decrescente, nervi transversi sinuosi et oblique ascendentes; cirrhus 15—20 cm longus, inferne gracilis, gradatim in basim ascidii recurvatam ampliatus; ascidium 10—12 cm longum × 2,5—3 cm latum, subcylindricum, gradatim a basi ad os obliquum ovatum ampliatum, inferne sparse puberulum, os versus fusco- v. ferrugineo-tomentosum evadens, alae ventrales angustae non ciliatae v. ad nervos prominentes reductae, os circulare v. subovatum, transversum v. ± obliquum, postice in collum triangulum elongatum; peristomium 2—3 mm latum, cylindricum, crebre striatum, margo incurvatus denticulatus; operculum 3—3,5 cm latum orbiculare, extus glabrum basim versus ± ferrugineo-pubescens, intus glabrum glandulis paucis magnis irregulariter dispersis, exsertis v. perithecioideis; calcar 4—5 mm longum, ferrugineo-pubescens; ascidium intus per partem octavam v. sextam glauco-purpureum opacum et deducens, inferne nitidum detinens et (quod solum in hac specie occurrit) supra non glandulosum, dein glandulis paucis parvis et irregulariter dispersis obsitum, basim versus glandulis magnis remotis et immersis instructum. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo: Labuan (Low!, Burbidge!).

Nota. Cujus speciei characteres distincti mihi a cl. Beccari primum communicati erant, qui figuram paravit nominatam. Mihi benigne permisit ut et specimina eius et figuras scrutatus hanc descriptionem pararem.

33. **N. gracilis** Korth. Verh. Nat. Gesch. Bot. (1839) 22 t. 1 et t. 4 f. 1—38; Spach, Hist. nat. des veg. XIII. (1846) 325, pl. 144; Miq. Fl. Ind. batav. I. p. 1 (1855) 1071; Hook. f. in Trans. Linn. Soc. XXII. (1859) 422; Masters in Gard. Chron. (1872) 542; Hook. f. in DC. Prodr. XVII. (1873) 104; Burbidge, Gard. of Sun (1880) 122; Beccari, Malesia III. (1886) 14; Hook. f. Fl. Brit. Ind. V. (1890) 71; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 190. — *N. Korthalsiana* Miq. l. c. 1071, Suppl. 151, 366, et Ill. Fl. Arch. Ind. (1871) 2 pl. 1. — *N. laevis* Lindl. in Gard. Chron. (1848) 655. — Planta gracilis, diffuse ramosa, breviter scandens. Caulis 2—3 m altus × 3—6 mm crassus, erectus v. rarius prostratus, nodosus et ramos ascendentes producens, trigonus v. triangulus, viridis usque purpureus, glaber. Folia 10—20 cm longa × 1,5—4 cm lata, sessilia, linearia v. elliptica, basi ad $^2/_3$—$^3/_4$ amplexicauli, leviter v. profunde decurrente attenuata, herbacea v. sub-coriacea, lucido-viridia juventute glabra v. ± pubescentia, nervi longitudinales in paria 5—7 saepe dispositi, par intimum 4—7 mm, par secundum 6—11 mm, par tertium 7,5—13 mm, par quartum 8,5—14 mm a costa remotum, paria cetera proportione decrescente, par intimum a costa basim versus oriens, cetera a basi folii orientia, nervi transversi irregulariter ascendentes; cirrhus 6—10 cm longus, gracilis, versus basim ascidii recurvatam leviter ampliatus; ascidia 6—12 cm longa × 1—3 cm lata, lucido- v. pallido-viridia, extus et intus ± purpureo-maculata, glabra v. minute punctata sub peristomio tomentosa, subdimorphia; inferiora cylindrica inferne ventricosa, alae ventrales expansae ciliatae v. o; superiora cylindrica v. inferne leviter ventricosa, alae ventrales angustae ciliatae v. ad nervos prominentes non ciliatos reductae, os circulare postice vix elongatum; peristomium 1,5—3 mm latum, cylindricum aequale, margo interior breviter denticulatus, superficie delicate striata; operculum 1—2,5 cm latum, cordato-orbiculare, extus fusco-punctatum, glabrum, intus glandulis paucis magnis perithecioideis diffusis v. glandulis multis parvis immersis instructum; calcar 4—6 mm

longum; ascidium intus per dimidium superius v. profundius glauco-viride usque purpureum, opacum et deducens, inferne nitidum glandulosum et detinens, glandulae superiores magnae circulares exsertae in seriem unam dispositae, inferiores parvae, discretae ± immersae. Inflorescentia 10—40 cm longa gracilis; pedunculus 2—10 cm longus sparse ferrugineo-tomentosus demum glaber; pedicelli 1—1,5 mm longi, tenues, unirarius biflori. Sepala elliptica v. ovata, extus tomentosa intus glandulis multis minutis dense punctata. Columna staminea sepalis brevior, glabra; antherae 8—12, uni- v. subbiseriatae ± convolutae. Ovarium ovatum, sessile, dense ferrugineo-tomentosum, stigma discoideum 4-lobatum. Capsula 2—3 cm longa, fusiformis, saepe curvata, sparse ferrugineo-tomentosa demum punctata et brunneo-nitida, valvis lineari-lanceolatis, apice bilobis. Semina 15 mm longa, testa circum embryonem undulata. — Fig. 2, 4.

S. W. Malayische Provinz: Malakka (Jack!, Wallich n. 2248!, Cuming n. 2310!); Singapore, bei Praman (Ridley n. 1473!); Singapore »feuchte Waldränder« 50 m (Engler n. 3911!).

Borneo: Bei Sintang (Teysmann n. 10956!, n. 11082!); bei dem Flusse Palantau (Müller, fide Miquel); Berg Pamatton (Korthals!); bei Labuan (Lobb!, Burbidge!); "common along N. W. coast" (Low!, Burbidge!); Bruni, Bintulu und Kutcing (Beccari).

Sumatra: Bei Siboga (Korthals!, Teysmann!, Burck!).

Billiton (Riedel, Teysmann!).

Einheim. Name: Ketakong-monjit. (Teysmann).

Nota. Varietas *elongata* Blume (l. c. 10) et varietas *longinodis* Beck (l. c.) ad typum sensim transeunt, nec dignae sunt quae separentur. In Herb. Kew. specimina sunt a cl. H. N. Ridley (n. 1473!) sub titulo *N. gracilis* var. *arenaria* lecta; planta pumila lucida, pallido-viridis purpureo-maculata. Aut variatio est in tempus per causas exteras effecta, aut varietas forsan constans.

34. **N. angustifolia** Masters in Gard. Chron. II. (1881) 524. — *N. gracilis* Beccari, Malesia III. (1886) 5. — *N. tentaculata* forma G. Beck in Wien. Ill. Gart. Zeitg. (1895) 188. — Planta tenuis, pallido-viridis, breviter scandens. Caulis 1—2 m altus × 4—5 mm crassus, trigono-cylindricus, alatus, ramosus. Folia 10—20 cm longa × 1,5—2 cm lata, subcoriacea, lineari-lanceolata, sessilia, basis $^1/_2$-amplexicauli, decurrente et gradatim ad folium proximum inferius attenuata, apice in cirrhum attenuata, supra et subtus glabra, nervi longitudinales in paria 5—6 dispositi, par intimum 3—5 mm, par secundum 5—8 mm, par tertium 6—9,5 mm, par quartum 7—10 mm, par quintum 7,5—11 mm a costa remotum, nervi transversi oblique ascendentes, alterni validi usque ad marginem et tenues ad dimidiam partem marginis currentes; cirrhus 6—9 cm longus, tenuis, in basim ascidii gradatim ampliatus; ascidia 5—7 cm longa × 0,75—1,5 cm lata, cylindrica, inferne leviter ventricosa, minute ferrugineo-punctata, sub peristomio ferrugineo-pubescentia, viridia rarissime purpureo-maculata, alae ventrales membranaceae, angustae, ciliatae, os subcirculare; peristomium anguste, cylindricum, nitido-striatum; operculum cordato-orbiculare, extus glabrum, intus sparse glandulosum; calcar breve, simplex v. 3—5-fidum et ciliatum; ascidium intus per dimidium superius pallido-glaucum opacum et deducens, inferne glandulosum, glandulae discretae, subsessae. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo: Sarawak (Curtis n. 123, Beccari n. 587!); Lawas Fluss (Burbidge n. 32 in Veitch M. S. S.).

35. **N. khasiana** Hook. f. in DC. Prodr. XVII. (1873) 102 et in Gard. Chron. (1872) 542, Fl. Brit. Ind. V. (1890) 70; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 189. — *N. distillatoria* Graham in Edinb. N. Phil. Journ. III. (1827) 371 et in Bot. Magaz. LV. (1828) 2798. — *N. Phyllamphora* Sims in Bot. Magaz. LIII. (1826) 2629; Hook. f. et Thoms. Herb. Ind. Or. — *N. melamphora* Hook. f. in Trans. Linn. Soc. XXII. (1859) 423 ex parte. — *Nepenthes* sp. Griffith Posth. Papers II. (1848) 76. — Planta robusta, alte scandens, ramosa. Caulis 6—10 m altus × 8—12 mm crassus, cylindricus, glaber, viridis usque rubro-fuscus. Folia 20—45 cm longa × 5—8 cm lata, subcoriacea, sessilia, lanceolata, basim versus ± angustata dein expansa, $^1/_2$

amplexicaulia, ± decurrentia, apice in cirrhum attenuata, juvenilia supra molliter fulvo-pubescentia demum glabra, infra glabra et fusco-punctata, nervi longitudinales in paria 5—6 dispositi, paria 4—5 intima a costa altitudine varia a medio basim versus orientia, par externum a basi oriens, nervi transversi oblique et irregulariter ascendentes et ramosi; cirrhus 10—25 cm longus, molliter pubescens demum glabratus, pro rata gracilis et plano-convexus, gradatim versus basim ascidii ampliatus; ascidia 10—20 cm longa × 3,5—4,5 cm lata, monomorphia v. subdimorphia, longe tubulosa v. in ascidiis inferioribus inferne ± ventricosa, glabra, viridia v. inferne viridi-rubra, os versus rubra, alae ventrales in ascidiis inferioribus angustae ± ciliatae, in ascidiis superioribus ad nervos prominentes non ciliatos reductae, os ovato-orbiculare leviter obliquum; peristomium 6—10 mm latum, cylindricum, viride, postice sub operculo incompletum, crebre striatum; operculum 4—5 cm longum × 3—4,5 cm latum, ovale v. orbiculare, extus glabrum viride, intus rubro-viride ad rubrum, glandulosum, glandulae multae diffusae, majores per medium marginem versus minores; calcar parvum 4—6 mm longum; ascidium intus per dimidium superius glaucum, saepe purpureo-maculatum opacum et deducens, inferne nitidum glandulosum et detinens. Inflorescentia 25—60 cm longa, ♂ fere bis longior quam ♀, juvenilis pubescens v. subtomentosa demum glabra; pedunculus 15—30 cm longus; racemus ± laxiflorus; pedicelli vulgo biflori versus apicem racemi uniflori, saepe basi bracteolati. Sepala ovata, extus dense fusco-tomentosa demum subglabra, intus glandulis multis minutis instructa. Columna staminea quam sepala longior, glabra; antherae 8—12 convolutae v. subbiseriatae. Ovarium breviter pedunculatum pubescens demum glabrum quadrangulum; lobi stigmatici 4 prominentes trianguli, margines profunde bilobi. Capsula 20—22 mm × 4—5 mm, nitida, punctata. Semina 4—5 mm longa, parva, numerosa, rubro-fusca.

Provinz des tropischen Himalaya: East Bengal, auf den Khasia und Jyntea Gebirgen bis 1000 m. Khasia Gebirge (Hooker f. et Thomson!); Jyntea Gebirge (Wallich n. 58!, n. 2244, Wall. Cat. sub nom. *N. distillatoria*, Griffith »notes« n. 1140); Jarain in dem Jyntea Gebirge (Clarke n. 3500); ohne Standort (Collett n. 123!).

36. **N. tubulosa** Macfarlane sp. nov. — Caulis 1 m et ultra × 7—8 mm crassus, cylindricus, leviter sinuosus, internodiis superioribus 3—5 cm longis, juvenilis albido-tomentosus demum glaber. Folia 20—25 cm longa × 2,5—3 cm lata, coriacea, juvenilia albido- et stellato-pubescentia demum supra glabra subtus sparse albido-pubescentia; petiolus 4—6 cm longus, alatus, alae a basi attenuata laminae deorsum angustatae, dein in basim petioli $^1/_2$-amplexicaulem non decurrentem gradatim expansae; lamina lineari-lanceolata, inferne in alas petiolares et superne in cirrhum concavo-convexum longe attenuata, costa subtus prominens, longitudinaliter sulcis duobus lateralibus constricta, nervi longitudinales in paria 6 dispositi, par intimum 4 mm, par secundum 6 mm, par tertium 8 mm, par quartum 10 mm, par quintum 11,5 mm, par sextum 12,5—13 mm a costa remotum, omnia a v. fere a basi folii orientia, nervi transversi obliqui, irregulariter ascendentes et ramosi; cirrhus 25—30 cm longus, in ascidii basim recurvatam elongatam angustam graciliter ampliatus; ascidia monomorphia, 15—20 cm longa × 2,5—3 cm lata, elongato-tubulosa, inferne leviter ventricosa dein gradatim in basim ascidii recurvatam angustata, os versus vix v. leviter ampliata, juventute sparse stellato-pubescentia demum glabra et fusco-punctata, alae ventrales valde reductae, forma nervorum prominentium a basi recurvata ad os continuatae, dein in nervos curvatos circum os solutae, os ovatum obliquum, postice non elongatum; peristomium 4—5 mm latum, cylindricum aequale, margine interiore denticulato; operculum ovale ad ovali-cordatum, nervis longitudinalibus in paria 7—8 dispositis percursum, extus glabrum intus glandulis multis perithecioideis depressis obsitum; calcar 4—5 mm longum, planum, obtusum; ascidium intus a peristomio deorsum versus v. sub medio glauco-purpureum opacum et deducens, dein nitidum glandulosum et detinens, glandulae copiosae, approximatae, mediocres v. subparvae, immersae. Flores et fructus ignoti.

S. Malayische Provinz: Poe Gibeh oder Poe Gebe (Teysmann n. 6759!).

Nota. Species haec nova mihi solum nota est e speciminibus a cl. Teysmann lectis. Descriptionem dedi secundum exemplaria mihi a cl. Treub sub nom. »*N. Rafflesiana* Jack« missa, a qua species facile dignoscenda est foliis angustis attenuatis, nervatura, collo ascidii nullo, forma et latitudine peristomii, et operculi structura glandulosa.

37. **N. Hemsleyana** Macfarlane sp. nov. — Planta elongata, scandens. Caulis 6—8 mm crassus, cylindricus v. leviter triquetrus. Folia 30—44 cm longa × 4—5 cm lata, membranacea v. subherbacea, petiolata; petiolus 5—10 cm longus, tenuis, alis angustis, ad $^1/_2$—$^2/_3$ amplexicaulis, basi non v. ± decurrens; lamina lanceolata, basi et apice gradatim attenuata, glabra, nervi longitudinales in paria 5 rarius 4 dispositi, omnes a basi folii orientes, par intimum 5—8 mm, par secundum 8—12 mm, par tertium 10,5—15 mm, par quartum 13—18 mm, par quintum 15—21 mm a costa remotum, nervi transversi ascendentes paralleli ± sinuosi, 4—5 mm separati; cirrhus 35—45 cm longus gracilis versus basim ascidii recurvatum ampliatus; ascidia 12—20 cm longa × 2—2,5 cm lata, membranacea, sparse stellato-pubescentia et brunneo-punctata, sub peristomio tomentosa, dimorphia; ascidia inferiora subcylindrica, vix v. ± a basi ad os angustata, alae ventrales basi ampliatae, os versus gradatim angustatae, ciliatae; ascidia superiora infundibuliformia a basi os versus gradatim ampliata, dein leviter contracta, alae ventrales ad nervos prominentes reductae, os circulare obliquum postice in collum angustum 2—3 cm altum elevatum; peristomium 5—12 mm latum, antice cylindricum aequale, aliquanto angustum margine interiore pectinatum, postice sursum in collum forma jugorum duorum latorum convergentium pectinatorum ampliatum; operculum 3,5—4 × 2,5—3 cm latum membranaceum, cordato-triangulare, in medio valde binervium nervis minoribus lateralibus, extus glabrum, intus glandulis fere aequalibus dispersis obsitum; calcar 10—12 mm longum, gracile, attenuatum; ascidium intus per dimidium superius v. profundius glaucum, opacum et deducens, inferne nitidum glandulosum et detinens. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo: Lawas-Fluss, N. Borneo (Burbidge!).

Sumatra?: (Korthals!, specimen in Herb. Kew. nomine — fide Blume — *N. Rafflesiana* designatum, et sub nomine *N. Rafflesiana* var. *glaberrima* Hook. f. in DC. Prodr. descriptum).

Nota. Species haec adhuc confusa est cum *N. Rafflesiana*, cui similis est petiolo longo et peristomio elongato pectinato. Differt nervis foliorum, cirrho longo gracili, ascidiis angustis elongatis, operculo cordato glandulis diffusis, superficie deducente profunda. In Herb. Kew. sunt exemplaria separata, in Herb. Mus. Brit. et in Herb. Harv. singula. Haec omnia cum *N. Rafflesiana* var. *glaberrima* Hook. f. congruere videntur.

38. **N. Rafflesiana** Jack in Comp. Bot. Magaz. I. (1835) 270, et Calc. Journ. Nat. Hist. IV. (1844) 364; Korthals, Verh. Nat. Ges. Bot. (1839) 35; Hook. in Bot. Magaz. LXXIII. (1847) t. 4285; Korth. Ann. de Gand III. (1847) 7; Morren in Belg. Hort. V. 193; Lemaire in Fl. d. serres III. (1847) t. 213, 214; Low, Sarawak (1848) 68; Houlston in Florist III. (1850) 77; Vriese, Tuinb. Fl. I. (1855) 208 t. 5; Blume, Mus. bot. lugd. batav. II. (1852) 9; Miq. Fl. Ind. batav. I. p. 1 (1855) 1070, Suppl. 150, 365; J. A. in Gard. Chron. (1865) 1060; Van Houtte in Fl. d. serres XVI. (1867) 167, t. 1698; Rev. Hortic. (1869) 130 sub nom. err. *N. Raflesea*; Baines in Gard. Chron. (1872) 1164; Florist (1872) 221; Hook. f. in DC. Prodr. XVII. (1873) 96; Planchon in Fl. d. serres XXII. (1877) 161, t. 2343; Masters in Gard. Chron. n. s. IX. (1878) 177; Burbidge, Gard. of Sun (1880) 41, 60; Masters in Gard. Chron. II. (1882) 424, fig. 69, 70; Burbidge in Gard. Chron. (1882) 56; Beccari, Malesia III. (1886) 10; Hook. f. Fl. Brit. Ind. V. (1890) 69; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 146; Fenner in Flora XCIII. (1904) 358, t. 10, 11; Veitch, Hort. Veitchii (1906) 483. — *N. Sanderiana* Burbidge in Flora and Sylva II. (1904) 113, III. (1905) 280 et icon. col. — Planta statura et aspectu variabilis secundum situm, plerumque alta robusta scandens. Caulis usque ad 15 m altus × 7—18 mm crassus cylindricus, ramosus, juvenilis dense albido-tomentosus demum glaber. Folia 20—50 cm longa × 5—10 cm lata, herbacea v. subcoriacea, longe petiolata; petiolus 5—15 cm longus alatus, $^1/_2$ amplexicaulis, alae basi et ad laminam angustae, saepe medium versus ± ampliatae; lamina lanceolata,

elliptica v. oblonga, inferne in petiolum gradatim v. abrupte angustata, superne in cirrhum attenuata v. abrupte rotundata, juventute dense albido-tomentosa, demum subglabra v. glabra, nervi longitudinales inconspicui, in paria 5 dispositi, par intimum 13—20 mm, par secundum 19—30 mm, par tertium 26—37 mm, par quartum 30—43 mm, par quintum 31—46 mm a costa remotum, omnia a basi laminae orientia, nervi transversi obscuri, obliqui, ascendentes, paralleli, 4—8 mm separati; cirrhus 20—40 cm longus, glaber, fere plano- v. concavo-convexus, superne cylindricus et in basim ascidii recurvatam gradatim ampliatus; ascidia 10—20 cm longa × 7—12 cm lata, dimorphia; inferiora ampullacea v. ventricosa, juvenilia albido-tomentosa demum glabra, pallido-viridia v. nitido-albida, copiose purpureo-maculata v. diffusa, alae ventrales inferne late expansae, os versus aliquanto contractae, longe ciliatae, per superficiem ventralem pallido-virides, dorso ut in ascidio coloratae, os obliquum ovatum, postice in collum altum prolongatum; peristomium 10—20 mm latum, subaequale, margine exteriore revolutum, interiore oblique inclinatum superficie valide et crebre striata margine interiore in dentes pectinatos terminante, viridi- v. saepe ± purpureo-striatum, postice sursum in lamellas cum striis et dentibus deflexis parallelas productum; operculum 4—10 cm longum × 3—8 cm latum, ovato-oblongum, extus glabrum, intus glandulis in series duas inter medium et margines dispositis obsitum; calcar 10—20 mm longum, filiforme; ascidium intus postice per collum triangulum glaucum ± purpureo-maculatum, opacum et deducens, dein nitidum glandulosum et detinens; ascidia superiora 12—30 cm longa × 4—10 cm lata infundibuliformia, purpureo-striata v. maculata, alae ventrales angustae, leviter v. non ciliatae, vel ad nervos prominentes reductae, os antice fere transversum postice in collum ± elongatum; peristomium antice aequale, postice sursum in lamellas duas cum striis et dentibus deflexis leviter divergentes productum; calcar 5—30 mm longum, filiforme; ascidium intus ab ore per quartam v. trientem superiorem glaucum v. glauco-purpureum opacum et deducens, inferne nitidum glandulosum et detinens. Inflorescentia 15—30 cm longa, albido-tomentosa demum subglabra; pedunculus 10—15 cm longus; racemus densiflorus, pedicelli 12—15 mm longi, uni- rarius biflori. Sepala 4 late ovata v. elliptica, extus tomentosa intus rubra et dense glandulosa. Columna staminea sepalis aequalis glabra, purpurea; antherae 16—20 irregulariter biseriatae. Ovarium oblongum quadrangulum, albido-tomentosum; stigma peltatum 4-lobatum. Capsula 2—4 cm longa, saepe ± curvata, sparse tomentosa, stigmatibus late peltatis, purpureis, sulcatis. Semina 15—20 mm longa, testa circum embryonem brunnea, in alis albido-membranacea.

