IV. ENUMERATION OF THE FERNS FROM WESTERN GHATS.

(i) KEY TO THE CLASSES OF THE DIVISION PTERIDOPHYTA :

Names of classes after Pichi-Sermolli (1958), Key characters of classes adapted from Reimers (1954).

1. Leaves minute, appendiculate, trifarious, without a distinct vein. Sporangia turbinate, 3-celled, 3-valved, placed singly in the axils of the rudimentary leaves on the entire length of the stem. ... PSILOTOPSIDA*

1. Leaves minute, whorled or orchreate, sporophylls borne on the underside of the modified peltate sporangiophores which form a cone-like termination to the stem. ..... SPHENOPSIDA **

1. Leaves simple, one-nerved, close and small relatively to the axis; sporangia orbicular or semiorbicular, compressed, 1-celled, 2-valved, at the base of the sporophylls which are grouped in a spike ...
... LYCOPSIDA

1. Leaves large relatively to the axis, multinerved and usually compound. Sporangia on the margins, or on the back of the leaves, or on modified leaves, or in sporocarps. ..... FILICOPSIDA

---

* Class Psilotopsida is represented by only one species Psilotum nudum (L.) Griseb.

** Class Sphenopsida is represented by only one genus Equisetum Linn.

(ii) KEY TO THE SUB-CLASSES OF THE CLASS FILICOPSIDA :

Sub-classes after Pichi-Sermolli (1958). Key characters adapted from Beddome (1883).

1. Homosporous ferns - - - - 2.

2. Sporangia produced from plural sub-epidermal cells. Sori without an annular ring - - - 3.

3. Sori deeply two valved, opening down the side nearly to the base - - - OPHIOGLOSSIDAE*

3. Sori opening by a small slit down on one side or by a pore at the apex - - - MARATTIDAE**

2. Sporangia developed from a single epidermal cell. Sori with an annular ring - - - - 4.

4. Sori opening across the apex, furnished with a short horizontal ring - - - OSMUNDAE@

4. Sori not opening across the apex - - - FILICIDAE.

1. Heteropórous ferns - - - 5.

5. Marsh plants with creeping rhizome and erect, long petioled, 4-foliate leaves - - - MARSILIDAE@@

5. Annual floating aquatics with simple leaves. - - - SALVINIDAE

---

* Sub-class Ophioglossidae is represented by only one family OPHIOGLOSSACEAE.

** Sub-class Marattidae is represented by only one genus ANGIOPTERIS Hoffm.

@ Sub-class Osmundae is represented by only one genus OSMUNDA Linn.

@@ Sub-class Marsilidae is represented by only one genus MARSILEA Linn.

(iii) KEY TO THE ORDERS OF SUB-CLASS FILICIDAE :

Key characters adapted from Alston (1958).

1. Sori two-valved, opening down the side crowned by a operculiform complete ring - - - SCHIZAEALES*

1. Sori opening vertically, surrounded by a broad transverse complete ring - - - GLEICHENIALES**

1. Sori opening by bursting of a stroma, surrounded by a jointed vertical and complete elastic ring - - - - 2.

2. Indusium usually present, true or false - - - - - - - - 3.

3. Spores trilete - - - - 4.

4. True indusium present - - - 5.

5. Not tree ferns, but sometimes arborescent - - - 6.

6. Sori rounded circular or linear - - - - DICKSONIALES.

6. Sori cup-shaped, pocket-shaped, or flap-like never linear --- HYMENOPHYLLALES@

5. Tree ferns ---- CYATHEALES@@

4. No true indusium, sori indusiated by a reflexed margin----- PTERIDALES

3. Spores monolete ----- 7

7. Sori pocket-shaped or flap-like, veins free --- DAVALLIALES.

7. Sori circular, veins reticulate ------ ASPIDIALES.

7. Sori linear, parallel and close to the midrib. Veins free ---- BLECHNALES ⊗

2. Indusidum absent ----- 8

8. Spores monolete --- POLYPODIALES ⊗⊗

---

* Order Schizaleales is represented by only family SCHIZAEACEAE.

** Order Gleicheniales is represented by only one genus DICRANOPTERIS Bernh.

© Order Hymenophyllales is represented by only one family HYMENOPHYLLACEAE.

©© Order Cyatheales is represented by only genus CYATHEA. Sm.

⊗ Order Blechnales is represented by only one genus BLECHNUM. L.

⊗⊗ Order Polypodiales is represented by only one family POLYPODIACEAE.

(iv) KEY TO THE FAMILIES OF THE ORDER DICKSONIALES :

Key characters adapted from Copeland (1947).

1. Plants arborescent ----- DICKSONIACEAE.

1. Plants not arborescent ---- 2.

2. Indusium indistinct. Sori sometimes covered by reflexed margin --- ----- DENSTADTIACEAE.

2. Indusium distinct, opening from the margin towards the midrib --- --- LINDSAYACEAE .

(v) KEY TO THE FAMILIES OF ORDER DAVALLIALES :

Key characters adapted from Copeland (1947).