S. W. Malayische Provinz; Malakka: Singapore (Jack, Wallich n. 2242!, Beccari!); auf dem Berg Ophir bei Malakka (Maingay n. 2751!); Insel Billiton (Riedel!).

Sumatra: Ohne Standort (Jack); Westküste von Sumatra (Korthals).

Borneo: Auf dem Berg Kina Balu, 1000 m (Low!); ohne Standort (Lobb n. 85!).

Bangka: »dans les Marais« (fide Miquel).

Einheim. malay. Name: Ketakong-mendjangan.

Nota. *N. Rafflesiana* var. *insignis* Mast. (in Gard. Chron. XVIII. (1882) 424) vix a typo differt. Varietates tres infra describendae formis intermediis cum speciminibus typicis conjunguntur.

Var. *β.* **nigro-purpurea** Mast. in Gard. Chron. XVIII. (1882) 424. — Ascidia ovata, lurido-purpurea, sparse pallido- v. albido-punctata, collum aliquanto breve. — Cult., loc. nat. incert.

Var. *γ.* **nivea** Hook. f. in DC. Prodr. XVII. (1873) 97. — Minor, subcoriacea usque coriacea, tomento niveo copioso obtecta.

Borneo: Labuan (Motley n. 348!); ohne Standort (Barber n. 348!); N. Borneo und Labuan (Burbidge!); Montrado in der Prov. Pontianak (Teysmann).

Var. *δ.* **minor** Beccari, Malesia III. (1886) 11. — Glabra, innovationibus pubescentibus, ascidia superiora parva, inflato-infundibuliformia, collo valde elongato, operculo late ovato.

Borneo: In der Prov. Pontianak (Teysmann n. 10910 in Herb. H. Bot. Bog.!).

Nota. De *N. Rafflesiana* var. *Hookeriana* Mast. vide p. 34.

39. **N. Armbrustae** F. M. Bailey in Queensland Agric. Journ. XVI. (1905) 191. — Folia 18—20 cm longa × 4—5 cm lata, herbacea, petiolata; petiolus 3—4 cm longus, alatus, superne gradatim in laminam ampliatus; lamina elliptico-lanceolata subglabra, nervi longitudinales in paria 5 dispositi, nervi transversi prominentes; cirrhus 10 cm longus; ascidium 10 cm longum × 6—7 cm latum, ventricosum, ad basim abrupte contractum et acute recurvatum, alae ventrales reductae non ciliatae; peristomium angustum; operculum 3 cm latum orbiculare, intus multiglandulosum; ascidium intus per trientem superiorem luteo-maculatum purpureo-marmoratum, opacum et deducens, inferne glandulosum et detinens. Inflorescentia (♂ solum nota) ferrugineo-pubescens; pedicelli 10—12 mm longi. Sepala ovata, 5—6 mm longa, intus purpurea. Columna staminea quam sepali aliquanto longior; antherae caput globosum.

Austr.-malayische Provinz: Coen, Cape York Peninsula in N. O. Australien (Miss F. Armbrust).

Nota. Species mihi non visa, secundum auctoris descriptionem differt a speciebus omnibus adhuc cognitis, sed ex icone valde similis *N. Kennedyanae* est.

40. **N. albo-lineata** F. M. Bailey in Queensland Agric. Journ. III. (1898) 354, pl. 58. — Planta terrestris, erecta, vix scandens. Caulis 1—1,5 m altus × 10—12 mm crassus, cylindricus, tomentosus, demum fere glaber. Folia 15—30 cm longa × 5—7 cm lata, herbacea, petiolata; petiolus 4—8 cm longus, alatus, $^1/_2$-amplexicaulis, in medio angustatus, versus basim amplexicaulem ± ampliatus non v. leviter decurrens, sursum aliquanto abrupte in laminam ampliatus; lamina lanceolata, apice in cirrhum attenuata, supra glabra v. ad costam et in partibus contiguis laminae sparse stellato-pubescens, nervi longitudinales in paria 7 dispositi, par intimum 6—9 mm, par secundum 10—15 mm, par tertium 13—20 mm, par quartum 15—24 mm a costa remotum, tria reliqua fere 2 mm a quarto et inter se distantia, nervi transversi irregulariter ascendentes, radiantes, et fere 2 mm inter se separati; cirrhus 15—25 cm longus, sursum gradatim in basim ascidii recurvatam ampliatus; ascidium 12—18 cm longum × 2,5—3 cm latum, cylindricum, infra leviter ventricosum dein in cirrhum recurvatum angustatum, viride et albido-striatum, alae ventrales a basi ascidii recurvata medium versus forma laminae non ciliatae continuatae, dein os versus in nervos v. vertices angustatae, os leviter obliquum; peristomium 6—8 mm latum, cylindricum, aequale; operculum 3—4 cm latum, ovale ad orbiculare, extus glabrum intus glandulosum, glandulae medium versus magnae, marginem versus minores; calcar 6—8 mm longum, planum, tomentosum, recurvatum; ascidium intus per dimidium superius glaucoviride opacum et deducens, infra glandulosum et detinens. Inflorescentia ♂ 30—40 cm longa; pedunculus 15 cm longus, stellato-pubescens; pedicelli 9—10 mm longi, tenues, uniflori, stellato-pubescentes. Sepala 5 mm longa, elliptico-ovata, extus albido-pubescentia intus purpurea et glandulosa. Columna staminea sepalis brevior; antherae 8 uniseriatae. Flores pistilliferi et fructus ignoti.

Austr.-malayische Provinz: Cape York Peninsula in N. O. Australien (Jardine!).

41. **N. phyllamphora** Willd. Spec. pl. IV. p. 2 (1805) 874; Brongn. in Ann. sc. nat. I. (1824) 48; Jack in Hook. Comp. Bot. Mag. I. (1835) 271; Sprengel, Syst. veg. III. (1826) 84; Korthals, Verhand. Nat. Gesch. Bot. (1839) 28; Blume, Mus. bot. lugd. batav. II. (1852) 7; Miq. Fl. Ind. batav. I. p. 1 (1855) 1069; Hook. f. in Trans. Linn. Soc. XXII. (1859) 422, DC. Prodr. XVII. (1873) 97; Burbidge, Gard. of Sun (1880) 84; Beccari, Malesia I. (1877) 213, III. (1886) 11; Hook. f. Fl. Brit. Ind. V. (1890) 69; Villar in Blanco, Fl. Filip. ed. 3. IV. (1880) app. 173; G. Beck. in Wien. Ill. Gart. Zeitg. (1895) 218, ubi loco var. a. sub *N. macrostachya* enumerata est; Hemsley in Bot. Magaz. (1906) t. 8067. — *N. macrostachya* et *N. fimbriata* Blume, Mus. bot. lugd. batav. II. (1852) 7; Miq. Ill. Fl. Archip. Ind. (1871) 3 pl. 2, 5 pl. 6; G. Beck l. c. 217. — *N. distillatoria* Wall. Cat. n. 2244; Aiton Hort. Kew. ed. 2.

V. (1813) 420; Macgillivray, Voyage H. M. S. Rattle. I. (1852) 210; Hemsley in Garden LXVII. (1905) 269. — *N. O'Brieniana* Rodigas in Ill. Hort. (1890) 109. — *Phyllamphora mirabilis* Lour. Fl. cochinch. (1790) 606. — Planta elongata, prostrata v. scandens, lucido-viridis. Caulis 5—8 m longus × 7—9 mm crassus, cylindricus, juvenilis sparse stellato-pubescens demum glaber, internodiis superioribus 4—7 cm longis, inferioribus ± aggregatis. Folia 15—45 cm longa × 5—8 cm lata, membranacea v. herbacea, petiolata; petiolus 4—15 cm longus, leviter puberulus v. glaber, basi $^1/_2$-amplexicaulis alatus, alae verticales parallelae, sursum gradatim divergentes et in laminam expansae; lamina elliptico-oblonga, supra glabra, subtus glabra v. per costam sparse puberula, marginibus in plantis juvenilibus dentato-ciliatis, demum ciliatis v. glabris, apex abrupte et saepe inaequaliter in cirrhum contractus, nervi longitudinales in paria 6—10, plerumque 7 dispositi, par intimum 10—12 mm, par secundum 20—24 mm, par tertium 26—32 mm, par quartum 31—39 mm a costa remotum, paria reliqua proportione decrescente distantia, nervi transversi numerosi, paralleli, radiati v. oblique ascendentes; cirrhus 15—25 cm longus, inferne plano-convexus, superne cylindricus et in basim ascidii recurvatam ampliatus, sparse puberulus; ascidia 8—15 cm longa × 2—3 cm lata, monomorphia, subcylindrica, dimidium inferius leviter expansum, superius os versus leviter contractum, sparse puberulum, sub peristomio ± fusco-pubescens, superficie pallido-viridi v. rubro-viridi, glandulae perithecioideae ± copiosae et diffusae, alae ventrales in ascidiis inferioribus angustae, breviter v. non ciliatae, in ascidiis superioribus ad nervos prominentes reductae, os circulare ovatum v. transverse ellipticum; peristomium 4—7 mm latum cylindricum v. saepe superficie ± planum, antice latissimum, postice aliquanto angustatum, crebre striatum, transversum v. ± obliquum, postice non elevatum, pallido-viride ad purpureum; operculum 2—4 cm diametro, subovatum v. orbiculare, extus sparse puberulum et brunneo-punctatum intus glandulis multis circularibus aequaliter dispersis obsitum; calcar 8—10 mm longum; ascidium intus per dimidium superius glaucum v. rubro-viride opacum et deducens, inferne viride nitidum et glandulis multis discretis subsessis obsitum. Inflorescentia 20—35 cm longa, gracilis; pedunculus quam racemus longior, albido-et stellato-pubescens; pedicelli 12—16 mm longi, graciles, inferne biflori v. uniflori, superne uniflori. Sepala elliptica, extus dense albido- v. fusco-tomentosa, intus glandulis multis minutis diffusis. Columna staminea sepalis aequalis, glabra; antherae 16—20, biseriatae ± convolutae. Ovarium 5—6 mm longum ovatum, albido-tomentosum; stylus brevis; stigmata 4, sulcata. Capsula 18—20 mm longa pedunculata fusiformis, valvae leviter concavae, sparse puberulae. Semina 15—16 mm longa gracilia striata.

Hinterindisch-ostasiatische Provinz; Cochin-China: »loca humida et agrestia« (Loureiro). — China: St. Johns Island bei Macao (Millett!, Vachell!, Ford!); bei Lou'i-tsion in Prov. Canton (Delavay!).

S. W. Malayische Provinz; Malakka: Singapore (Wallich n. 2244!); Jurong bei Singapore (Ridley); Perak (Dr. King's coll. n. 10631!); auf dem Berg Ophir (Lobb!); Tullo Bahang bei Penang (Curtis!).

Sumatra: Padang (Korthals!, Beccari!); Kayu tanam (Beccari!); "abundant in moist places and ravines in neighborhood of Bencoolen" (Jack).

Borneo: Bei Sintang (Teysmann n. 10968!); Labuan (Low!); Bawang bei Kina Balu (Burbidge); Sarawak (Beccari!); bei Bangarmassing (Motley n. 755!); Marop in Prov. Batang Lupar (Beccari!).

Centromalayische Provinz; Amboina: Ohne genauen Standort (Rumphius!, Botter!).

Provinz der Philippinen: Bei Surigao in Mindanao (Vidal n. 3524!).

Papuanische Provinz; Neu-Guinea: Ramoi und Vandamen bei Geelvink Bay (Beccari).

Einheim. Namen: Dawon- oder daoen-gindi, gada-gada, prioek-beroek (Affen-Krug).

Nota 1. Species supra descripta, omnium specierum generis latissime dispersa, forma et ascidiorum colore, inflorescentiae magnitudine, florum dispositione et structura, maxime est variabilis. Specimina autem rite determinanda in herbariis adhuc parum copiosa sunt. Quae cum ita sit, oportet me auctores priores secutum duas profecto species discernere *N. macrostachya* et *N. phyllamphora*. Nec quidem hoc tempore characteres satis claros comparare facile est, nec cl. Blume iis definitis usus est. Forma a cl. Linden introducta, et sub nomine *N. O'Brieniana* (vide Rodigas op. cit.) culta ascidiis a typo iam diu in hortis botanicis culto maxime differt. Forma autem secunda ex Hainan in Hortum Kewensem introducta, aliis rebus inter duas est intermedia, aliis magis diversa. Varietas Blumei *platyphylla* et varietas Beccarii *macrantha* eodem modo sunt variabiles.

Nota 2. *N. Pascoensis* Bailey in Queensl. Agric. Journ. sec. figuram et descriptionem auctoris forma parva et pumila *N. phyllamphorae* esse videtur.

42. **N. Moorei** F. M. Bailey in Queensland Agric. Journ. III. (1898) 355, Queensl. Fl. IV. (1901) 1279 — Planta erecta non v. breviter scandens. Caulis 1—2 m altus × 6—7 mm crassus, cylindricus. Folia 15—20 cm longa × 3—4 cm lata, herbacea, petiolata; petiolus 2—4 cm longus alatus, basi ad $^1/_3$ amplexicaulis, leviter decurrens, sursum in laminam gradatim expansus; lamina elliptica v. lanceolata ad apicem in cirrhum attenuata, juvenilis ± albido-pubescens, demum supra et subtus glabra, nervi longitudinales in paria 7 rarius 6 dispositi, par intimum 4—6 mm a costa remotum et ab ea medium versus oriens, par secundum 7—11 mm, par tertium 9—14 mm a costa remotum, paria reliqua proportione decrescente, omnia primo excepto a basi folii orientia, nervi transversi irregulariter radiantes et reticulati; cirrhus 10—15 cm longus gracilis, fere plano-convexus, gradatim in basim ascidii recurvatam ampliatus; ascidium 8—12 cm longum × 2—3 cm latum, monomorphium, cylindricum, sub medio leviter ventricosum, viride et rubro-maculatum v. ± rubro-diffusum, ± stellato-pubescens, glabrum et punctatum, alae ventrales angustae non ciliatae, inferne et superne angustiores v. ad nervos prominentes reductae, os transverse v. leviter obliquum; peristomium 3—4 mm latum cylindricum; operculum ovale v. ovali-cordatum, glabrum, extus circum marginem brunneo-punctatum, intus brunneo-punctatum et glandulis multis aequalibus fere ad marginem dispersis obsitum; calcar 4—5 mm longum, planum, ± recurvatum; ascidium intus per dimidium superius glaucum opacum et deducens, inferne nitidum glandulosum et detinens. Inflorescentia 25—35 cm longa ± pubescens; pedunculus 10—15 cm longus; racemus sublaxiflorus; pedicelli tenues 6—7 mm longi, uniflori. Sepala elliptica, extus tomentosa, intus glandulis multis parvis obsita. Columna staminea glabra, sepalis brevior; antherae 10—12 sinuosae, subbiseriatae. Ovarium sericeo-tomentosum. Capsula 18—20 mm longa.

Austr.-malayische Provinz; Cape York Peninsula in N. O. Australien (Jardine!).

43. **N. Bernaysii** F. M. Bailey in Proc. Linn. Soc. N. S. Wales V. (1881) 185, Synop. Queensl. Fl. (1883) 417, Queensl. Agric. Journ. I. (1901) 369, et in Queensl. Fl. IV. (1901) 1278 — Planta procumbens v. breviter scandens. Caulis 6—8 mm crassus, basibus amplexicaulibus foliorum obtectus. Folia 30—40 cm longa × 5—8 cm lata, herbacea v. subcoriacea, petiolata; petiolus 3—5 cm longus, alis verticalibus, basis $^1/_2$-amplexicaulis; lamina elliptico-lanceolata, basi et apice obtusa, margine sparse dentato-ciliata, juventute supra et subtus albido- et stellato-pubescens, demum sparse puberula et minute fusco-punctata, nervi longitudinales in paria 7 v. in foliis minoribus 5—6 dispositi, par intimum 8—10 mm, par secundum 16—20 mm, par tertium 22—28 mm, par quartum 26—34 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi oblique et irregulariter ascendentes demum radiantes; cirrhus 15—25 cm longus, sursum gradatim in basim ascidii recurvatam ampliatus; ascidium 8—15 cm longum × 3—4 cm latum, monomorphium, duabus partibus inferioribus leviter ventricosum, triente superiore cylindricum, ± albido- et stellato-pubescens, fusco-punctatum, rubrum, alae ventrales gradatim a basi ad medium ampliatae, dein sursum ad os leviter angustatae, ciliatae, rubrae, os ovatum obliquum; peristomium 4 mm latum cylindricum, aequale, acute striatum; operculum 3,5—5 cm longum × 3—4 cm latum, ovato-cordatum, extus sparse albido-pubescens et fusco-punctatum, margine extus et intus fusco-puberulo, intus diffuse

glandulosum; calcar 8—10 mm longum, planum, pubescens, recurvatum. Inflorescentia 25—35 cm longa ± tomentosa; pedunculus 10—15 cm longus; racemus subdensiflorus; pedicelli 10—12 mm longi, simplices, tenues, tomentosi. Sepala 4 oblongo-cuneata, extus tomentosa, intus minute glandulosa, purpureo-rubra. Columna staminea sepalis aequilonga. Ovarium albido-pubescens; stylus brevis, crassus; stigma late expansum 3—4-lobum, lobi sulcati. Capsula 10—12 mm longa, lobis stigmaticis turgidis coronata. Semina in exemplo fructifero 2—3 mm longa, sed forsan immatura.

Austr.-malayische Provinz: Cape York Peninsula in N. O. Australien (Jardine!).

44. **N. Jardinei** F. M. Bailey in Queensl. Agric. Journ. I. (1897) 230, III. (1898) 355; Masters in Gard. Chron. s. 3. XXII. (1897) 337. — Planta robusta erecta brevis, non v. humiliter scandens. Caulis 1—2 m altus × 6—8 mm crassus erectus v. prostratus, nodosus, rhizomata et ramos ascendentes ferens. Folia 18—30 cm longa × 5—7 cm lata, omnia v. pleraque ascidiifera, subcoriacea, petiolata; petiolus 4—6 cm longus alatus, alae medio angustatae, basi expansae $^1/_2$-amplexicaules, vix v. leviter decurrentes, sursum gradatim in laminam ampliatae; lamina oblongo-lanceolata, in cirrhum attenuata, supra glabra, subtus sparse albido- et stellato-pubescens, costa rubro-viridis usque purpurea, margine non ciliata, nervi longitudinales in paria 7 rarius 6 dispositi, par intimum 8—10 mm, par secundum 13—16 mm, par tertium 16—20 mm, par quartum 19—24 mm, par quintum 21—26 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi radiati, reticulati; cirrhus 15—20 cm longus, rectus v. sinuosus, gradatim in basim ascidii recurvatam ampliatus; ascidia 10—20 cm longa × 4—6 cm lata, cylindracea, inferne leviter ventricosa, os versus vix contracta, purpureo-rubra, nervi longitudinales prominentes, alae ventrales angustae non ciliatae, rubrae, a basi ad os ± sinuosae, os obliquum postice in collum latum triangulum elevatum; peristomium 5—6 mm latum, cylindricum, crebre striatum, postice sursum in collum prolongatum; operculum 4—5 cm × 3—4 cm, cordatum, rubrum, extus glabrum, intus ad marginem pubescens per totum glandulosum, glandulae multae diffusae; calcar 5—8 mm longum, planum, recurvatum; ascidium intus per dimidium superius glauco-purpureum v. purpureo-maculatum, opacum et deducens, inferne nitidum glandulosum et detinens. Inflorescentia 30—35 cm longa, ♂ longior quam ♀; pedicelli 12—15 mm longi, tenues. Sepala 4 ovalia, extus et margine interiore albido-tomentosa, intus glandulis multis minutis obsita. Columna staminea sepalis aequilonga, tenuis, glabra; antherae 12—16 convolutae, sub-biseriatae. Ovarium tomentosum; stigma sessile, 4-lobatum. Capsula 18—20 mm longa, valvae fusiformes, apice stigmatibus triangulis sulcatis coronatae.