1. Sori covered by a pocket-shaped indusium which is attached at the base to the lamina, opening at the apex ---- DAVALLIACEAE.

1. Sori covered by kidney-shaped indusium which is attached to the lamina at the centre or the centre of the base, opening from all sides ----- OLEANDRACEAE.

(vi) KEY TO THE FAMILIES OF ORDER ASPIDIALES :

1. Fertile fronds acrostichoid --- LOMARIOPSIDACEAE.

1. Fertile fronds not acrostichoid ---- 2.

2. Indusium linear or oblong or sometimes horse-shoe-shaped, opening towards the midrib, outer margin attached to the veins ----- 3.

3. Plants mostly epiphytic, rarely lithophytic; scales clathrate, the two vascular bundles at the base of the stipe uniting upwards in X-shaped. ----- ASPLENIACEAE.

3. Plants mostly terrestrial; scales not clathrate, the two vascular bundles at the base of the stipe unite upwards in U-shape ---- ATHYRIACEAE.

2. Indusium elliptical, sub-globose or reniform, fixed to the lamina in the centre or at the sinus ----- 4.

4. Pinnules with reticulate veins --- ASPIDIACEAE.

4. Pinnules with paralle veins --- THELYPTERIDACEAE.

(vii) KEY TO THE FAMILIES OF ORDER PTERIDALES :

Key characters adapted from Copeland (1947).

1. Aquatic or sub-aquatic plants ---- PARKERIACEAE.

1. Non-aquatic plants ---- 2.

2. Plants epiphytic --- VITTARIACEAE.

2. Plants terrestrial ------ 3.

3. Sori running along the margins or covering entire lower surface ---- 4.

4. Margins irregularly folded and very much curled ---- SINOPTERIDACEAE.

4. Margins entire or deeply cut, reflexed but not curled ---- 5.

5. Sori continuous, exposed at maturity ----- 6.

6. Fronds pinnate, heart-shaped or digitate; veins reticulate --- --- PTERIDACEAE.

6. Fonds palmate; veins parallel -- --- ACTINIOPTERIDACEAE.

5. Sori broken at intervals, covered by reflexed margin even at maturity --- ADIANTACEAE.

3. Sori restricted more or less in the centre of the frond -- GYMNOGRAMMACEAE.

(viii) Key to the Families of Order SALVINIALES :

1. Leaves very small, two ranked, deeply 2-lobed. Roots present --- AZOLLACEAE.

2. Leaves in numerous alternating 3-merous whorls. Two leaves are aerial and one ventral, submerged, root-like in each whorl. No true roots --- SALVINIACEAE.

(ix) KEY TO THE GENERA OF OPHIOGLOSSACEAE :

1. Venation free, both the sterile and fertile segments compound cravely simple, racemose or paniculate bearing distinct sessile or stalked sporangia ----- 2.

2. Sterile segments pinnate or decompound, the fertile segments pinnate with several spreading branches; sporangium dehiscing by a transverse slit ---- BOTRYCHIUM.

2. Sterile segments palmate with several separate leaflets; fertile segments compact with many short branches, sporangia dehiscing by a longitudinal slit --- HELMINTHOSTACHYS.

1. Venation reticulate; sterile and fertile segments simple, entire (or with few lobes). Spikes simple, terete, erect or pendulous; sporangia half-embedded in two lateral rows --- OPHIOGLOSSUM.

1. BOTRYCHIUM Sw.

(Deriv.Botrys, a bunch; in allusion to the fructification which is like a bunch of grapes).

Sporangia sessile, arranged in two rows on the face of the spikes. Fronds erect, consisting of a fertile and sterile segment on the same stipe. Sterile segments leafy, triangular, 2-3 pinnatifidly decompound; rarely pinnate. Veins forked, free; fertile segment consisting of a stalked spike which forms a compound panicle.

TEXT FIG. 7 BOTRYCHIUM SUBCARNOSUM. WALL.

1. Botrychium subcarnosum. Wall (Text Fig.No.7)

DISTRIBUTION : Silent Valley (Kerala State); Bombay Presidency.

USES : Various species of this genus are used in dysentery; ruptures and for healing wounds. (Wealth of India).