Austr.-malayische Provinz: Somerset, Cape York Peninsula in N. O. Australien (Jardine!).

45. **N. Kennedyana** F. Muell. Fragm. V. (1865) 154; Hook. f. in DC. Prodr. XVII. (1873) 98; Masters in Gard. Chron. I. (1882) 257, f. 36; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 218; Veitch, Hort. Veitchii (1906) 484. — *N. Kennedyi* Benth. Fl. Austr. VI. (1873) 40; Bailey in Queensl. Agric. Journ. I (1897) 361, III. (1898) 354, Synop. Queensl. Flora (1883) 416. — Planta elongata scandens. Caulis 2—3 m longus × 6—7 mm crassus, cylindricus usque trigonus, juvenilis stellato-pubescens dein glaber. Folia 25—35 cm longa × 4—8 cm lata, membranacea v. subherbacea, petiolata; petiolus 4—7 cm longus, alatus, basi $^1/_2$-amplexicaulis, leviter decurrens, superne in laminam gradatim ampliatus; lamina oblongo-lanceolata, supra glabra subtus stellato-pubescens, margine tenuiter ciliata et pubescens, nervi longitudinales in paria 7 rarius 6 v. 8 dispositi, par intimum 6—10 mm, par secundum 9—15 mm, par tertium 12—22 mm a costa remotum, paria reliqua proportione decrescente distantia, nervi transversi radiati v. oblique ascendentes; cirrhus 15—20 cm longus, gracilis, inferne plano-convexus, superne in basim ascidii recurvatam ampliatus; ascidia 10—20 cm longa × 2—3,5 cm lata, monomorphia, elongato-cylindrica, dimidio inferiore leviter expansa, parte superiore os versus leviter contracta, sparse stellato-pubescentia, rubro-viridia v. rubra, alae ventrales basim versus angustae, os versus gradatim v. interrupte

expansae et ± ciliatae; peristomium 2—4 mm latum, cylindricum, crebre striatum, postice non v. leviter elongatum; operculum 2,5—4 cm × 2—3,5 cm, oblongo-orbiculare, extus et margine intus stellato-pubescens, intus glandulis multis aequaliter dispersis obsitum; calcar 6—9 mm longum, planum, recurvum; ascidium intus per dimidium superius glauco-purpureum v. ± purpureo-maculatum et deducens, inferne glandulosum, glandulae parvae, multae, immersae. Inflorescentia (♂) 25—50 cm longa; pedunculus 10—30 cm longus, stellato-pubescens; pedicelli solitarii 10—12 mm longi, dense sericeo-pubescentes. Sepala elliptica v. obovata, extus albido-pubescentia demum fere glabra, intus glandulis multis minutis obsita.

Austr.-malayische Provinz: Cape Sidmouth (Moore!); Cape York (Jardine!).

Nota. Valde affinis *N. phyllamphora*, sed satis distincta quae secundum geographiam pro specie propria habeatur. Pubescentia copiosior, bases foliorum breviter decurrentes, alae ciliatae, operculum longius, coloris splendor ascidii cum peristomio angustiore hanc speciem definiunt.

46. **N. Garrawayae** F. M. Bailey in Queensl. Agric. Journ. XVI. (1906) 191 et icon. — Planta pumila non scandens. Folia 22 cm longa × 6,5 cm lata, herbacea, petiolata; petiolus alatus inferne semiamplexicaulis; lamina in cirrhum attenuata; cirrhus 12—15 cm longus, tenuis, aequus; ascidia 9—15 cm longa × 2,5—3,5 cm lata, inferne ± inflata, os versus angustata, per dimidium inferius viridia, per superius fusco-rubra, alae 5—6 mm latae, ciliatae, a basi ad os continuatae, fusco-rubrae; os ovale; peristomium 5—6 mm latum postice non elongatum; operculum 4,5—5 cm longum × 3,5 cm latum, ovato-orbiculare, fusco-rubrum, intus glandulis minutis obsitum; calcar valde recurvatum; ascidium intus per dimidium superius glaucum et deducens, dein glandulosum et detinens.

Austr.-malayische Provinz: Australien: "Between York Downs and Weipa" (R. W. Garraway).

Nota. Species mihi non visa, secundum auctorem inter *N. Bernaysii* et *N. Rowanae* intermedia.

47. **N. Beccariana** Macfarlane n. sp. — Caulis 10—12 mm crassus, glaber. Folia 30—40 cm longa × 7—9 cm lata, crasse-herbacea ad subcoriacea, petiolata; petiolus 7—10 cm longus, alatus, alae inferne leviter expansae, $^1/_2$-amplexicaules, gradatim in laminam superne ampliatae, basim versus v. per totum supra et subtus fusco- v. ferrugineo-hirsutae; lamina elliptico-lanceolata usque obovata, juventute ferrugineo-hirsuta demum fusco-puberula, costa subtus prominens, sparse cirrhum versus fusco-hirsuta, nervi longitudinales in paria 7—8 dispositi, par intimum 12—20 mm, par secundum 18—30 mm, par tertium 23—38 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi numerosi, oblique ascendentes et paralleli; cirrhus 25—35 cm longus, crassus ± fusco-pubescens; ascidia dimorphia; inferiora 15—18 cm longa × 4—5 cm lata, inferne urceolato-ventricosa, os versus tubulosa, extus et circum marginem exteriorem operculi juvenilia dense ferrugineo-pubescentia, demum punctato-puberula, alae ventrales inferne late expansae, superne gradatim angustatae, longe ciliatae, os obliquum ovatum postice in collum breve elongatum; peristomium 10—15 mm latum, uniusmodi, postice ± elongatum, margo exterior recurvatus, interior breviter serratus; operculum 5—7 cm longum × 3,5—5 cm latum, ovato-cordatum, extus et intus ± ferrugineo-hirsutum, intus per regionem mediam basalem amplificatum, per totum glandulosum, glandulae in medio numerosae aggregatae magnae, marginem versus minores; operculum et ascidium extus glandulis magnis perithecioideis dispersis illecebrosis obsitum; calcar 12—15 mm longum, filiforme, apice clavatum; ascidium intus per dimidium superius purpureo-rubrum et coeruleo-maculatum opacum et deducens, inferne nitidum glandulosum et detinens, glandulae subapproximatae immersae; ascidia superiora 25—30 cm longa × 4—6 cm lata, cylindrica, alae ventrales ad lobos inaequales a nervis longitudinalibus orientes reductae, peristomium angustius, magis elongatum et obliquum quam in ascidio inferiore. Flores et fructus ignoti. — Fig. 17.

S. W. Malayische Provinz: Auf der Insel Pulo Nias bei Sumatra (Modigliani! in Herb. Beccar.).

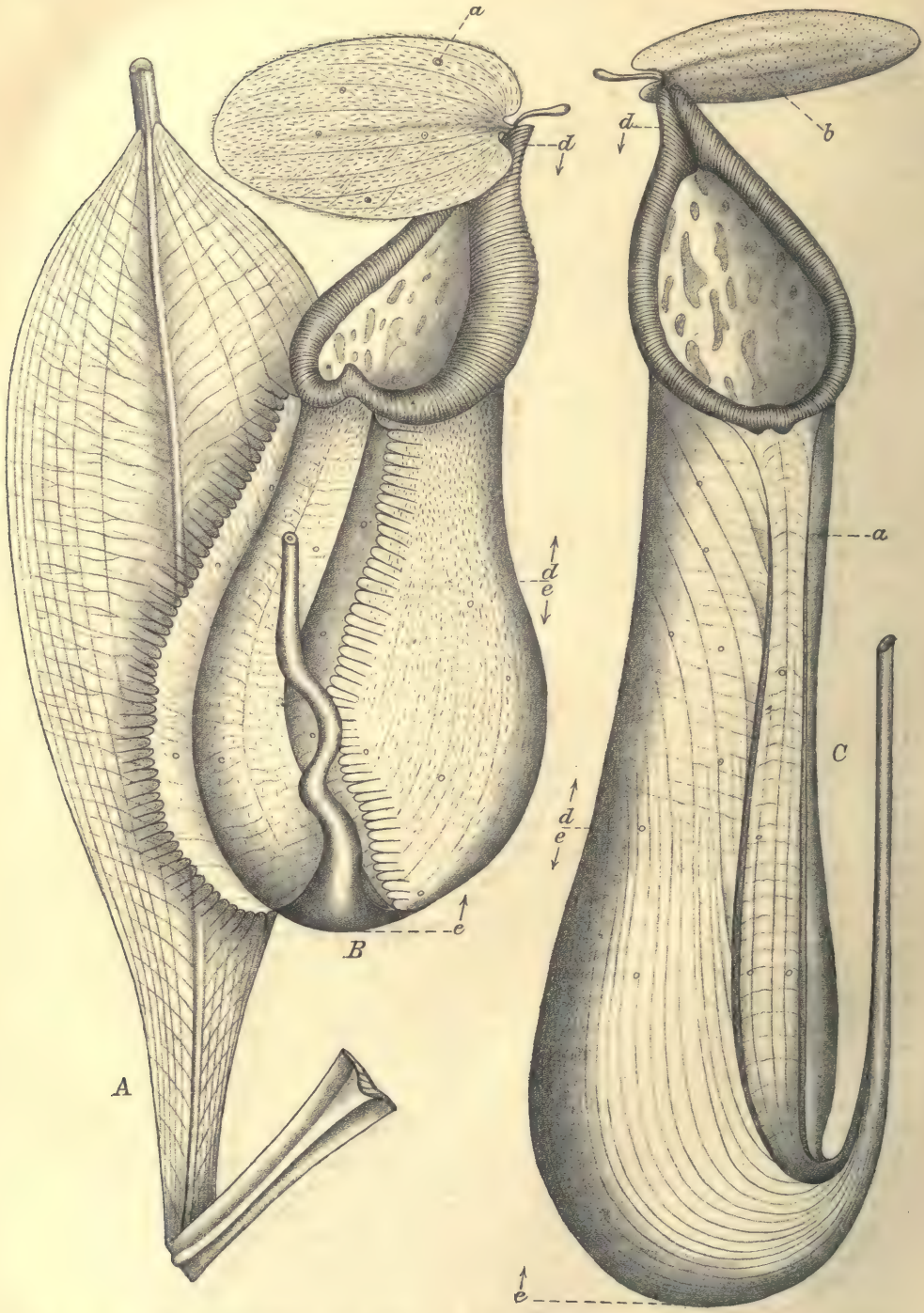

Fig. 17. *N. Beccariana* Macf. *A* Lamina. *B* Ascidium inferius terrestre. *C* Asc. caulinum *a* glandulae perithecioideae allectantes, *b* glandulae operculi, *c* calcar, *d—d* area deducens, *e—e* area detinens. (Icon. origin.)

Nota. Cujus speciei notabilis specimen unicum a cl. Beccari benigne mihi communicatum est cui clarissimo viatori magna cum voluptate eandem dedico.

48. **N. Rowanae** F. M. Bailey in Queensl. Agric. Journ. I. (1897) 231 cum t., III. (1898) 355; Journ. Roy. Hort. Soc. XXII (1898) 192. — Planta robusta erecta non scandens. Caulis 0,75—1 m altus × 8—10 mm crassus, dense tomentosus. Folia 20—30 cm longa × 4—7 cm lata, coriacea, petiolata; petiolus late alatus, basi $^1/_2$-amplexicaulis, alae decurrentes, sursum in laminam gradatim v. abrupte expansus; lamina elliptica apice peltata, supra sparse albido-pubescens, subtus ± pubescens, lateribus costae dense pubescens, nervi longitudinales in paria 7—8 dispositi, par intimum 8 mm, par secundum 13—14 mm, par tertium 17—18,5 mm, par quartum 20—21,5 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi numerosi, leviter ascendentes; cirrhus 20—25 cm longus, plano-convexus et pro rata sparse pubescens, versus basim ascidii recurvatam gradatim ampliatus rotundatus et subdense pubescens; ascidia 15—20 cm longa × 5—8 cm lata, infundibuliformia v. pyriformia, ± pubescentia et brunneo punctata, sub peristomio dense brunneo-tomentosa, rubro-viridia v. lurido-viridia, alae ventrales aliquanto approximatae et ad nervos validos prominentes reductae quae a basi os versus continuatae sunt, os ovatum, obliquum, antice ± depressum; peristomium 8—20 mm latum, antice cylindricum, ± planum, marginibus externis in partibus postico-lateralibus expansis; operculum 5—6 cm diametro, sub-orbiculare, extus glabrum et glandulis sparsis perithecioideis, intus glandulis multis magnis mediis et parvis lateralibus obsitum; calcar 12—15 mm longum, planum, tomentosum; ascidium intus ad 1—2 cm altitudinis planum, deducens, inferne nitidum glandulosum, glandulae immersae. Flores et fructus ignoti.

Austr.-malayische Provinz: Somerset, Cape York Peninsula in N. O. Australien (Ellis-Rowan!, F. L. Jardine!).

49. **N. Treubiana** Warburg in Englers Bot. Jahrb. XIII. (1891) 318. — *N. Boschiana* var. *sumatrana* Miq. Fl. Ind. bat. I. p. 1 (1855) 1074 et Suppl. 151; Hook. f. in DC. Prodr. XVII. (1873) 98. — *N. maxima* var. *sumatrana* Beccari, Malesia III. (1886) 3. — Planta robusta scandens. Caulis 6—10 m altus × 8—12 mm crassus, trigonus v. subcylindricus, glaber, internodiis superioribus 2—5 cm longis, alatis. Folia 15—45 cm longa × 7—8 cm lata, coriacea, petiolata; petiolus 4—10 cm longus, $^1/_2$-amplexicaulis alatus, alae basi leviter expansae, oblique fere ad nodum inferiorem decurrentes, medium versus ± angustatae, gradatim in laminam ampliatae; lamina elliptica v. lato-lanceolata, apice in cirrhum attenuata v. leviter peltata, juvenilis ferrugineo-pubescens demum glabra et minute punctata, nervi longitudinales in paria 7—10 dispositi, omnes pare intimo excepto a basi orientes, par intimum 7—8 mm a costa remotum et a quarta parte inferiore oriens, par secundum 12—14 mm, par tertium 16—20 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi approximati, oblique ascendentes; cirrhus 20—35 cm longus cylindricus, gradatim in basim ascidii recurvatam ampliatus; ascidia 10—20 cm longa × 4—7 cm lata, juventute ferrugineo-pubescentia demum glabra, dimorphia; inferiora ampullacea v. ventricosa, alae ventrales basim versus 5—10 mm latae, ciliatae v. non ciliatae, sursum ad 10—15 mm sub peristomio in nervos prominentes aliquanto abrupte angustatae, os fere transversum postice leviter elongatum; ascidia superiora infundibuliformia, alae ventrales angustatae v. ad nervos prominentes reductae, os obliquum postice in collum triangulum elongatum, superficie viridi irregulariter purpureo-maculata et areolata; peristomium 15—20 mm latum, margine exteriore ± expansum, interiore incurvatum minute dentatum; operculum orbiculare extus sparse pubescens v. glabrum, intus glandulis variae magnitudinis dense dispersis obsitum; calcar 6—8 mm longum planum; ascidium intus fere per totum nitidum glandulosum et detinens. Inflorescentia 40—60 cm longa ± ferrugineo-pubescens; pedunculus 10—15 cm longus validus; pedicelli 20—30 mm longi, tenues, basim versus saepe bracteolati, biflori v. apice racemi uniflori. Sepala 4, obovata, extus ferrugineo-tomentosa, intus glandulis multis minutis dense dispersis obsita. Columna staminea sepalis aequalis, glabra; antherae 24—30, densae, parvae, biseriatae.

Ovarium obovatum, ferrugineo-pubescens; lobi stigmatum trianguli. Capsula 20—22 mm longa ± curvata, valvae brunneo-nitidae sparse puberulae v. glabrae, raro glandulosae. Semina 7—8 mm longa, per embryonem ferruginea.

S. W. Malayische Provinz; Sumatra: Bei Siboga (Teysmann n. 535 in Herb. Kew. ex Miquel!, in Herb. Calc., Kurz don.!, utraque sub nom. *N. Boschiana* var. *sumatrana*, in Herb. Bot. Bog. sub nom. Nepenthes sp.!).

Papuanische Provinz; Neu-Guinea: »Nicht selten an der Küste des Mac Cluers Golfes in holländisch Neu-Guinea an den Sandsteinabhängen« (Warburg n. 20581 in Herb. Berol.!).

50. **N. echinostoma** Hook. f. in DC. Prodr. XVII. (1873) 95; Beccari, Malesia III. (1886) 9 t. II.; Macfarlane in Ann. of Bot. VII. (1893) 433. — Folia (solum nota) 45—60 cm longa × 6—9 cm lata, herbacea v. subcoriacea, petiolata; petiolus 6—8 cm longus, alatus, alae medio angustatae v. 0, ad basim leviter expansae et $^1/_2$-amplexicaules, sursum in laminam gradatim ampliatae, supra glaber, subtus ± fusco-hirsutus; lamina elliptico-lanceolata, apice acuminata v. peltata, margine ± ciliato-denticulata, nervi longitudinales in paria 8—9 dispositi, par intimum 8—10 mm, par secundum 14—17 mm, par tertium 20—24 mm, par quartum 26—31 mm, par quintum 30—36 mm a costa remotum, paria reliqua proportione decrescente, nervi transversi oblique ascendentes sinuosi, paralleli, 5—6 mm inter se distantes; cirrhus 30—50 cm longus, validus, aequalis, versus basim ascidii recurvatam leviter ampliatus; ascidium 12—20 cm longum × 4—5 cm latum, subcylindricum, a basi ad medium gradatim expansum, dein os versus contractum, sparse fusco-hirsutum usque glabrum, alae ventrales angustae non ciliatae, os ovale obliquum in collum triangulum leviter elongatum; peristomium 15—18 mm latum, superficies in seriem exteriorem et interiorem dentium 10—12 mm longorum incurvorum dissecta, dentes exteriores pyramidati apice meatu singulo, dentes interiores lati, plani, 2—3-fidi et eodem numero meatuum; operculum oblongum, intus glandulosum, glandulae per medium magnae, marginem versus parvae; calcar 12—15 mm longum, flexuosum, obtusum; ascidium intus per dimidium superius glaucum v. purpureo-coeruleum, opacum et deducens, inferne viridi-luteum, nitidum, glandulosum et detinens. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo: Diese Art ist nur in zwei Blättern bekannt, die Beccari bei Sarawak in Kutcing gesammelt hat. Eines dieser Blätter ist jetzt im Herbarium Beccari, das andere im Herb. Kew (Beccari n. 121!).

51. **N. Burbidgei** Hook. f. ex Burbidge in Gard. Chron. I. (1882) 56; Burbidge, Gard. of Sun, sine nom. (1880) 107, app. 343; Beccari, Malesia III. (1886) 6. — Planta robusta, alte scandens. Caulis 12—15 m altus × 12—15 mm crassus, acute triangulus, alatus v. jugosus, juventute brunneo-puberulus demum punctatus, internodia in speciminibus notis 7—10 cm longa, alterne angulis duobus alata v. jugosa, angulo tertio nuda. Folia 20—35 cm longa × 6—8 cm lata, coriacea, longe-petiolata; petiolus 7—10 cm longus, alatus, alae medio angustatae, basim versus gradatim expansae, $^1/_3$—$^1/_2$ amplexicaules et ad nodum inferiorem decurrentes, aliquanto abrupte in laminam superne expansae; lamina elliptica in cirrhum attenuata, supra glabra et brunneo-punctata, subtus sparse pubescens usque glabra et punctata, margine dense ferrugineo-pubescente, nervi longitudinales in paria 3—4 dispositi, sub-marginati, par intimum 18—30 mm, par secundum 21—35 mm, par tertium 23—38 mm, par quartum 24—39,5 mm a costa remotum, nervi transversi radiantes ascendentes, inferiores oblique nervis longitudinalibus conjuncti; cirrhus 20—25 cm longus × 1,5—2 cm latus ± brunneo-pubescens, in basim ascidii recurvatam ± abrupte ampliatus; ascidia 6—10 cm longa × 3—5 cm lata, ut cognita monomorphia (sed verisimile dimorphia), infundibuliformia, ad os leviter contracta, ± pubescentia v. subhirsuta, zona dense tomentosa sub peristomio instructa, murreo-alba purpureo-maculata, alae ventrales inferne forma nervorum prominentium evolutae, dein medium versus ampliatae ciliatae, os versus ± angustatae, os circulare transversum, postice in collum elevatum; peristomium 8—12 mm latum, cylindricum, aequale, postice in collum 1—2 cm elevatum, crebre albo- et purpureo-striatum; operculum late cordatum, margine undulatum, extus sparse puberulum, purpureo- et albido- ad

viridi-striatum, intus basi carinatum, carina valida multiglandulosa, superficies per totum glandulosa, glandulae circulares vulgo diffusae; calcar 8—10 mm longum crassum, obtusum, pubescens; ascidium intus per totum nitidum, glandulosum et detinens, v. area superior postice triangularis glauca et deducens, glandulae supra multae, minutae, infra majores et pauciores. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo: Auf dem Marie Parie Spur des Berges Kina Balu am 1000—1200 m (Low!, Burbidge!).

Nota. Cuius speciei pulchrae specimina a cl. Low primum lecta sunt, qui eam appellavit "the painted Nepenthes" (in Herb. Kew.). Quam speciem post annos triginta Burbidge cum collegisset novam esse cognovit.

52. **N. Boschiana** Korthals, Verh. Nat. Gesch. Bot. (1839) 25 t. 2 et 4 f. 39—54; Blume, Mus. bot. lugd. batav. II. (1852) 8; Miq. Fl. Ind. bat. I. p. 1 (1855) 1074 et Suppl. 151; Hook. f. in DC. Prodr. XVII (1873) 98; Beccari, Malesia I. (1877) 214, III. (1886) 9 in parte sub nom. *N. maxima*; Burbidge, Gard. of Sun (1880) 107; G. Beck in Wien Ill. Gart. Zeitg. (1895) 184: non *N. Boschiana* var. *sumatrana* Miq. l. c. 1074; nec Hook. f. in DC. Prodr. l. c. 98 quae *N. Treubiana* sunt. — Planta robusta, alte scandens. Caulis 5—10 m altus × 8—12 mm crassus, subtrigonus, alatus, juventute ferrugineo-hirsutus demum glaber. Folia 20—30 cm longa × 5—7 cm lata, coriacea, petiolata; petiolus 4—9 cm longus, alatus, $^1/_2$ amplexicaulis, alae amplae, ad 2—3 cm decurrentes, sursum gradatim in laminam attenuatae; lamina elliptico-lanceolata usque ovata, apice acuta, supra glabra, costa ± villosa, subtus brunneo-hirsuta demum brunneo-punctata, nervi longitudinales in paria 3—4 dispositi, par intimum 18—20 mm, par secundum 21—25 mm, par tertium 23—28 mm, par quartum 24—30 mm a costa remotum, nervi transversi irregulariter radiantes, ascendentes, 2—3 mm distantes; cirrhus 20—35 cm longus, validus, sursum gradatim in basim ascidii ampliatus, pilosus v. puberulus, demum glaber; ascidia 10—35 cm longa dimorphia v. trimorphia, inferne viridia v. rubro-viridia, superne et per operculum pallido-viridia, purpureo-maculata; ascidia inferiora 10—15 cm longa × 7—8 cm lata, urceolata, alae ventrales amplae expansae, os circulare, postice non v. leviter in collum elevatum; peristomium 7—10 mm latum, aequale; ascidia superiora subcylindrica usque infundibuliformia, basis leviter ventricosa, alae ventrales inferne ad cristas angustas v. nervos prominentes reductae, superne gradatim os versus in alas ciliatas ampliatae vel sursum forma nervorum prolongatae, os ovatum, postice in collum 2—4 cm alte elongatum; peristomium 15—25 mm latum, obliquum, margine exteriore antice expansum, recurvatum, margine interiore incurvatum denticulatum, postice gradatim angustatum et in collum elevatum, striae distinctae prominentes; operculum cordato-orbiculare, extus ferrugineo-pubescens et glandulis parvis illecebrosis diffusis obsitum, intus basi in carinam auriculatam ampliatum, glandulosum, glandulae per medium magnae, sparsae, ad marginem minores copiosiores; calcar 10—12 mm longum, ferrugineo-pubescens; ascidium intus glauco-purpureum, opacum et deducens per cinctum angustum sub peristomio et per collum, inferne nitidum glandulosum et detinens, glandulae ovales, immersae, discretae. Forma tertia ascidii media inter duas supra descriptas producta est. Inflorescentia 30—70 cm longa, dense ferrugineo-hirsuta; pedunculus 6—10 cm longus, in plantis ♂ brevior quam in ♀; pedicelli inferne biflori superne uniflori. Sepala ovalia extus et margine interiore ferrugineo-tomentosa, intus glandulis multis diffusis obsita. Columna staminea 4 mm longa, infra ferrugineo-pubescens, supra glabra; antherae 8, 1-seriatae. Ovarium subquadrangulare pubescens. Capsula 15—25 mm longa, aliquanto angustata ± pubescens demum nitida; lobi stigmatici sessiles, obscure bilobi. Semina 7—10 mm longa, tenuia; testa circum embryonem brunnea.

S. W. Malayische Provinz; Borneo: Auf dem Berg Sakoembang, 1000 m (Korthals!); auf dem Berg Mooloo (Low!, Beccari!); bei dem Flusse Lawas (Low!, Burbidge!); auf dem Berg Dulit, 1000—1500 m (Haviland-Hose, n. 3304!).

Einheim. Name: Dawon-sompitan.

53. **N. alata** Blanco, Fl. Filip. ed. 1. (1837) 805, ed. 2. (1845) 555, ed. 3. III. (1879) 214, IV. 173; Hook. f. in DC. Prodr. XVII. (1873) 99; G. Beck in Wien. Ill.

Gart. Zeitg. (1895) 221. — Planta terrestris v. epiphytica, scandens. Caulis 1—3 m altus × 8—10 mm crassus, obtuse trigonus, ramosus, juvenilis tomentosus demum glaber, viridis usque purpureus. Folia 10—30 cm longa × 2,5—4 cm lata, herbacea v. subcoriacea, petiolata; petiolus 3—6 cm longus, ad $^1/_3$—$^1/_2$ amplexicaulis, alatus, alae gradatim in laminam sursum dilatatae, supra fere glabrae cum areis axillaribus ferrugineo-hirsutis, subtus pilis dispersis obsitae; lamina elliptica usque lanceolata, apice superficie superiore cirrhi acuminata, juvenilis fusco- usque ferrugineo-pubescens demum glabra et fusco-punctata, nervi longitudinales in paria 3 rarius 4 dispositi, par intimum 10—20 mm a costa remotum et oblique ab ea abiens spatio partis tertiae basis deficiens, par secundum 14—27 mm, par tertium 16—30 mm a costa remotum, utrumque a basi laminae oriens, nervi transversi costae rectae v. ± deflexae; cirrhus 12—22 cm longus, infra tenuis, gradatim ad basim ascidii ampliatus, ± pubescens v. glaber; ascidia 8—20 cm longa × 2—5 cm lata, monomorphia v. dimorphia; inferiora cylindrico-ventricosa, superiora cylindrica, herbacea ad coriacea, albido- v. fusco- et stellato-pubescentia, nervi longitudinales et transversi numerosi, alae ventrales infra nervos prominentes formantes, sursum in laminas ciliatas expansae; os ovatum obliquum, postice ± in collum breve triangulare productum; peristomium 5—20 plerumque 7—10 mm latum, cylindricum, aequale v. rarissime regione exteriore per marginem postico-lateralem late expansum, postice sub operculo marginibus parallelis et approximatis, crebre striatum; operculum submembranaceum, ovato- ad orbiculari-cordatum, extus stellato-pubescens, intus carina basali auriculata copiose glandulosa et glandulis multis minutis circularibus nectariferis obsitum; calcar 8—12 mm longum filiforme; ascidium intus per totum dimidium superius coeruleo-purpureum opacum et deducens, inferne luteo-viride ad fuscum nitidum glandulosum et detinens, basim versus glandulae magnae exsertae et discretae. Inflorescentia 25—70 cm longa, ♂ longior quam ♀; pedunculus 10—30 cm longus, fusco- v. ferrugineo-pubescens; pedicelli 10—14 mm longi, interdum basim versus bracteolati, uniflori. Sepala 4—5 mm longa, obovata, extus et margine intus tomentosa, intus purpurea et glandulis multis nectariferis dispersis obsita. Columna staminea infra puberula, supra glabra; antherae 8—10, uni- v. sub-biseriatae. Pistillum 4-carpellatum, ovarium albido- ad ferrugineo-tomentosum; stigmata 4 triangula, sulcata. Capsula 20—25 mm longa, fusiformis, nitida, punctata v. sparse pubescens. Semina 12—14 mm longa; testa circum embryonem undulata.

Provinz der Philippinen: "Often abundant and forming thickets by streams" bis zu 1000 m auf dem Berg Mariveles in Luzon (Williams!), und bis 2400 m auf dem Berg Apo in Südost-Mindanao (Williams); Ins. Luzon: Vintar (Blanco); Tonglon (Loher n. 415!); Dupax in Prov. Nueva Vircaya (Vidal n. 3944!); Lampola (Warburg n. 13119); auf dem Berg Mariveles in der Prov. Bataan (Vidal, Meyer n. 2211!, Merrill n. 3229!, 5181!, Elmer n. 5854!, 7022!, Borden n. 1375! Whitford n. 419!, Williams n. 402!, 664!); auf dem Berg Isarog (Vidal); Prov. Albay (Cuming n. 947!); Tinnan Fluss in Prov. Infanta (Whitford n. 805!); Baguis (Merrill n. 4655!, Topping n. 76, Curran n. 4832!); Lueban (Elmer n. 5854!); Trinidad (Williams n. 1012!); Benguet (Loher n. 416!); Ins. Panay (Cuming n. 1682!); Ins. Bohol Cuming n. 1812!); Ins. Mindanao, Bogobo auf dem Berg Apo (Williams n. 2560!); Surigao (Bolster n. 258!, 270!).

Einheim. Namen: »Bał-batidor, Cadung, Igorrote, Tumahaha« (Vidal); »Inomangcalao« (Borden).

Var. β. **ecristata** Macfarlane var. nov. — Carina operculi reducta v. 0, glandulae operculi paucae, mediocres usque magnae, irregulariter dispersae.

Mindanao: Prov. Misamis, auf dem Berg Malindang (Mearns u. Hutchinson n. 4632!).

Var. γ. **biflora** Macfarlane var. nov. — Glandulae operculi in medio parvae similes, marginem versus magnae et irregulariter dispersae. Pedicelli 2- rarissime 1-flori.

Negros: Westl. Prov. Negros, auf dem Berg Selay (Whitford n. 1537!).

54. **N. Veitchii** Hook. f. in Trans. Linn. Soc. XXII. (1859) 421 ubi cit. est descr. in Bot. Magaz. (1858) t. 5080 sub nom. *N. villosa* err., et in DC. Prodr. XVII (1873) 96; Masters in Gard. Chron. (1872) 542; André in Ill. Hort. XXIII. (1876) 192, cum icon. 261 quae *N. lanata* err. nom. est; Burbidge in Fl. Mag. s. 2. (1877) pl. 265 et in Gard. of Sun (1880) 60, in Garden XXVII. (1880) 542, pl. 237; Masters in Gard. Chron. s. 2. XVI. (1881) 780, f. 152, 781; Burbidge in Gard. Chron. XVII. (1882) 56; Watson in Gard. Chron. s. 3. XX. (1896) 239; Burbidge in Journ. Roy. Hort. Soc. XXI. (1897) 259; Miller in Cycl. Amer. Hort. III. (1901) 1072; Veitch, Hort. Veitchii (1906) 484. — *N. lanata* Lindl. in Gard. Chron. (1854) 375 (nom. nud. sine descr.); André in Ill. Hort. XXIII. (1876) t. 261, vide supra; Masters in Gard. Chron. s. 2. XVII. (1882) 178; Beccari, Malesia (1886) 6; Veitch, Hort. Veitchii (1906) 302. — *N. villosa* Hook. f. in Bot. Magaz. LXXXIV. (1858) t. 5080; Lemaire in Ill. Hort. XVI. (1869) 45. — *N. sanguinea* Masters in Gard. Chron. s. 2. XVIII. (1882) 808 nom. err. pro *N. Veitchii* quae descr. et depict. est. — Planta epiphytica prostrata, disticha, luteo-viridis. Caulis 1—1,5 m longus × 8—12 mm crassus, cylindricus v. plerumque ellipticus, sinuosus nodis distichis, internodia brevia v. ± elongata saepe per superficiem glandulis allectantibus tuberculata, fusco-villosa. Folia 15—50 cm longa × 5—10 cm lata, alternantia, saepe decurvata et circa arborem amplexicaulia, coriacea, petiolata; petiolus 3—10 cm longus, lateraliter compressus, alatus, alae verticales medium versus angustatae, ad basim dilatatae et ad $^7/_8$ amplexicaules oblique decurrentes, externe glandulis allectantibus ± tuberculatae, superne in laminam abrupte v. gradatim ampliatae; lamina late elliptica v. obovata, apice acuta obtusa truncata v. cordata, in foliis non ascidiiferis amplissima, in foliis ascidia magna gerentibus ± reducta, supra luteo-viridis glabra, subtus rufo- v. fusco-villosa, margine fusco-ciliata, nervi longitudinales in paria 5rarius 4 v. 6 dispositi, omnia a basi orientia et ad apicem in cirrhum incurvata, par intimum 15—20 mm, par secundum 22—30 mm, par tertium 26—36 mm, par quartum 29—40 mm, par quintum 30,5—42 mm a costa remotum, nervi transversi versus costam angulo recto dispositi, costa crassa subtus prominens; cirrhus 8—20 cm longus × 2—3 mm crassus, sursum in ascidium gradatim ampliatus, fusco-villosus; ascidia 12—30 cm longa × 5—8 cm lata, monomorphia, oblique inserta, cylindrico-ovata v. subcylindrica, luteo-viridia rarius rubro-viridia maculis purpureis, fusco-villosa, alae ventrales expansae ciliatae basim versus angustatae ante os auriculatae, v. alae angustae, leviter v. non ciliatae, os ovatum obliquum postice in collum triangulum elongatum; peristomium 15—60 mm latum, antice angustatum marginibus incurvatis et recurvatis, lateraliter extus late expansum et ad marginem planum v. undulatum, intus ± inclinatum margine pectinatum, superficies per marginem interiorem dense et crebre striata, striae marginem exteriorem versus divergentes, luteo-viridis v. rubro-viridis; operculum 4—8 cm longum × 3—5 cm latum, ovato-oblongum, luteo-viride, v. rubro-viride, extus fusco-villosum, intus sparse villosum, basi in carinam auriculatam expansum, glandulosum, glandulae per medium magnae, ovales, marginem versus minores; calcar 15—20 mm longum, recurvatum; ascidium intus per collum triangulum glauco-viride, opacum et deducens, ab ore inferne viride v. luteo-fuscum, nitidum glandulosum et detinens, glandulae superne parvae, immersae, inferne magnae, ovales, discretae, ± exsertae. Inflorescentia 25—35 cm longa, fusco-tomentosa; pedunculus 12—15 cm longus; racemus subdensiflorus v. densiflorus; pedicelli 8—10 mm longi, biflori, rarius versus apicem racemi uniflori. Flores 7—8 mm diametro. Sepala obovata, extus fusco- v. rufo-tomentosa, intus glandulis multis minutis dispersis obsita. Columna staminea tenuis, sepalis longior, sparse villosa; antherae 8 uniseriatae ± convolutae. Ovarium ellipticum, rufo-tomentosum; stigma peltatum quadrilobatum. Capsula 25 mm longa, lineari-lanceolata, nitida, sparse villosa, valvae lanceolatae stigmate plano triangulo coronatae.

S. W. Malayische Provinz; Borneo: Auf dem Berg Gunong Mooloo, 300—900 m (Lobb n. 145!); Gunong Mooloo und Lawas Fluss (Low!); Lawas Fluss (Burbidge!); auf dem Berg Santubong bei Kutcing (Beccari!).

55. **N. stenophylla** Masters in Gard. Chron. s. 3. VIII. (1890) 240, XI. (1892) 402 cum icon. 58, 401; G. Beck in Wien. Ill. Gart. Zeitg. (1895) 224; Veitch, Hort. Veitchii (1906) 303, 486. — Planta gracilis, ramosa, scandens. Caulis 2—3 m longus × 3—6 mm crassus, cylindricus, glaber, minute fusco-punctatus, internodiis inferne brevibus, superne 2—3 cm longis. Folia 15—25 cm longa × 2—3,5 cm lata, subcoriacea, petiolata; petiolus 3—6 cm longus alatus, alae a basi laminae deorsum gradatim angustatae et verticaliter directae, basim versus leviter expansae et ad $^1/_4$—$^1/_3$ amplexicaules; lamina lanceolata v. elliptico-lanceolata, inferne in alas petiolares et superne in cirrhum attenuata, supra glabra subtus fusco-punctata et sparse puberula, marginibus leviter ciliatis, nervi longitudinales in paria 3 dispositi, omnes a basi folii orientes, par intimum 6—8 mm, par secundum 8—11 mm, par tertium 8,5—10 mm a costa remotum, nervi transversi valde obscuri, irregulariter ascendentes et reticulati; cirrhus 10—20 cm longus, gracilis, concavo-convexus, sursum leviter ampliatus, in basim ascidii abrupte expansus, ± fusco-punctatus et puberulus; ascidia 8—15 cm longa × 1,5—2,5 cm lata, tubulosa, inferne ± ventricosa, medium versus angustata, dein sursum in os obliquum expansa, pallido-viridia maculis et areolis purpureis diffusis, ± fusco-puberula, alae ventrales inferne in nervos reductae, medium versus gradatim expansae non ciliatae, superne 2—3 mm latae et sub peristomio abrupte rotundatae et ciliatae, os 2—5 cm × 1—2,5 cm ovato-elongatum admodum obliquum; peristomium 5—7 mm latum, valde obliquum, cylindricum, antice quam postice angustius, marginibus sub operculo appositis, crebre striatum, rubrum; operculum 2—3 cm longum × 1,5—2,5 cm latum, ovato-cordatum, extus fusco-puberulum et punctatum, intus ad basim carina media levi et glandulis multis parvis circularibus dispersis obsitum; calcar 7—10 mm longum, puberulum, filiforme; ascidium intus per dimidium v. duas partes superiores glauco-purpureum v. purpureo-maculatum, opacum et deducens, inferne nitidum glandulosum et detinens, glandulae copiosae, discretae, expositae. Flores et fructus ignoti.

S. W. Malayische Provinz; Borneo (Curtis ex hort. Veitch!).

56. **N. maxima** Reinw. in litt. ad Nees v. Esenbeck in Ann. sc. nat. III. (1824) 369 t. 20, f. 2; Blume, Mus. bot. lugd. batav. II. (1852) 8; Miq. Fl. Ind. batav. I. p. 1 (1855) 1075; Hook. f. in DC. Prodr. XVII. (1873) 105; Beccari, Malesia III. (1886) 9 ex parte. — *N. Celebica* Hook. f. in DC. Prodr. XVII. (1873) 100. — *N. Curtisii* Mast. in Gard. Chron. II. (1887) 681, 689 f. 133; Hook. f. in Bot. Magaz. (1891) t. 7138; Masters in Illustr. Hort. XXXV. (1888) 65 t. 59, et in Gard. Chron. II. (1889) 661 f. 90. — *N. fallax* G. Beck in Wien. Ill. Gart. Zeitg. (1895) 191. — Planta saepe robusta alte scandens. Caulis 6—10 m altus × 10—12 mm crassus, juvenilis fulvo- v. ferrugineo-pubescens, demum sparse pubescens v. glaber. Folia 18—40 cm longa × 5—8 cm lata, sub-coriacea v. coriacea, petiolata; petiolus 4—10 cm longus, alatus, alae verticales medio angustatae, basim versus gradatim ampliatae, divergentes, ad $^1/_2$—$^2/_3$ amplexicaules, basi non v. leviter decurrentes, in laminam sursum aliquanto abrupte ampliatae, marginibus fusco-ciliatis; lamina elliptica v. oblongo-lanceolata, lucido-viridis v. luteo-viridis, supra glabra, subtus juventute stellato-pubescens demum fusco-punctata, costa supra dense hirsuta demum glabra, subtus ferrugineo-puberula, marginibus ± ferrugineo-ciliatis, apice acuminata, rotundata, v. ± peltata, nervi longitudinales obscuri, in dimidio superiore laminae in paria 3 dispositi, par intimum 22—30 mm, par secundum 27—38 mm, par tertium 28—40 mm a costa remotum, omnes inferne oblique in costam vergentes, v. nervi omnes a costa oblique orientes et irregulariter nervis transversis conjuncti; cirrhus 15—25 cm longus, sparse hirsutus et stellato-pubescens, sursum in basim ascidii recurvatam gradatim ampliatus; ascidia 10—25 cm longa, × 3—5 cm lata, dimorphia v. trimorphia; inferiora inferne ventricosa superne cylindrica, alae ventrales basi 0 v. angustae dein abrupte ampliatae, ciliatae et ad os continuatae; ascidia intermedia cylindrica, alae ventrales angustatae non v. vix ciliatae; ascidia superiora infundibuliformia, alae ventrales ad nervos prominentes reductae, ascidia omnia luteo- v. pallido-viridia, diffuse maculis et areolis

purpureis obtecta, ± pubescentia zona fulva v. ferrugineo-tomentosa sub peristomio instructa, os ovatum obliquum postice in collum triangulum elongatum; peristomium

Fig. 18. *Nepenthes maxima* Reinw. *A* Caulis et partes foliorum. *B* Ascidium. *C* Inflor. ♂ pars. *D* Inflor. ♀ pars. *E* Fl. ♂ auctus. *F* Fl. ♀ auctus. *G* Fructus dehiscens. *H* Semina. (Icon. origin.)

10—30 mm latum, antice angustatum convexum, margine exteriore sinuosum intus denticulatum, parte postico-laterali ad marginem exteriorem late expansum, ad marginem interiorem denticulatum, postice in collum elongatum, superficie viridi-purpureum ad purpureum; operculum 3—6 cm longum × 2,5—4 cm latum, cordatum, extus sparse stellato-pubescens v. glabrum, intus nervo medio percursum, qui basim versus in carinam auriculatam simplicem — rarius 2—3-lobatam — expansus et versus apicem in calcar elongatum prolongatus est, superficie basim versus per carinam et marginem versus copiose glandulosum; calcar 12—15 mm longum filiforme, a collo 5—8 mm sub insertione operculi oriens; ascidium intus sub margine et per collum triangulum v. etiam ad dimidium glaucum v. glauco-purpureum opacum et deducens, inferne glandulosum et detinens. Inflorescentia 30—50 cm longa; pedunculus 10—15 cm longus viridis, pubescens; racemus simplex laxiflorus; pedicelli 20—25 mm longi, graciles, inferne biflori, superne uniflori. Sepala elliptica, extus pubescentia demum subglabra, intus glandulosa. Columna staminea sepalis aequilonga v. longior; antherae 8 uniseriatae. Ovarium ovato-quadrangulare, sulcatum, pubescens; stigma 4-lobatum. Capsula 30—35 mm longa, fusiformis, sparse pubescens, punctata. Semina 20—25 mm longa; testa circum embryonem brunnea, alis colore stramineo. — Fig. 18.

Centro-malayische Provinz; Celebes: Auf dem Berg Rumengan (Reinwardt n. 1537!); ohne genauen Standort (Meyer! = *N. Celebica* Hook. f. l. c.); Gutuing Abaawa (Forsten n. 301!). — Amboina: Ohne genauen Standort (Christopher Smith n. 174!, Teysmann n. 26a!, Beccari).

S. W. Malayische Provinz; Borneo: Sarawak (Beccari n. 2386!); ohne Standort (Curtis!).

Papuanische Provinz; Neu-Guinea: Auf dem Berg Arfak (Beccari!); Sogari Gegend (Forbes n. 643!).

Nota. Ex synonymia speciei supra descripta una cum *N. Boschiana* hanc parum intelligi satis constat. Foliorum structura et venis, ascidii figura et colore, operculi duobus processibus, fructu et seminibus maximis, facillime a ceteris distinguitur. Reinwardtii specimina *N. maximae* in Herb. Kew. asservata atque specimina *N. Curtisii* Mast. et viva et exsiccata sine ullo dubio ad unam eandemque speciem pertinent. Descriptio Reinwardtii forsan nimis brevis sed accurata et omnino definita est.

57. **N. Lowii** Hook. f. in Trans. Linn. Soc. XXII. (1859) 420 t. 71, et in DC. Prodr. XVII. (1873) 94; Spencer St. John, Life For. Far East II. (1862) 279, 338, 343; Burbidge, Gardens of Sun (1880) 99, 284; Macfarlane in Ann. of Bot. VII. (1893) 429 et seq., pl. 20; Whitehead, Explor. Mt. Kina Balu (1893) 166; Burbidge in Journ. Roy. Hort. Soc. XXI. (1897) 258. — Planta robusta, terrestris v. epiphytica, scandens. Caulis 2—4 m longus × 6—7 mm crassus, cylindricus, glaber. Folia 20—35 cm longa × 6—10 cm lata, coriacea, petiolata; petiolus 5—8 cm longus, ± puberulus, alatus, basi oblique ad $^1/_2$—$^2/_3$ amplexicauli, alae angustae verticales sursum in laminam abrupte ampliatae; lamina elliptica v. obovata, lucido-viridis, supra glabra, subtus furfuraceo-puberula, nervi longitudinales in paria 3—4 dispositi, sinuosi, par intimum 25—35 mm, par secundum 30—43 mm, par tertium 33—47 mm, par quartum 35—50 mm a costa remotum, nervi transversi sinuosi, laxe reticulati; cirrhus 15—20 cm longus, validus, in basim ascidii ventricosam aliquanto abrupte expansus; ascidia dimorphia 10—20 cm longa × 5—15 cm lata; inferiora (fide Whitehead l. c. 166) pyriformia ad ventricosa, viridia, margine rubro-lineari; superiora oblique curvata, dimidium inferius valde ventricosum, medio constrictum, dimidium superius os versus gradatim et oblique expansum, per totum pallido-viride demum brunneum coriaceum, alae ventrales ad nervos prominentes reductae v. costis sub peristomio jugo transverso conjunctae, os obliquum ovatum, postice in collum leviter elongatum; peristomium simplex erectum, margine aequali, non v. leviter reflexo, superficies interior remote striata et serie orum glandularum marginalium obsita; operculum 6—12 cm longum × 4—8 cm latum, crassum concavum, ovatum, basi profunde cordatum v. subauriculatum, extus et margine interiore villosum v. brunneo-punctatum, intus setis multis longis rigidis per latus

utrumque lineae mediae v. aequaliter dispersis et glandulis multis perithecioideis immersis intermixtis obsitum; calcar 20—30 mm longum attenuatum, sub apice colli insertum; ascidium intus primo glauco-viride maculis rubro-fuscis demum fuscum nitidum, per totum glandulosum, glandulae superne parvae discretae ± immersae, inferne magnae, coarctatae, nudae. Inflorescentia 20—30 cm longa; pedunculus 10—15 cm longus × 6—8 mm crassus; racemus densiflorus, ferrugineo-tomentosus; pedicelli 20—25 mm longi, biflori, basi bracteolati. Sepala elliptica v. obovata, extus et per marginem interiorem puberula, intus per medium glandulosa. Columna staminea basi villosa, superne glabra, sepalis aequalis; antherae 8—12, uniseriatae. Ovarium ovatum, dense ferrugineo-pubescens; stigma 4-lobum. Capsula 20—22 mm longum × 5—7 mm latum oblongum, ± pubescens, stigmatibus bilobis expansis. — Fig. 19.

S. W. Malayische Provinz; Borneo: Auf dem Berge Kina Balu, 2000—2500 m (Low!); auf dem Kiau Rücken des Kina Balu (Spencer St. John); auf Kiau und auf dem Marie Parie Spur, 1500 m (Burbidge!); Kiau und Melungkap des Kina Balu (Whitehead!).

58. **N. Macfarlanei** Hemsley in Proc. Linn. Soc. (1905) 12 et in Gard. Chron. s. 3. XXXVII. (1905) 241, 260, in Hook. Icon. pl. XXIX. (1906) t. 2814, 2815. — Planta scandens saepe epiphytica. Caulis 2—3 m altus × 6—8 mm crassus, ± trigonus, sulcatus, glaber praeter axillas foliorum, juvenilis dense ferrugineo-hirsutus, demum subglaber. Folia 6—20 cm longa × 2—3,5 cm lata, sessilia, semiamplexicaulia, coriacea, ovato-lanceolata ad obovata, apice in cirrhum abrupte rotundata, glabra praeter costam supra puberulam, infra glabra, nervi longitudinales in paria 4 dispositi, par intimum a triente inferiore costae oriens et ab ea 8—12 mm remotum, par secundum 10—14 mm, par tertium 10—13,5 mm, par quartum 11,5—15 mm a costa distans, nervi transversi obscuri, rectangule v. leviter obliqui irregulariter reticulati; cirrhus 10—20 cm longus aequalis, in basim ascidii recurvatam abrupte ampliatus, juvenilis dense pubescens demum supra ± pubescens, subtus glaber; ascidia 8—15 cm longa × 2,5—4 cm lata, juvenilia ferrugineo-pubescentia demum sparse pubescentia ad brunneo-punctata, pallido- v. albido-viridia maculis magnis purpureis, dimorphia v. subtrimorphia; ascidia inferiora subovata v. ventricosa, alae ventrales inferne angustae, sursum gradatim ampliatae et ciliatae, os ovatum obliquum in collum triangulum leviter elongatum; peristomium antice cylindricum, margine exteriore postico-laterali leviter dilatatum, tenuiter striatum, margine interiore pectinatum; operculum 3—4,5 cm latum cordato-orbiculare, extus glabrum, intus setis longis unicellularibus rigidis deflexis et

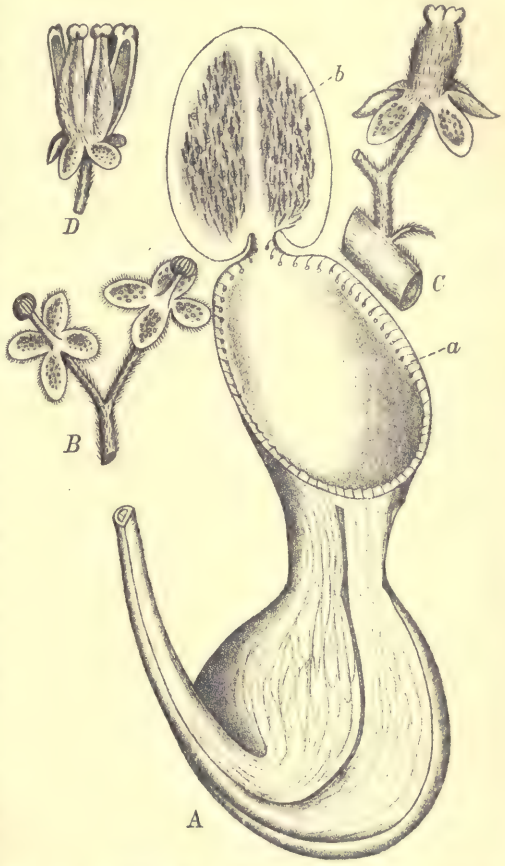

Fig. 19. *Nepenthes Lowii* Hook. f. *A* Ascidium a fronte visum, *a* os glandulae marginalis, *b* operculum pilos longos et glandulas depressas perithecioideas gerens. *B* Flos ♂. *C* Fl. ♀. *D* Capsula. (Icon. origin.)

glandulis magnis circularibus nectariferis intermixtis obsitum; calcar 8—10 mm longum gracile; ascidium intus per trientem v. dimidium superius glauco-purpureum opacum et deducens, inferne nitidum et glandulosum; ascidia superiora cylindrica v. infundibuliformia, basi a cirrho abrupte ampliata, alae ventrales angustae non ciliatae v. ad nervos prominentes reductae, os transversum v. leviter obliquum, vix v. non in collum elevatum; peristomium aequale cylindricum; ascidium intus in formis cylindricis per trientem v. dimidium superius glauco-purpureum et deducens, inferne glandulosum, in formis infundibuliformibus per superficiem triangulam superiorem postice glauco-purpureum opacum et deducens, inferne glandulosum. Inflorescentia 15—25 cm longa, pedunculus 10—15 cm longus, juventute ferrugineo-pubescens demum glaber; racemus subdensiflorus; pedicelli 10—12 mm longi, ferrugineo-hirsuti, biflori, ad furcam bracteolati. Sepala 4 ovalia v. ovata, extus ferrugineo-pubescentia, intus glabra et glandulis multis parvis obsita. Columna staminea sepalis aequalis, inferne ferrugineo-puberula, superne glabra; antherae 6, uniseriatae. Ovarium breviter stipitatum, ovatum, pubescens. Capsula 18—20 mm longa, nitida, sparse pubescens, valvis lanceolatis; stigmata 4 depressa, biloba. Semina 10—12 mm longa, circum embryonem brunnea et rugosa.

S. W. Malayische Provinz; Malakka: Auf dem Berge Gunong Bubu bei Perak 1500—1700 m (Murton n. 36, »E. G. R. — Dr. King's Coll.« n. 7395!, 7421!); Gunong Bubu um 2000 m (Wray n. 339!, n. 1643!, n. 3849!); bei Perak (Scortechini!).

Hybridae artificiales.

Nepenthes Alleniana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074; Cat. Siebrecht and Wadley (1884) 49; parentes ignoti, descriptio imperfecta.

N. amabilis Hort. ex Nicholson, Dict. of Gard. Suppl. (1888) 571; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Hybrida inter *N. Hookeriana* et *Rafflesiana* similitudine parentis prioris. Ascidia pallido-viridia et lurido-rubro-maculata.

N. Amesiana Veitch in Gard. Chron. s. 3. XIV. (1893) 756; G. Beck in Wien. Ill. Gartenzeitg. XX. (1895) 147. — *N. Rafflesiana* × *Hookeriana*?. — Ascidia pallido-viridia rubro-maculata et punctata, operculum late ovale, extus obscure-viride, intus ± rubro-maculatum.

Bei Veitch erzogen und 1893 ausgestellt; von *N. amabilis* nicht sehr verschieden.

N. Anerleyensis Hort. ex G. Beck in Wien. Ill. Gartenzeitg. XX. (1895) 222. — Syn. *N. Morganianae* q. v. p. 85.

N. Arnoldiense Hort. ex G. Beck in Wien. Ill. Gartenzeitg. XX. (1895) 222. — Syn. *N. Morganianae* q. v. p. 85.

N. atro-sanguinea Masters in Gard. Chron. s. 2. XVII. (1882) 826 et icon. 827; Nicholson, Dict. of Gard. II. (1885) 435; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 240; Miller in Cycl. Amer. Hort. III. (1901) 1073. — Parentes incerti at probabiliter *N. distillatoria* × *Sedeni*. — Folia 25—30 cm × 8—12 cm apice in cirrhum attenuata; cirrhus fere aequalis; ascidia inferne ± ventricosa, superne cylindrica, rubro-purpurea et ± luteo-viridia maculata, alae a basi ad os continuatae et ciliatae, inferne late expansae, superne ± angustatae, os obliquum; peristomium aequale cylindricum, postice leviter elongatum rubro- et purpureo-striatum; operculum oblongum, emarginatum, viride et purpureo-maculatum.

Von Taplin im Etablissement Such (Amboy U. S. A.) erzogen, und von Veitch in den Handel gebracht.

N. Balfouriana Hort. ex Masters in Gard. Chron. s. 3. XXVI. (1899) 90 et icon. 91, Desloges l. c. s. 3. XXXVI. (1904) 97; Veitch, Hort. Veitch. (1906) 304, 488. — *N. mixta* (*N. Northiana* × *maxima* [= *Curtisii* Mast.]) × *Mastersiana* (*N. sanguinea* × *khasiana*). — Folia glabra, apice rotundata; ascidia 15—30 cm × 5—12 cm cylindrico-ventricosa, viridia maculis paucis magnis purpureis per totam superficiem praedita vel praecipue os versus illis obsita, alae a basi ad os continuatae, longe

ciliatae; peristomium 2—6 mm latum, margine exteriore [illegible] undulatum, viridi- et [illegible]-striatum; operculum 6—9 cm × 5—8 cm subrotundatum, viride purpureo-macu[illegible] et striatum, intus apicem versus caudatum; ascidium intus glauco-viride et purpur[illegible]-maculatum.

Von Tivey im Etablissement Veitch erzogen, und 1899 ausgestellt.

N. Boisiana Desloges in Gard. Chron. s. 3. XXXVIII. 1905 [illegible], Journ. d. Hort. s. 4. VI. 1905 664. — *N. Tivey*[illegible] *N. maxima* var. *superba* [illegible] *Morganiana*? *N. Hookeriana*? × *phyllamphora*. — Ascidia cylindrica, elongata, pallido-viridia, copiose et irregulariter rubro-maculata, alae ciliatae; [illegible]; peristomium viridi-rubrum; operculum ovatum, extus pallido-viride et rubro-[illegible], intus basi profunde carinatum et per superficiem glandulosum.

Von Desloges erzogen und 1905 ausgestellt.

N. Broomeana Hort. ex Lindsay in Trans. and Proc. Bot. Soc. Edinb. XVIII. 1891 237. — Parentes ignoti, sine descriptione, ergo nomen nudum.

N. chelsonii Veitch ex Masters in Gard. Chron. 1872 542; Burbidge in Garden XXIII. 1883 493 et icon. col.; Nicholson, Dict. of Gard. II. 1885 435; G. Beck in Wien. Ill. Gartenztg. XX. 1895 147; Veitch in Journ. R. Hort. Soc. XXI. 1897 237 et icon. 239, Hort. Veitch. 1906 304, 487. — *N. H*[illegible] × *Dominii* × *N. Rafflesiana* × spec.?. — Caulis cylindricus; folia 25—50 cm × 8—10 cm, glabra, petiolata; petiolus 6—10 cm longus, latus, basi [illegible] caulis; lamina coriacea, oblonga, apice in cirrhum attenuata; ascidia 8—12 cm × 5—7 cm late ovata, luteo-viridia et purpureo-maculata, alae latae, a basi [illegible] ciliatae et angustatae, os obliquum; peristomium subcylindricum aequale, rubro- et pallido-viridi-striatum; operculum ovato-cordatum, medio viride, lateribus [illegible] purpureo-maculatum; ascidium intus glauco-viride et purpureo-maculatum.

Von Seden im Etablissement Veitch erzogen und 1872 ausgestellt.

Nota. *N. chelsonii* var. *excellens* Veitch est *N. edinensis* × *N. Rafflesiana* × *chelsonii*, vide p. 81.

N. Claytonii Hort. ex Miller in Cycl. Amer. Hort. III. 1901 1074, ex Cat. Pitcher and Manda (1895). — Sine descriptione, parentes ignoti, ergo nomen nudum.

N. coccinea Hort. ex Masters in Gard. Chron. s. 2. XVIII. 1882 169 et icon.; Nicholson, Dict. of Gard. II. 1885 435; Rodigas in Ill. Hort. XLI. 1894 143; G. Beck in Wien. Ill. Gartenztg. XX. 1895 223; Miller in Cycl. Amer. Hort. III. 1901 1074. — *N. Hookeriana* × *phyllamphora*. — Folia 20—50 cm × 6—9 cm petiolata; lamina lanceolata subcoriacea, apice in cirrhum attenuata, margine polite fimbriata vel dentata; ascidia 12—20 cm × 5—8 cm, inferne ventricosa, superne cylindrica, per totam superficiem purpureo-rubra lentiginibus luteo-viridibus, alae ciliatae, os ovatum postice leviter elongatum; peristomium 8—12 mm latum, rubro- et purpureo-striatum; operculum ovato-oblongum pallido-viride et rubro-maculatum; ascidium intus glauco-viride rubro-maculatum.

Von Taplin im Etablissement Such erzogen und bei Williams in London in den Handel gegeben.

N. compacta Hort. ex Baines in Garden XXVII. 1885 496 et icon.; Nicholson, Dict. of Gard. Suppl. 1888 571; G. Beck in Wien. Ill. Gartenztg. XX. 1895 218. — *N. Hookeriana*? × *phyllamphora*. — Parentes probabiliter ut in *N. coccinea*, *N. Morganiana*, *N. Wrigleyana* (q. v. pp. 79, 85, 89), at peristomium luteo-viride.

Von Taplin erzogen und von Williams in den Handel gebracht. Diese Hybride dürfte wohl mit der obengenannten zu vereinigen sein.

N. Courtii Veitch in Gard. Chron. s. 2. VIII. (1877) 441; Regel in Gartenfl. XXVIII. (1879) 369 et icon. 370; Masters in Gard. Chron. s. 2. XVI. (1881) 844 et icon. 845; Nicholson, Dict. of Gard. II. 1885 436; G. Beck in Wien. Ill. Gartenztg. XX. 1895 187; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238, Hort. Veitch. (1906) 305, 487. — *Nepenthes* spec. ?borneensis × *Dominii* × *N. Rafflesiana* × spec. ?borneensis.

— Caulis ± purpureo-ruber et villosus; folia 25—35 cm × 4—7 cm, obscure viridia, subcoriacea, lanceolata, basi amplexicaulia; ascidia 15—25 cm × 5—8 cm, inferne leviter ventricosa, superne cylindrica, viridia ± purpureo-maculata, alae aequales ciliatae, os ovatum leviter obliquum; peristomium cylindricum aequale; operculum ovatum, viride, purpureo-maculatum.

Von Court im Etablissement Veitch erzogen. Nach Veitch wurde der Bastard mit *N. hybrida* und *N. rubro-maculata* von denselben hybriden Samen erzogen.

N. Craigiana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074, ex Cat. Hort. Siebrecht and Wadley (1889) 49, ubi descriptio imperfecta est; parentes ignoti. Nomen nudum.

N. cylindrica Veitch in Gard. Chron. s. 3. II. (1887) 521; Nicholson, Dict. of Gard. Suppl. (1888) 571; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 225; Miller in Cycl. Amer. Hort. III. (1901) 1072; Veitch, Hort. Veitch. (1906) 305, 488. — *N. distillatoria* (sub nom. *N. hirsuta* var. *glabrescens* Veitch, Nicholson etc. supra) × *Veitchii*. — Caulis ascendens internodiis ± elongatis; folia 15—40 cm × 4—8 cm obovata vel oblanceolata, inferne basi $^1/_2$-amplexicaulia, costa ± purpureo-rubra; ascidia 15—20 cm × 3—5 cm quam cirrhus longiora, subcylindrica, infra medium leviter expansa, luteo-viridia maculis purpureis parvis dispersa, alae inferne incompletae, superne dentato-ciliatae; peristomium 10—25 mm latum, viridi-luteum; operculum ovale rectum vel ± inclinatum, intus multiglandulosum.

Von Tivey im Etablissement Veitch erzogen und 1887 ausgestellt.

N. Deslogesii Jarry-Desloges in Le Jard. XIX. (1905) 136 et icon. col.; Masters in Gard. Chron. s. 3. XXXVIII. (1905) 379. — *N. Tiveyi* (*N. maxima* var. *superba* × *Veitchii*) × *mixta* (*N. Northiana* × *maxima*). — Ascidia 20—24 cm × 3—5,5 cm, viridia, copiose rubro-striata et maculata, alae late expansae et longe ciliatae; peristomium rubro-purpureum, margine exteriore ± undulatum; operculum ovato-cordatum, extus polite purpureo-maculatum, intus basi carinatum.

Ein schöner Bastard, in den Gewächshäusern von cl. M. Jarry-Desloges erzogen.

N. Dicksoniana Lindsay ex Masters in Gard. Chron. s. 3. IV. (1888) 543 et icon. 541; Wittmack in Gartenfl. XXXVIII. (1889) 465 et icon. 466; Lindsay in Trans. and Proc. Bot. Soc. Edinb. XVIII. (1891) 236 et icon. col.; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 144; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238, Hort. Veitch. (1906) 305, 488. — *N. Rafflesiana* × *Veitchii*. — Caulis elongatus, subcylindricus; folia 20—50 cm × 5—10 cm coriacea, petiolata; petiolus 7—15 cm longus, alatus, alae ± verticales, basi ad $^3/_4$ amplexicaules; lamina 20—50 cm × 5—10 cm elliptica vel elliptico-obovata, supra glabra subtus ± pubescens, nervi longitudinales 5; ascidia 12—25 cm × 5—10 cm cylindrico-ventricosa ± villosa, fulvo-viridia et purpureo-maculata, alae a basi ad os continuatae, longe ciliatae; os obliquum, peristomium 10—40 mm latum, inclinatum, pallido-viride et rubro-striatum; operculum 4—8 cm × 3—6 cm oblongum, extus pilosum et purpureo-maculatum.

Eine schöne Hybride, von Lindsay im Botanischen Garten zu Edinburgh erzogen und von der Firma Veitch in den Handel gebracht.

N. Dominii Veitch in Gard. Chron. (1862) 398; Masters in do. (1872) 542; Nicholson, Dict. of Gard. II. (1885) 436 (sub nom. *N. Dominiana*); G. Beck in Wien. Ill. Gartenztg. XX. (1895) 148; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238 et icon. 243, Hort. Veitch. (1906) 305; Miller in Cycl. Amer. Hort. III. (1901) 1074. — *N. Rafflesiana* × spec. ?borneensis; probabiliter *gracilis*. — Caulis cylindricus, purpureo-ruber, folia 30—40 cm × 4—6 cm petiolata, petiolus basi amplexicaulis et decurrens; lamina lanceolata, subcoriacea ad coriacea, nervi longitudinales 5—6; ascidia 10—15 cm × 3—5 cm inferne ventricosa, superne cylindrica et os versus contracta, viridia et purpureo-maculata vel marmorata, alae a basi ad os continuatae, inferne latissimae, os versus ± angustatae, longe ciliatae; peristomium 3—6 mm latum cylindricum, postice in collum 8—15 mm altum elongatum; operculum ovatum, viride et purpureo-maculatum; calcar 10—20 mm longum filiforme.

Von Dominy im Etablissement Veitch zu Exeter erzogen und 1862 in den Handel gebracht.

N. Dormanniana Williams ex Masters in Gard. Chron. s. 2. XVII. (1882) 525 et icon.; Baines in Garden XXVII. (1885) 496 et icon. col.; Nicholson, Dict. of Gard. II. (1885) 436; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 223; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes non accurate noti, at probabiliter *N. Rafflesiana* × *Sedeni*. — Folia elliptico-lanceolata, apice acuta, margine ciliata, nervi longitudinales 5—6; ascidia 12—18 cm × 5—8 cm cylindrico-ventricosa, viridia et purpureo-maculata vel marmorata, alae a basi ad os continuatae et angustatae, inferne ± sinuosae, margine dentata vel ciliata; peristomium 7—12 mm latum, fere aequale, obliquum, postice non elongatum, pallido-viride; operculum 5—8 cm × 4—6 cm late ovatum, viride, margine purpureo-maculatum vel striatum; ascidium intus glauco-viride.

Von Taplin erzogen und von Williams in den Handel gebracht.

N. Dyeriana Macfarlane nom. nov.; Masters in Gard. Chron. s. 3. XXVIII. (1900) 256 et icon. 257, XXXVIII. (1905) 325; Veitch, Hort. Veitch. (1906) 307, 489 (omnes sub nom. »Sir W. T. T. Dyer«). — *N. mixta* (*N. Northiana* × *maxima*) × *Dicksoniana* (*N. Rafflesiana* × *Veitchii*). — Caulis elongatus, ascendens subcylindricus; folia 30—45 cm × 8—12 cm coriacea, petiolata; petiolus 5—10 cm longus, brunneo-villosus, basi ad $^3/_4$—$^7/_8$ amplexicaulis, ad 2—3 cm decurrens; lamina ovalis ad elliptico-obovata apice rotundata subpeltata vel peltata, nervi longitudinales 5—6; cirrhus fere aequalis; ascidia 15—35 cm × 6—10 cm cylindrico-ventricosa, luteo-viridia et copiose purpureo-maculata, alae latae, fere aequales, longe ciliatae; os obliquum; peristomium 20—35 mm latum, extus late expansum et ± sinuosum, postice in collum elongatum; operculum 5—10 cm × 3—6 cm ovatum margine ± sinuosum, extus pallido-viride et copiose purpureo-maculatum, basi extus carina prominente; calcar 10—25 mm longum, attenuatum; ascidium intus glauco-viride et copiose purpureo-maculatum.

Eine prächtige Hybride, von Tivey bei der Firma Veitch erzogen und 1900 ausgestellt.

N. edinensis Lindsay ex Dixon in Gard. Chron. s. 3. III. (1888) 170; Dickson in Proc. Roy. Soc. Edin. XII. (1884) 381; Oliver in Amer. Fl. VII. (1891) 381 et fig.; Lindsay in Trans. and Proc. Bot. Soc. Edinb. XVIII. (1891) 237; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 148; Miller in Cycl. Amer. Hort. III. (1901) 1073. — *N. chelsonii* var. *excellens* Veitch, Hort. Veitch. (1906) 304. — *N. Rafflesiana* × *chelsonii* [*N. Dominii* (*N. Rafflesiana* × *N.*?) × *Hookeriana*]. — Caulis validus cylindricus; folia 25—40 cm × 6—8 cm coriacea petiolata; petiolus ad 4—12 cm $^1/_2$ amplexicaulis; lamina lanceolata; cirrhus laminae aequilongus, fere aequalis; ascidia 8—20 cm × 3—10 cm ovata ad ventricosa, luteo-viridia et brunneo-rubra maculata, alae late expansae, basi amplissime, os versus ± angustatae, longe ciliatae; peristomium 10—15 mm latum subcylindricum, fere aequale, postice in collum 15—20 mm altum elongatum; operculum 4—6 cm × 3—5 cm ovatum.

Von Lindsay im Botanischen Garten zu Edinburgh erzogen.

N. Edmundsii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Pitcher and Manda. — Parentes ignoti, sine descriptione, ergo nomen nudum.

N. Elmenhorstiana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Siebrecht and Wadley (1889) 49. — Parentes ignotae et sine descriptione, ergo nomen nudum.

N. elongata G. Beck in Wien. Ill. Gartenztg. XX. (1895) 221; ubi pro var. *N. hybridae* habetur, at *N. elongata* est var. *N. Hookerianae* (vide Masters in Gard. Chron. s. 2. VIII. [1877] 441).

N. excelsior Williams in Garden XXVIII. (1885) 463; Nicholson, Dict. of Gard. Suppl. (1888) 571; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 147; Miller in Cycl. Amer. Hort. III. (1901) 1074. — *N. Rafflesiana* × *Hookeriana*. — Caulis validus, juventute dense pubescens; folia 20—50 cm × 5—10 cm subcoriacea, petiolata;

lamina elliptica, apice subrotundata; ascidia 20—25 cm × 4—6 cm cylindrico-ventricosa, pallido-viridia et lurido- vel brunneo-purpureo-maculata, alae latae, longe ciliatae; peristomium 10—15 mm latum, aequale, postice in collum 1—2 cm altum elongatum; operculum ovato-rotundatum.

Von Taplin erzogen und von Williams 1885 in den Handel gebracht. Die Eltern sind die nämlichen wie bei den Hybriden *N. amabilis* und *N. Amesiana* und alle sind nahe verwandt.

N. Eyermanni Hort. Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Siebrecht and Wadley (1889) 51. — Parentes non accurate noti at probabiliter *N. phyllamphora* × *Hookeriana*. — Folia luteo-viridia, subcoriacea, margine polite dentato-ciliata; ascidia 10—20 cm × 4—5 cm rubro-purpurea et parce viridi-maculata; alae inferne non ciliatae, superne ciliatae; peristomium aequale, cylindricum, postice leviter elongatum, pallido-viride et sparse rubro-striatum; operculum subrotundatum extus ± purpureo-maculatum.

N. Findlayana Hort. ex Nicholson in Dict. of Gard. Suppl. (1888) 572; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes et ortus ignoti.

N. formosa Hort. ex Kew Bull. (1897) 407, ubi parentes *N. chelsonii* × *distillatoria* indicati sunt. Ortu ignoto et sine descriptione.

N. Fournieri Gautier in Journ. Soc. Nat. d'Hort. s. 4. IV. (1903) 589. — *N. Northiana* × *mixta* (*N. Northiana* × *maxima*). — Plantae aspectu et ascidii forma *N. Northianae* consimilis, at ascidium inferne rubrum et purpureo-maculatum, alae late expansae; peristomium rubrum atro-purpureum striatum; ascidium intus viride et rubro-maculatum.

Von Gautier im Garten von Dr. Fournier erzogen und 1903 ausgestellt.

N. Gamerii Desloges in Gard. Chron. s. 3. XXXVIII. (1905) 379, Journ. d'Hort. s. 4. VI. (1905) 664. — *N. Tiveyi* (*N. maxima* var. *superba* × *Veitchii*) × *mixta* (*N. maxima* × *Northiana*). — Parentes ergo ut in *N. Deslogesii*, *N.* et *remilliensis* (q. v.), at ascidia sparse purpureo-maculata; peristomium sanguineo-rubrum; operculum oblongo-acutum, viride et rubro-suffusum, basi intus carina laevi.

Von M. Jarry-Desloges erzogen und 1905 ausgestellt.

N. Gautieri Hort. in Journ. Soc. Nat. d'Hort. s. 4. IV. (1903) 589. — *N. Northiana* × *mixta*. Parentes et semina ut in *N. Fournieri* (q. v. p. 82), hybrida ei valde similis.

N. Hamiltoniana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074, ubi synonymum est *N. coccineae* (q. v. p. 79).

N. Henryana Williams in Ill. Hort. XXIX. (1882) 125 et icon. 460, Rodigas, op. cit. XXXIV. (1887) 43 et icon. col. 15; Baines in Garden XXVII. (1885) 496 et icon. col.; Nicholson, Dict. of Gard. Suppl. (1888) 572; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 220; Miller in Cycl. Amer. Hort. III. (1901) 1074. — *N. Hookeriana* × *Sedeni* (*N. khasiana* × sp. incert.). — Folia 20—40 cm × 4—7 cm coriacea, petiolata; lamina lanceolata apice attenuata; ascidia 15—20 cm × 4—6 cm cylindrico-ventricosa, inferne rubra vel viridi-rubra superne rubro- et viridi-maculata vel punctata, alae inferne late expansae os versus ± angustatae, ciliatae; peristomium 7—12 mm aequale, cylindricum, ± viridi- et rubro-striatum; operculum ovale, extus rubro-maculatum; ascidium intus glauco-viride et purpureo-maculatum.

Von Taplin in Amboy N. J. erzogen und zu Ehren Henry Williams benannt. Von Williams 1881 in den Handel gegeben. Mit *N. Outramiana* und *N. Williamsii* nahe verwandt und von ähnlichen Eltern abstammend.

N. Hibberdii Nicholson, Dict. of Gard. Suppl. (1888) 572; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 218; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes ignoti, at probabiliter ex structura similes parentibus *N. Henryanae*. Characteres ut in eo, sed ascidia inferne purpureo-viridia, superne purpureo-rubra maculis et punctis luteo-viridibus diffusis.

Eine der »Taplin'schen« Hybriden, durch die Firma Williams in den Handel gebracht.

N. Hookerae Hort. ex G. Beck in Wien. Ill. Gartenztg. XX. (1895) 222; Kew Bull. (1897) 405, ubi parentes affirmati sunt esse *N. Rafflesiana* × *phyllamphora*, sed ortus ignotus est. — Beck sagt »nur schwierig durch die Färbung d. h. größere gelbe Flecken von *N. Morganiae* (= *N. Morganiana*) zu unterscheiden«.

N. hybrida Masters in Gard. Chron. (1872) 542; Nicholson, Dict. of Gard. II. (1885) 436; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 221; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238, do. Hort. Veitch. (1906) 487; Miller in Cycl. Amer. Hort. III. (1901) 1072. — *N. khasiana* × sp. incert. borneensis, probabiliter *N. gracilis*. — Caulis cylindricus glaber; folia 15—25 cm × 5—6 cm breviter petiolata, petiolus alatus basi ad $^2/_3$ amplexicaulis et ad 1—2 cm decurrens; lamina oblongo-lanceolata apice acuta, glabra, costa excepta juventute ± brunneo-pubescente; ascidia 10—15 cm × 2—3 cm cylindrica medium versus leviter contracta, viridia, alae fere aequales, ciliatae; os ovatum obliquum; peristomium 5—7 mm latum obliquum, cylindricum, postice non elongatum, viride; operculum oblongum viride, intus glandulosum et sparse purpureo-diffusum.

Var. a. **typica** G. Beck v. s. — Ascidia viridia.

Bei Dominy im Etablissement Veitch erzogen und 1866 in den Handel gebracht.

Var. b. **maculata** Veitch ex Dombrain, Fl. Mag. VII. (1868) 409, Gard. Chron. (1872) 542; Wien. Ill. Gartenztg. III. (1878) et icon.; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238, Hort. Veitch. (1906) 306, 487. — Ascidia viridia, extus et superficie superiore intus ± copiose purpureo-maculata et marmorata.

N. intermedia Veitch in Gard. Chron. s. 2. III. (1875) 118; Robinson(?) in Garden XI. (1877) 429 et icon.; Masters in Gard. Chron. n. s. XVII. (1882) 178 et icon. 179; Nicholson, Dict. of Gard. II. (1885) 436; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 148; Veitch in Journ. Roy. Hort. Soc. XXI. (1887) 238 et icon. (sub nom. *N. Dominii* var. *intermedia*) 243, Hort. Veitch. (1906) 305, 487; Miller in Cycl. Amer. Hort. III. (1901) 1073. — *N.* sp. incert. borneensis × *Rafflesiana*, ergo parentes ut in *N. Dominii* (q. v. p. 80). — Caulis validus, juventute ± brunneo-hirsutus; folia 20—35 cm × 5—10 cm, coriacea, petiolata; lamina lanceolata apice attenuata, supra glabra subtus ± hirsuta; ascidia 15—25 cm × 5—8 cm inferne ovata ad subventricosa, superne cylindrica et gradatim ad os contracta, viridia et purpureo-maculata vel punctata, alae a basi ad os continuatae, os versus ± angustatae, longe ciliatae; peristomium 3—7 mm latum cylindricum, postice in collum 10—20 mm altum elongatum, pallido-viride et purpureo-striatum; operculum ovatum ± concavum, viride et purpureo-striatum; operculum ovatum ± concavum, viride et purpureo-maculatum; calcar 15—20 mm longum, attenuatum; ascidium intus glauco-viride et purpureo-maculatum.

Von Court im Etablissement Veitch erzogen, 1875 ausgestellt und dann in den Handel gebracht.

N. Johnsonii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Siebrecht and Wadley (1889) 51, ubi descriptio est, "in the way of *N. picturata* (q. v. p. 86) though of more robust growth. The pitchers, which are highly colored, are produced freely". Parentes non accurate noti.

N. Lonewoodii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074, ex Cat. Siebrecht and Wadley (1889) 51 (nomen nudum).

N. Lawrenciana Masters in Gard. Chron. s. 2. XIV. (1880) 40 et icon.; Rodigas in Ill. Hort. XXIX. (1882) t. 460; Nicholson, Dict. of Gard. II. (1885) 438; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 221. — Probabiliter *N. phyllamphora* × *Hookeriana*. — Caulis cylindricus ± polite pubescens; folia lanceolata vel ovali-lanceolata, subcoriacea, margine leviter ciliato-dentata; ascidia 8—15 cm × 4—5 cm cylindrico-ventricosa, pallido-viridia et copiose rubro-maculata, alae a basi ad os continuatae, fere aequales, ciliatae; peristomium 7—8 mm latum aequale, luteo-viride et rubro-striatum; operculum ovale ad subrotundatum ± rubro-maculatum.

Eine von den durch Taplin erzogenen hybriden Formen, von der Firma Williams 1880 in den Handel gebracht.

N. lyrata Veitch in Gard. Chron. (1877) 2, 441, ubi pro hybrida *N. hybrida* × *Rafflesiana* habetur, sed sine descriptione, ergo nomen nudum.

N. Maria-Louisa Gautier in Journ. Soc. Nat. d'Hort. 4. s. IV. (1903) 589. — *N. Northiana* × *mixta*. — Parentes et semina ut in *N. Fournieri* et *N. Gautieri* (q. v.), at ascidia ± pellucida, murreo-alba et sparse rubro-punctata, alae angustae ± ciliatae; peristomium angustum luteo-album sparse rubro-striatum; operculum ut peristomium coloratum.

Eine schöne Hybride, von Gautier in den Gewächshäusern von Dr. Fournier erzogen.

N. Mastersiana Veitch ex Masters in Gard. Chron. s. 2. XVI. (1881) 748, XXI. (1884) 248 et icon.; Burbidge in Garden XXIII. (1883) 492 et icon. col.; Regel in Gartenfl. XXXIII. (1884) 208 et icon. 209; Nicholson, Dict. of Gard. II. (1885) 438; Rodigas in Ill. Hort. XXXIII. (1886) 618; Burbidge in Flora and Sylva II. (1904) 112; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 185; Rudolph in Journ. Soc. Nat. Hort. Fr. (1896) 45; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 237 et icon. 241, Hort. Veitch. (1906) 306, 487; Miller in Cycl. Amer. Hort. III. (1901) 1071. — *N. sanguinea* × *khasiana*. — Caulis leviter trigonus v. subcylindricus, glaber; folia 15—45 cm × 4—8 cm, basi sessilia $^1/_2$ amplexicaulia saepe ± decurrentia, lamina subcoriacea glabra vel juventute polite pubescens, nervi longitudinales 4—5 paria; ascidia 15—25 cm × 5—8 cm subdimorphia, inferiora inferne ± ventricosa superne cylindrica, superiora tubulosa, rubro-viridia et obscure rubro-maculata vel in speciminibus colore intermedio variantibus ad omnino purpureo-diffusa, alae in ascidiis inferioribus expansae subaequales, ciliatae, in ascidiis superioribus ± reductae; os leviter obliquum; peristomium 10—20 mm latum cylindricum aequale, ut ascidium coloratum; operculum ovato-orbiculare; calcar 10—20 mm filiforme; ascidium intus glauco-viride et rubro-maculatum ad omnino glauco-purpureum.

Eine prächtige Hybride, welche Court im Etablissement Veitch auferzog; 1881 wurde sie ausgestellt und 1883 in den Handel gebracht. Die Farbe der Kannen wechselt sehr bedeutend von scharlach-grün bis scharlach-rot und dunkel purpurn (var. *purpurea* hort.), aber so variieren auch die Eltern, besonders *N. sanguinea*.

N. Mayi Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ab Cat. Siebrecht and Wadley (1889) 51. — Parentes ignoti, sine descriptione, ergo nomen nudum.

N. Mercieri Gautier in Journ. Soc. Nat. d'Hort. 4. s. IV. (1903) 590. — *N. Northiana* × *mixta*. — Parentes et semina ut in *N. Fournieri*, *Gautieri*, *Maria-Louisa* (q. v.), at ascidia viridia sparse rubro-punctata, inferne os versus copiose punctata et maculata, alae late expansae; peristomium angustum viride rubro-striatum; operculum viride sparse rubro-maculatum.

Von Gautier erzogen und 1903 ausgestellt.

N. mixta Masters in Gard. Chron. 3. s. XIII. (1893) 46 et icon. 47; Gentil in Rev. d'Hort. Beig. XXI. (1895) 268; Gard. Mag. XXXVI. (1893) 754; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 145 et icon. col.; Miller in Cycl. Amer. Hort. III. (1901) 1073; Veitch, Hort. Veitch. (1906) 306, 488 et tab. — *N. Northisii* Veitch in Gard. Chron. 3. s. XII. (1892) 561. — *N. Northiana* × *maxima*. — Caulis 6—8 m × 7—9 mm cylindricus; folia 15—40 cm × 4—10 cm, subcoriacea, petiolata; petiolus 2,5—5 cm late alatus, basi $^1/_2$-amplexicaulis, profunde decurrens; lamina ellipticо-lanceolata apice rotundata subpeltata vel peltata, margine pellucida et juventute ± brunneo-ciliata, nervi longitudinales 3—4; ascidia 10—35 cm × 3—8 cm, inferne luteo-viridia et sparse purpureo-maculata, os versus maculis majoribus et copiosioribus, alae mediae vel angustae basim versus ± incompletae, a medio os versus continuatae et ciliatae; peristomium 10—35 mm oblique, antice et postice angustatum lateraliter late expansum, postice in collum 3—5 cm altum elevatum, lurido-purpureum vel intus

margine purpureo-viride vel ± purpureo- et viridi-striatum; operculum ovato-elongatum, basi ± cordatum, sed sine calcaribus mediis duobus internis *N. maximae.*

Bei Tivey im Etablissement Veitch auferzogen und 1893 in den Handel gebracht. Eine schöne und leicht zu kultivierende Hybride, welche die Charaktere beider Eltern miteinander vereint.

Var. **sanguinea** Masters in Gard. Chron. 3. s. XVI. (1894) 318; Veitch, Hort. Veitch. (1906) 488. — Ascidia fusco-rubra, maculis magnis brunneo-purpureis dispersa; peristomium pellucido-rubrum.

N. Morganiana Veitch ex Masters in Gard. Chron. 2. s. XVI. (1881) 381; Such in Garden XX. (1881) 388; Miller in Cycl. Amer. Hort. III. (1901) 1074. — *N. Morganiae* Masters in Gard. Chron. 2. s. XIX. (1883) 150; Burbidge in Garden XXIII. (1883) 493 et icon. col.; Nicholson, Dict. of Gard. II. (1885) 438; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 222; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238 et icon. 247, Hort. Veitch. (1906) 487. — Parentes non accurate noti, probabiliter *N. phyllamphora* × *Hookeriana.* — Caulis cylindricus glaber; folia 30—50 cm × 5—10 cm subcoriacea petiolata, petiolus 5—8 cm longus, alatus, basi $^1/_2$-amplexicaulis; lamina lanceolata, claro-viridis, glabra, nervi longitudinales 5—6; ascidia 15—20 cm × 5—8 cm cylindrico-ventricosa, omnino purpureo-rubra et sparse luteo-viridia maculata vel punctata, alae aliquanto angustae, superne ciliatae; peristomium 6—10 mm latum obliquum fere aequale, pallido-viride et purpureo-striatum; operculum ovale ad orbiculare, viride et sparse purpureo-maculatum; ascidium intus glauco- vel luteo-viride et purpureo-maculatum.

Bei Taplin im Etablissement Such erzogen und Frau Morgan in New York gewidmet. Später gab sie Frau Morgan zu Veitch, der den Bastard 1881 ausstellte.

N. Northisii Veitch in Gard. Chron. 3. s. XII. (1892) 561 est syn. *N. mixtae* Masters (q. v. p. 84).

N. O'Brieniana Linden et Rodigas in Illustr. Hort. XXXVII. (1890) 109; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 224; sec. G. Beck pro var. vel forma hybrida consanguinea *N. rufescentis* habenda est, quod Auctori erroneum esse videtur, qui *N. O'Brieniana* sub titulo varietatis geographicae *N. phyllamphorae* enumerat (v. p. 64).

N. Osborniana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Siebrecht and Wadley (1889) 51, sed sine descriptione vel nominibus parentum, ergo nomen nudum.

N. Outramiana Williams in Gard. Chron. s. 2. XII. (1879) 505, XIV. (1880) 40 et icon. 41; Dean in Floral Mag. (1879) t. 384; Moore in Flor. and Pomol. (1880) 156 et icon.; Nicholson, Dict. of Gard. II. (1885) 483; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 220; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes non accurate noti, probabiliter *N. Sedeni* (*N. distillatoria* × sp. incert. borneensis) × *Hookeriana.* — Folia 25—35 cm × 5—7 cm subcoriacea, breviter petiolata, lamina lanceolata margine ± hirsuta, nervi longitudinales 5—6; ascidia 10—15 cm × 3,5—5 cm, cylindrico-ventricosa, pallido-luteo-viridia maculis rubris copiose diffusa, alae a basi ad os continuatae ciliatae; peristomium 7—10 mm latum, aequale, pallido-viride et purpureo-striatum; operculum ovale basi extus purpureo-maculatum.

Bei Taplin erzogen und durch die Firma Williams 1880 in den Handel gebracht.

N. paradisae Hort. ex Nicholson, Dict. of Gard. Suppl. (1888) 573; G. Beck in Wien. Ill. Gartenztg. XX. (1895), ex Cat. probabiliter Siebrecht and Wadley (1889) 51. — *N. Hookeriana* (?) × *phyllamphora.* — Folia 40—55 cm × 5—8 cm subcoriacea, petiolata; petiolus 5—8 cm longus, alatus, lamina lanceolata apice acuminata; ascidia 12—20 cm × 5—8 cm inferne expansa et ventricosa, medium versus constricta, superne cylindrica, inferne purpureo-rubra, gradatim ad os ± luteo-viridia maculata, alae in ascidiis inferioribus expansae et ciliatae, in superioribus ± angustatae; peristomium 6—8 mm latum aequale, pallido-viride; operculum ovale ad subovatum, extus viride et sparse rubro-maculatum.

Eine von den durch Taplin erzogenen amerikanischen Hybriden, bei Williams 1883 ausgestellt. Nach Nicholson ist sie nach den »Paradise Nurseries« genannt.

N. Patersonii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Saul Washington et ex Cat. Siebrecht and Wadley (1889) 51. — Parentes ignoti, at sec. structuram probabiliter *N. phyllamphora* × *Hookeriana*; specimina in Hortis Americanis nunc saepe culta sunt. — Folia 30—40 cm × 7—10 cm herbacea ad subcoriacea, petiolata; petiolus alatus, basi $^1/_2$-amplexicaulis, lamina elliptica vel elliptico-lanceolata, glabra margine ciliato-dentata, nervi longitudinales 5—6; ascidia 8—12 cm × 2,5—3,5 cm cylindrico-ventricosa ad cylindrica, medium versus leviter angustata luteo-viridia et copiose rubro-marmorata, alae a basi ad os continuatae et ± angustatae, margine ciliatae; peristomium aequale obliquum luteo-viride; operculum ovale extus marginem versus ± maculatum et marmoratum; ascidium intus glauco- et pallido-viride.

Wahrscheinlich eine von den amerikanischen Hybriden.

N. picturata Hort. ex Gordon in Gard. Mag. XLVI. (1903) 670 et icon. 677; Burbidge in Flora and Sylva II. (1904) 68 et icon. 69; Veitch, Hort. Veitch. (1906) 306, 489. — Parentes ut in *N. Dyeriana* (q. v. p. 81), hybrida vix differt ab ea, ergo synonymum.

N. Pitcheri Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Pitcher and Manda (1895), sed sine descriptione. — *N. paradisae* × *Henryana*. Specimina ignota.

N. Ratcliffiana Veitch ex Masters in Gard. Chron. s. 2. XVII. (1882) 178 et icon.; Nicholson, Dict. of Gard. II. (1885) 439; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 221; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 240, Hort. Veitch. (1906) 306, 487. — *N. phyllamphora* × *Hookeriana*, ergo parentes ut in *N. coccinea*, *N. robusta*, *N. Stewartii* et *N. Wrigleyana* (q. v.). — Caulis cylindricus, juventute dense albido- vel fusco-pubescens; folia 20—45 cm × 6—8 cm subcoriacea, petiolata; lamina lanceolata basi et apice attenuata margine ± serrulata; ascidia 12—18 cm × 4—6 cm ampulliformia sub medio ± ventricosa, viridia et purpureo-maculata et marmorata, alae a basi ad os continuatae, latae, longe ciliatae; peristomium 5—10 mm latum obliquum, aequale, viridi- et rubro-striatum; operculum 3—4 cm × 2—2,5 cm ovale viride vel basi extus ± rubro-maculatum.

Bei Court erzogen und durch die Firma Veitch 1880 in den Handel gegeben. Benannt nach Herrn Ratcliff, Edgbaston, England.

N. remilliensis Macfarlane nom. nov.; Masters in Gard. Chron. s. 3. XXXVIII. (1905) 379, Desloges in Journ. d. Hort. s. 4. VI. (1905) 664. — *N. Tiveyi* (*N. maxima* var. *superba* × *Veitchii*) × *mixta* (*N. Northiana* × *maxima*), parentes ergo ut in *N. Deslogesii* et *N. Gamerii* (q. v.), sed ascidia obscure viridia et purpureo-reticulata, operculum basi leviter carinatum.

Bei M. Jarry-Desloges in Remilly erzogen und 1905 unter dem Namen *N. Remilly* ausgestellt.

N. robusta Hort. ex Masters in Gard. Chron. 2. s. XVII. (1880) 40 et icon.; Moore in Florist and Pomol. (1880) 156 et icon.; Nicholson, Dict. of Gard. II. (1885) 439. — Sec. Williamso parentes sunt *N. phyllamphora* × *Hookeriana*, ergo ut in *N. coccinea*, *N. Wrigleyana* etc. (q. v.). — Characteres similes, sed ascidia 10—15 cm × 4—5 cm pyriformia, medium versus contracta, superne cylindrica, alae basim versus latae expansae, os versus gradatim angustatae; peristomium fere transversum viride.

Von Taplin erzogen und 1880 durch die Firma Williams in den Handel gebracht.

N. Roeblingii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Pitcher and Manda (1895), ubi descriptio est "pitcher almost globular, medium-sized, spotted". Parentes ignoti.

N. rubro-maculata Veitch ex Masters in Gard. Chron. s. 2. VIII. (1877) 441; XVII. (1882) 143 et icon.; Nicholson, Dict. of Gard. II. (1885) 439; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 223; Veitch, Hort. Veitch. (1906) 306, 487. — *N. hybrida* var. *maculata* × sp. incert. borneensis. — Caulis cylindricus, purpureus ± pubescens; folia 25—35 cm × 4—6 cm coriacea, petiolata, basi $^1/_2$-amplexicaulia, apice rotundata, margine polite ciliata, nervi longitudinales 3—4 a costa remoti; ascidia 12—18 cm × 3—5 cm cylindrico-ventricosa, pallido-viridia et purpureo-marmorata, alae a basi ad os continuatae, late expansae, longe ciliatae; peristomium 6—9 mm latum cylindrico-depressum, rubro-viride ad rubrum, operculum ovale ad ovatum, extus rubro-maculatum, intus copiose glandulosum.

Bei Court erzogen und durch Veitch 1881 in den Handel gebracht.

N. rufescens Masters in Gard. Chron. 3. s. IV. (1888) 669 et icon.; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 224; Miller in Cycl. Amer. Hort. III. (1901) 1072; Veitch, Hort. Veitch. (1906) 307, 488. — *N. distillatoria* var. *rubra* × *Courtii* [*N.* sp. incert. borneensis × *Dominii* (*N. Rafflesiana* × sp. incert. borneensis)]. — Caulis cylindricus, ruber; folia 25—35 cm × 6—8 cm coriaeca, petiolata; petiolus 2,5—3,5 cm longus, basi expansus amplexicaulis et longe decurrens, lamina elliptico-lanceolata, costa rubra, nervi longitudinales 3—4 marginem versus; ascidia 20—25 cm × 5—6 cm cylindrica, viridia ± rubro-diffusa vel rubro-maculata, alae a basi ad os continuatae, aequales, ciliatae; peristomium 10—15 mm latum, obliquum, margine leviter undulatum, postice in collum 1—1,5 cm elongatum, valide striatum; operculum oblongum 5—6 cm × 3—4 cm; ascidium intus glauco-viride.

Bei Court im Etablissement Veitch erzogen und 1888 in den Handel gebracht.

N. Savageana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074, ex Cat. Siebrecht and Wadley (1889) 51 ubi descriptio est "in the way of *N. Craigiana* though it differs from that variety in that the pitchers are not quite as long but broader, like those of *Hookeriana*". Parentes ignoti.

N. Sedeni Masters in Gard. Chron. (1872) 542; Florist and Pomol. (1872) 54; Nicholson, Dict. of Gard. II. (1885) 439; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 224; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 237 et icon. 235, Hort. Veitch. (1906) 307, 487; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes non accurate noti, at sec. Masters "raised from the pollen of *N. khasyana* (= *distillatoria* of gardens) applied to the female flower of an undetermined species". — Caulis cylindricus, glaber; folia 15—25 cm × 4—6 cm, basi ± decurrentia, coriacea, lanceolata, glabra; ascidia 8—15 cm × 3—5 cm cylindrica, basi leviter dilatata, medium versus leviter contracta et ad os ± expansa, alae ciliatae; peristomium ovatum, cylindricum, postice ± elevatum; operculum cordato-orbiculare rubro-punctatum.

Von Seden im Etablissement Veitch erzogen.

N. Seemannii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Pitcher and Manda. — Parentes ignoti, sine descriptione, ergo nomen nudum.

N. Siebrechtiana Hort. ex Miller v. s. ex Cat. Siebrecht and Wadley (1889) 51, ubi nominata est *N. Siebrechtii*, sed descriptio imperfecta est et parentes haud indicati sunt. Sec. specimina in Horto Univ. Pennsylv. asservata parentes probabiliter sunt eidem ac in *N. Dormanniana*.

N. Shelburnei Hort. in Cat. Siebrecht and Wadley (1889) 51. — Parentes non indicati et descriptio imperfectus, ergo nomen nudum.

N. Simonii Gautier in Journ. Soc. Nat. d'Hort. 4. s. IV. (1903) 589. — *N. Northiana* × *mixta*. — Parentes et semina ut in *N. Fournieri*, *Gautieri*, *Maria-Louisa* et *Mercieri* (q. v.) at ascidia viridia rubro-punctata, alae amplae, inferne undulatae, longe ciliatae; peristomium late expansum, margine exteriore undulato, viridi-luteo leviter rubro-striato.

Bei Gautier in Neuilly-sur-Seine erzogen und 1903 ausgestellt.

N. splendida Hort. ex Cat. Pitcher and Manda. — Sec. specimina in Horto Univ. Pennsylv. asservata parentes probabiliter sunt eidem ac in *N. Rateliffiana*.

N. Stewartii Hort. Moore in Flor. and Pomol. (1879) 156; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 222; Miller in Cycl. Amer. Hort. III. (1901) 1074; Veitch, Hort. Veitch. (1906) 487. — *N. phyllamphora* × *Hookeriana.*

Die Eltern dieser Hybride sind dieselben wie für *N. Ratcliffiana* und *N. Morganiana* und sie weicht nicht wesentlich von diesen ab.

N. superba Williams in Garden XVIII. (1880) 624 et icon. 625; Dean in Floral Mag. (1881) t. 434; Masters in Gard. Chron. s. 2. XVI. (1881) 846; Nicholson, Dict. of Gard. II. (1885) 439; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 220. — Parentes non accurate noti, sed ex auctoribus probabiliter *N. Hookeriana* et *N. Sedenii.* — Caulis cylindricus, pubescens; folia 20—40 cm × 5—8 cm coriacea, petiolata; petiolus basi $^1/_2$-amplexicaulis, lamina lanceolata, apice attenuata; ascidia 15—20 cm × 5—6 cm, cylindrico-ventricosa, viridia et tota copiose purpureo-maculata, alae a basi ad os continuatae, ciliatae; peristomium 8—12 mm latum aequale; operculum ovale, extus purpureo-maculatum.

Diese Hybride ist mit der *N. Henryana*, *N. Outramiana* und *N. Williamsii* nahe verwandt, und wahrscheinlich sind alle hybride Varietäten aus einer hybriden Samensammlung.

N. Taplinii Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074, ex Cat. Siebrecht and Wadley (1889) 51, ubi sine descriptione et nominibus parentum. Specimina culta auctori ignota sunt. Nomen nudum.

N. Thorpeiana Hort. Historia ut in praeced.

N. Tildeniana Hort. ex Miller v. s., ex Cat. Pitcher and Manda, et Siebrecht and Wadley (1889) 51, sine nominibus parentum. Sec. Cat. Siebrecht: "a fine hybrid with gorgeous pitchers in the way of *N. Siebrechtii*".

N. Tiveyi Masters in Gard. Chron. 3. s. XXII. (1897) 201 et icon. 200, 201; Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238 et icon. 53, Hort. Veitch. (1906) 307, 488. — *N. maxima* var. *superba* × *Veitchii.* — Caulis ascendens cylindricus, ± villosus; folia 25—50 cm × 5—10 cm coriacea, petiolata; petiolus 4—8 cm longus, basi $^3/_4$-amplexicaulis, longe decurrens; lamina elliptica vel obovata ad apicem rotundata subpeltata vel peltata, supra glabra, subtus sparse villosa, nervi longitudinales 3—4; cirrhus quam ascidium brevior, crassus; ascidia 10—30 cm × 4—8 cm cylindrica, basi gradatim contracta, luteo-viridia maculis magnis irregularibus per totam superficiem dispersis, alae basim versus imperfectae, superne aequales expansae et longe ciliatae; peristomium 20—40 mm latum, obliquum, antice et postice angustatum, ad latera late expansum et marginibus exterioribus undulatum, postice in collum elongatum; operculum 4—6 cm × 3—5 cm, cordatum, luteo-viride et purpureo-maculatum, basi intus carina verticali instructum et apicem versus in calcar attenuatum; calcar 12—20 mm filiforme.

Eine schöne Hybride, von Tivey im Etablissement Veitch erzogen und 1897 ausgestellt.

N. Vallierae Desloges in Le Jardin XIX. (1905) 136 et icon. col.; Masters in Gard. Chron. s. 3. XXXVIII. (1905) 379, ubi parentes err. cit. sunt. — *N. Tiveyi* (*N. maxima* var. *superba* × *Veitchii*) × *Morganiana*? (*N. Hookeriana* × *phyllamphora*), ergo parentes ut in *N. Boisiana*; at ascidia extus luteo-viridia, peristomium late expansum, aureum et sparse rubro-striatum; operculum ovatum viride vel sparse rubro-maculatum, intus basi leviter carinatum.

Von Desloges erzogen und 1905 ausgestellt.

N. Wadleyana Hort. ex Miller in Cycl. Amer. Hort. III. (1901) 1074 ex Cat. Siebrecht and Wadley (1894) 63, sed sine descriptione vel nominibus parentum, ergo nomen nudum.

N. Washingtoniana Hort. ex Lindsay in Trans. and Proc. Bot. Soc. Edinb. XVIII. (1891) 237. — Nomen nudum.

N. Williamsii Masters in Gard. Chron. 2. s. XIV. (1880) 40 et icon.; Baines in Garden XXVII. (1885) 496 et icon. col.; Nicholson, Dict. of Gard. II. (1885) 439;

G. Beck in Wien. Ill. Gartenztg. XX. (1895) 220; Miller in Cycl. Amer. Hort. III. (1901) 1074. — Parentes non accurate noti, sed ex structura probabiliter *N. Sedeni* (*N.* sp. incert. × *distillatoria*) × *Hookeriana*. — Vix differt a *N. Henryana* et *N. Outramiana* parentibus similibus, ascidiis exceptis, quae in *N. Williamsii* luteo-rubra vel pallido-rubra maculis multis sanguineis colorata et intus superne glauco-rubra et purpureo-maculata sunt.

Bei Taplin erzogen und von Williams 1880 in den Handel gebracht.

N. Wittei Veitch in Journ. Roy. Hort. Soc. XXI. (1897) 238; Kew Bulletin (1897) 238, ubi parentes (*N.* sp. incert. [auctori omnes characteres hybridae indicant *N. stenophylla*] × *maxima*) indicati sunt, sed sine descriptione. Descriptio subsequens est ex specimine in Hort. Bot. Universitatis Pennsylvaniae asservato, quod cum speciminibus kewensibus et Veitchianis congruit. — Caulis sparse puberulus; folia 20—30 cm × 4—6 cm subcoriacea petiolata; petiolus alatus, alae medium versus ± angustatae, basi ± expansae et $^3/_4$-amplexicaules, lamina elliptico-obovata apice rotundata vel peltata, lucido- ad luteo-viridis, supra glabra, subtus glabra costa et margine exceptis, quae ferrugineo-hirsuta et ciliata sunt; ascidia 10—20 cm × 2—2,5 cm cylindrico-tubulosa, medium versus leviter contracta, sub peristomio cinctu brunneo-pubescente instructa, irregulariter rubro- vel purpureo-maculata, alae inferne reductae, os versus et ante os gradatim expansae et ciliatae; os obliquum; peristomium antice et postice angustatum medio ± late expansum, postice in collum elongatum; operculum 3—4 cm × 2—3 cm ovato-cordatum, extus rubro-striatum et maculatum, intus basi carina verticali instructum.

Bei Witte erzogen und durch die Firma Veitch ausgegeben.

N. Wrigleyana Hort. ex Masters in Gard. Chron. 2. s. XVII. (1882) 143 et icon.; Nicholson in Dict. of Gard. II. (1885) 439; G. Beck in Wien. Ill. Gartenztg. XX. (1895) 223; Veitch, Hort. Veitch. (1906) 307, 487. — *N. phyllamphora* × *Hookeriana*, ergo parentes ut in *N. coccinea*, *N. Eyermanni*, *N. Lawrenceana*, *N. Morganiana*, *N. paradisae*, *N. Ratcliffiana*, *N. robusta* et *N. Stewartii*. — Characteres in illis hybridis fere eidem sed variabiles. Auctor pro eis nomen unicum proponit.

Nomina nuda v. incerta.

N. cristata Brongn. in Ann. sc. nat. 1. s. I. (1824) 48.

N. Lindleyana Low ex W. Baxt. in Loudon, Hort. Brit. Suppl. III. (1850) 593.

Register

für J. M. Macfarlane-Nepenthaceae.

Die angenommene Gattung ist **fett** gedruckt, die angenommenen Arten sind mit einem Stern (*) bezeichnet.

Affen-Krug 64.
Ailanthus 23.
Akar-taboeng-taboeng 51.
Amramatico 31.
Aristolochiaceae 26.
Bandura Adans. 27.
Bandura-wel 37.
Bat-batidor 72.
Cadung 72.
Cistaceae 26.
Cytinaceae 26.
Daoen-gindi 64.
Dawon 64.
Dawon-sompitan 71.
Dionaea 22.
Drosera 22.
Drosera ceae 26.
Gada-gada 64.
Heliamphora 4, 5, 26.
Igorrote 72.
Inomangcalao 72.
Kapok 31.
Katoepat-baroek 52.
Ketakong-betoel 34.
Ketakong-Kidjang 51.
Ketakong-mendjangan 62.
Ketakong-monjit 59.
Nepenthaceae Benth. et Hook. f. 1.
Nepenthaceae Lindl. 1, 4, 25, 26.
Nepentheae Blume 1.
Nepentheae Lindl. 1.
Nepenthes L. 27. (3, 4 Fig. 1, 5, 7, 8 Fig. 3, 14, 15 Fig. 6, 16 Fig. 7, 19 Fig. 8, 21, 22, 25).
*alata Blanco 71, n. 53. (7, 8, 11, 20, 24, 30).
var. γ. biflora Macfarlane 72, n. 53.
var. β. ecristata Macfarlane 72, n. 53.
albo-cincta var. rubra 38, n. 7.
*albo-lineata F. M. Bailey 63, n. 40. (26, 29).
*albo-marginata Lobb 37, n. 7. (3, 8, 10, 15, 17, 24, 25, 27, 39, 45).
var. γ. rubra Macfarlane 38, n. 7.
var. β. villosa Hook. f. 38, n. 7.
*Alicae F. M. Bailey 57, n. 31. (3, 28).
Alleniana Hort. 78.
amabilis Hort. 78.
Amesiana Veitch 78.
ampullacea Low 33, n. 3.
*ampullaria Jack 33, n. 3. (3, 5, 7, 8—12, 14, 17, 18, 20, 23, 25—27, 32 Fig. 13, 35, 56).
var. γ. Geelvinkiana Beccari 34, n. 3.
var. β. longicarpa Beccari 34, n. 3.
ampullaria var. vittata Ill. Hort. 33, n. 3.
ampullaria var. vittata major hortulan. 33, n. 3.
*anamensis Macfarlane 39, n. 8. (3, 7, 26, 27).
Anerleyensis Hort. 78.
*angustifolia Masters 59, n. 34. (29).
*Armbrustae F. M. Bailey 63, n. 39. (29).
Arnoldiense Hort. 78.
atrosanguinea Mast. 78.
Balfouriana Hort. 78.
*Beccariana Macfarlane 67, n. 47. (29, 68 Fig. 17).
*Bernaysii F. M. Bailey 65, n. 43. (5, 29, 67).
*bicalcarata Hook. f. 35, n. 5. (3—10, 14—16 Fig. 7, 17, 19 Fig. 8, 20, 23, 25, 27, 36 Fig. 14).
*Blancoi Blume 40, n. 11. (27, 56).
Boisiana Desloges 79.
*Bongso Korthals 47, n. 18. (4, 23, 24, 28, 48).
*Boschiana Korthals 71, n. 52. (3, 7, 11, 20, 25, 30, 76).
*Boschiana var. sumatrana Herb. Bot. Bog. 70, n. 49.
Boschiana var. sumatrana Miq. 69, n. 49; 71, n. 52.
Broomeana Hort. 79.
*Burbidgei Hook. f. 70, n. 51. (3, 5, 8, 11, 20, 30).
*Burkei Masters 55, n. 28. (15 Fig. 6, 28).
var. β. excellens Veitch 55, n. 28.
var. γ. prolifica Mast. 55, n. 28.
Celebica Hook. f. 74, 76, n. 56.
chelsonii Veitch 79.
chelsonii × distillatoria 82.
chelsonii var. excellens Veitch 79, 81.
*Cholmondeleyi F. M. Bailey 40, n. 10. (27).
cincta Masters 8, 25, 45.
Claytonii Hort. 79.
coccinea Hort. 79.
compacta Hort. 79.
*Copelandii Merrill 51, n. 23. (28).
Courtii Veitch 79.
Craigiana Hort. 80.
cristata Brongn. 89.
Curtisii Mast. 74, n. 56. (23, 25, 76).
cylindrica Veitch 80.
*Deaniana Macfarlane 57, n. 30.
Deslogesii Jarry-Desloges 80.
Dicksoniana Lindsay 80.
distillatoria Grah. 37, n. 6, 59, n. 35.
distillatoria Griffith 60.
distillatoria Jack 37, n. 6.
*distillatoria L. 35, n. 6. (8, 21, 23 Fig. 10, 24, 26, 27, 40).
distillatoria Steud. 37, n. 6.
distillatoria Wall. 63, n. 41.
distillatoria var. rubra × Courtii 87.
distillatoria × Sedenii 78.
distillatoria × Veitchii 80.
Dominiana Nicholson 80.

Dominii Veitch 80, 83.
Dominii var. intermedia 83.
Dormanniana Williams 81.
Dyak Moore 35, n. 5.
Dyeriana Macfarlane 81, 86.
*echinostoma Hook. f. 70, n. 50. (10, 16 Fig. 7, 18, 25, 30).
Edgeworthii Reichb. f. 53, n. 26.
edinensis Lindsay 79, 81.
Edmundsii Hort. 81.
*Edwardsiana Hook.f. 53, n. 26. (8, 10, 18, 21, 25, 26 Fig. 12, 28, 52, 53 Fig. 16).
Edwardsiana × villosa Burbidge 54.
Elmenhorstiana Hort. 81.
elongata G. Beck 81.
*eustachya Miq. 51, n. 24. (28).
excelsior Williams 81.
Eyermanni Hort. 82.
fallax G. Beck 74, n. 56.
fimbriata Blume 63. n. 41.
Findlayana Hort. 82.
formosa Hort. 82.
Fournieri Gautier 82.
Gamerii Desloges 82.
*Garrawayae F. M. Bailey 67, n. 46. (29).
Gautieri Hort. 82.
gracilis Beccari 59, n. 34.
*gracilis Korth. 58, n. 33. (4, 5, 6 Fig. 2, 7, 8, 9 Fig. 4, 10, 12, 18, 19 Fig. 8, 20, 25, 26, 28, 37, 43, 51).
gracilis var. arenaria 59.
var. elongata Blume 59.
gracillima Ridley 38, n. 7.
gymnamphora Reinw. 56, n. 29.
Hamiltoniana Hort. 82.
Harryana Burbidge 25, 54.
*Hemsleyana Macfarlane 61, n. 37. (10, 29).
Henryana Williams 82, 89.
Hibberdii Nicholson 82.
*hirsuta Hook. f. 49, n. 21. (4, 8, 25, 28).
var. β. glabrata Macfarlane 50, n. 21.
var. α. typica Macfarlane 50, n. 21.
hirsuta var. glabrescens Smith 37, n. 6.
hispida G. Beck 49, 50, n. 21.
Hookerae Hort. 83.
Hookeri Alphand 34, n. 4.
*Hookeriana Lindley 34, n. 4. (12, 13 Fig. 5, 16 Fig. 7, 20, 23, 25, 27, 35).
Hookeriana × Dominii 79.
Hookeriana × phyllamphora 79, 85.
Hookeriana × Rafflesiana 78.
Hookeriana × Sedeni 82.
hybrida Masters 83.
var. β. maculata Veitch 83.
var. α. typica G. Beck 83.
hybrida × Rafflesiana 84.
*Jardinei F. M. Bailey 66, n. 44. (29).
indica Poir. 37, n. 6.
intermedia Veitch 83.
Johnsonii Hort. 83.
*Kennedyana F. Müll. 66, n. 45. (26, 29, 63).
Kennedyi Benth. 66, n. 45.
*khasiana Hook. f. 59, n. 35. (7, 8, 9, 10, 16 Fig. 7, 17, 18, 19 Fig. 8, 20, 21, 25, 26, 29, 37).
khasiana × ?gracilis 83.
Korthalsiana Herb. Calc. 51.
Korthalsiana Miq. 58, n. 33.
laevis Lindl. 58, n. 33.
lanata Lindl. 73, n. 54.
Lawrenciana Masters 83.
Lindleyana Low 89.
Loddigesii Baxter 34, n. 4.
Lonewoodii Hort. 83.
*Lowii Hook. f. 76, n. 57. (9, 10, 11, 16 Fig. 7, 18, 19 Fig. 8, 20, 25 Fig. 12, 30, 77 Fig. 19).
lyrata Veitch 84.
*Macfarlanei Hemsley 77, n. 58. (8, 11, 20, 30).
macrostachya Bl. 63, n. 41, 65.
*madagascariensis Poir. 31, n. 2. (5, 15 Fig. 6, 23, 26, 27).
var. cylindrica Dubard 32, n. 2.
var. macrocarpa Scott Elliott 32, n. 2.
Maria-Louisa Gautier 84.
Mastersiana Veitch 25, 84.
var. purpurea Hort. 84.
maxima Herb. Kew. 76.
*maxima Reinw. 74, n. 56. (5, 7, 8, 9, 11, 18, 20, 21, 23, 25, 26, 30, 71, n. 52, 75 Fig. 18).
maxima var. sumatrana Beccari 69, n. 49.
maxima var. superba × Veitchii 88.
Mayi Hort. 84.
*melamphora Blume 56, n. 29. (3, 7, 10, 20, 21, 25, 28).
var. β. haematamphora Miq. 57, n. 29.
var. γ. tomentella Beccari 57, n. 29.
melamphora Hook. f. 59, n. 35.
melamphora Villar 40, n. 11; 56, n. 29.
Mercieri Gautier 84.
mixta Masters 25, 84, 85.
var. sanguinea Masters 85.
mixta × Dicksoniana 81.
mixta × Mastersiana 78.
*Moorei F. M. Bailey 65, n. 42. (29).
Morganiae Masters 85.
Morganiana Veitch 85.
*neglecta Macfarlane 58, n. 32. (25, 28).
*Northiana Hook. f. 44, n. 15. (3, 5, 8, 9, 10, 15, 17, 20, 25, 28, 45).
Northiana × albo-marginata Masters 45.
Northiana × maxima 84.
Northiana × mixta 82, 84, 87.
Northisii Veitch 84, 85.
O'Brieniana Linden et Rodigas 64, n. 44; 85.
Osborniana Hort. 85.
Outramiana Williams 85, 89.
paradisae Hort. 85.
paradisae × Henryana 86.
Pascoensis Bailey 65.
Patersonii Hort. 86.
*Pervillei Blume 30, n. 1. (16 Fig. 7, 19 Fig. 8, 20, 23, 24, 25, 26, 27).
*philippinensis Macfarlane 43, n. 14. (27).
Phyllamphora Sims 59, n. 35.
*phyllamphora Willd. 63, n. 41. (5, 7, 10, 11, 14, 16 Fig. 7, 17, 18, 19 Fig. 8, 26, 29, 37, n. 6, 40, 65, 67).
phyllamphora × Hookeriana 82, 83, 85, 86, 88, 89.
phyllamphora var. macrantha 65.
phyllamphora var. platyphylla 65.
picturata Hort. 86.
Pitcheri Hort. 86.
pumila Griff. 45, n. 16.
*Rafflesiana Jack 61, n. 38. (3, 5, 7—10, 20, 23, 25, 26, 29, 34, 35, 61).
var. glaberrima Hook. f. 61, n. 37.
var. Hookeriana 63.
var. insignis Mast. 62.
var. δ. minor Beccari 62, n. 38.
var. β. nigro-purpurea Mast. 62, n. 38.
var. γ. nivea Hook. f. 62, n. 38. (8, 14).
Rafflesiana × chelsonii 81.
Rafflesiana × Hookeriana 78, 81.
Rafflesiana × phyllamphora 83.
Rafflesiana × Sedenii 81.

Rafflesiana × Veitchii 80.
Raflesea Hort. 61, n. 38.
*rajah Hook. f. 46, n. 17. (5, 7, 8, 10, 23, 25, 26 Fig. 12, 28).
Ratcliffiana Veitch 86.
*Reinwardtiana Miq. 50, n. 22. (5, 10, 18, 20, 28, 39).
Reinwardtii Hook. f. 50, n. 22.
remilliensis Macfarlane 86.
Remilly 86.
robusta Hort. 86.
Roeblingii Hort. 86.
*Rowanae F. M. Bailey 69, n. 48. (20, 29, 67).
rubra Nicholson 37, n. 6.
rubro-maculata Veitch 87.
rufescens Masters 87.
Sanderiana Burbidge 61, n. 38.
sanguinea Gard. Chron. 45.
*sanguinea Lindl. 45, n. 16. (8, 9, 10, 17, 18, 21, 25, 28, 46, 48).
sanguinea Masters 73, n. 54.
sanguinea × khasiana 84.
Savageana Hort. 87.
Sedeni Masters 11, 87.
Sedeni × Hookeriana 85, 89.
Seemannii Hort. 87.
Shelburnei Hort. 87.
Siebrechtiana Hort. 87.
Siebrechtii Hort. 87.
Simonii Gautier 87.
*singalana Beccari 47, n. 19. (28).
*Smilesii Hemsley 40, n. 9. (3, 26, 27, 40).
Smithii G. Beck 37, n. 6.
speciosa Hort. 37, n. 6.
splendida Hort. 87.
spuria Beck 44, n. 15.
*stenophylla Masters 74, n. 55. (30).
Stewartii Hort. 88.
superba Williams 88.
Taplinii Hort. 88.
*tentaculata Hook. f. 41, n. 12. (4, 11, 18, 23, 27, 42 Fig. 15).
var. β. imberbis Beccari 43, n. 12. (11).
var. γ. tomentosa Macfarlane 43, n. 12.
tentaculata forma G. Beck 59, n. 34.
Teysmanniana Miq. 38, n. 7.
Thorpeiana Hort. 88.
Tildeniana Hort. 88.
Tiveyi Masters 25, 88.
Tiveyi × mixta 80, 82, 86,
Tiveyi × Morganiana 79, 88.
tomentella Miq. 38, n. 7.
*Treubiana Warburg 69, n. 49. (30, 71, n. 52).
*trichocarpa Miq. 43, n. 13. (27, 43).
*tubulosa Macfarlane 60, n. 36. (29).
Vallierae Desloges 88.
*Veitchii Hook. f. 73, n. 54. (3, 7—11, 14, 15 Fig. 6, 17, 18, 25, 30, 45, 52).
*ventricosa Blanco 54, n. 27. (3, 15, 18, 28, 55).
*Vieillardii Hook. f. 48, n. 20. (7, 20, 26, 28).
var. β. Deplanchei Dubard 49, n. 20.
var. γ. Montrouzierii Dubard 49, n. 20.
*villosa Hook. f. 52, n. 25. (8, 10, 17, 22 Fig. 9, 25, 26 Fig. 12, 28, 53, 73).
villosa Hook. f. in Bot. Mag. LXXXIV. (1858) t. 5080. 52.
Wadleyana Hort. 88.
Wardii Wright 30, n. 1.
Washingtoniana Hort. 88.
Williamsii Masters 88, 89.
Wittei Veitch 89.
Wrigleyana Hort. 89.
Zeylanica Raf. 37, n. 6.
Zeylanica var. rubra G. Beck 37, n. 6.
Nepenthin 21.
Nepenthinae Link (sect.) 1.
Papaveraceae 26.
Phyllamphora Lour. 1, 27.
mirabilis Lour. 64.
Ponga 31.
Prioek-beroek 64.
Sarracenia 4.
Sarraceniaceae 4, 7, 26.
Sogon-sogon 41.
Sulud-sulud 41.
Tarsius spectrum 10.
Tumahaha 72.

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18

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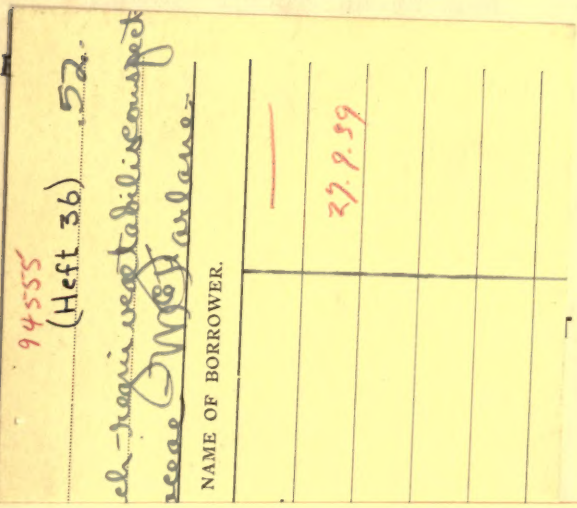
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