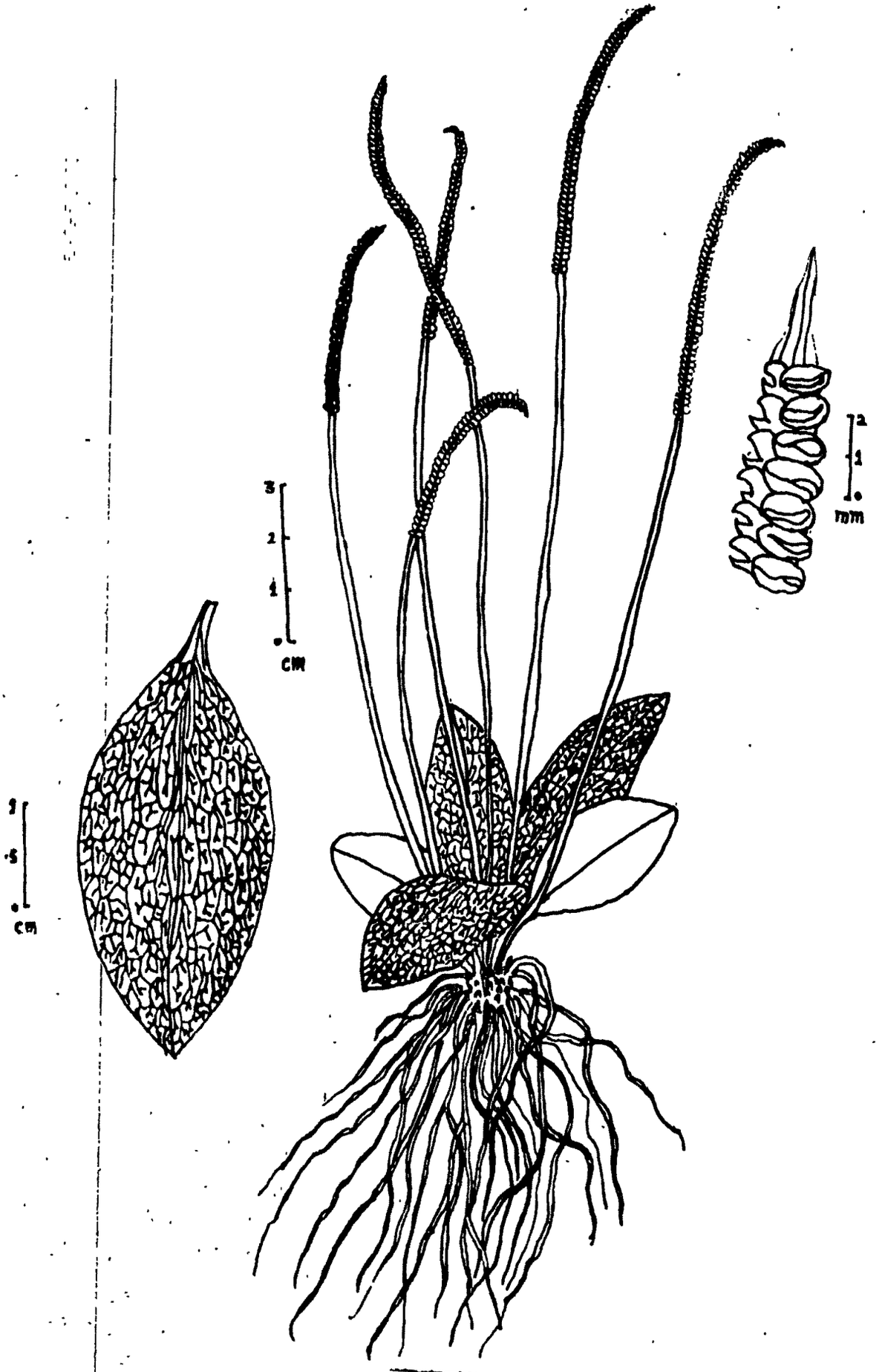
2. OPHIOGLOSSUM. Lin.

(Deriv.Ophis, a snake; glossa, a tongue)

Sporangia, sessile, arranged in two rows, forming a narrow close spike which arises from the base or centres of the barren segment, rarely distinct, rising direct from the rhizome; veins reticulate; fronds simple, entire, rarely palmate.

KEY TO THE SPECIES :

1. Rhizome round-cormatous, roots fibrous, numerous --- O.costatum.
1. Rhizome not round-cormatus; roots few ---- 2.
   2. Rhizome elongated; cylindrical, plants not tiny ---- 3.
      3. Rhizome long-stoloniferous, reproducing vegetatively; leaves cordate -- O.reticulatum.
      3. Rhizome not long-stoloniferous, leaves not cordate ---- 4.
         4. Rhizome with ± 3 cm.long scales --- --- O.polyphyllum.



TEXT FIG. 9 OPHIOGLOSSUM COSTATUM. R.BR.

4. Rhizome not scaly --- 5.

5. Midrib present ---- O. angustatum.

5. Midrib absent ---- 6.

6. Leaves ovate, ± 5 cm. long, fleshy ---- O. vulgatum.

6. Leaves ovate-oblong, only ± 2 cm. long not fleshy --- O. petiolatum.

2. Rhizome not elongated, small-tuberous plants tny ---7

7. Leaves broadly ovate, elliptic or orbicular --- O. nudicaule var. macrorrhizum.

7. Leaves linear or sickle-shaped--- --- O. gramineum.

1. Ophioglossum costatum L. (Text Fig. No. 9)

DISTRIBUTION : Matheran, Lonavala, Savantwadi, Panhala, Kolhapur, Maharashtra.

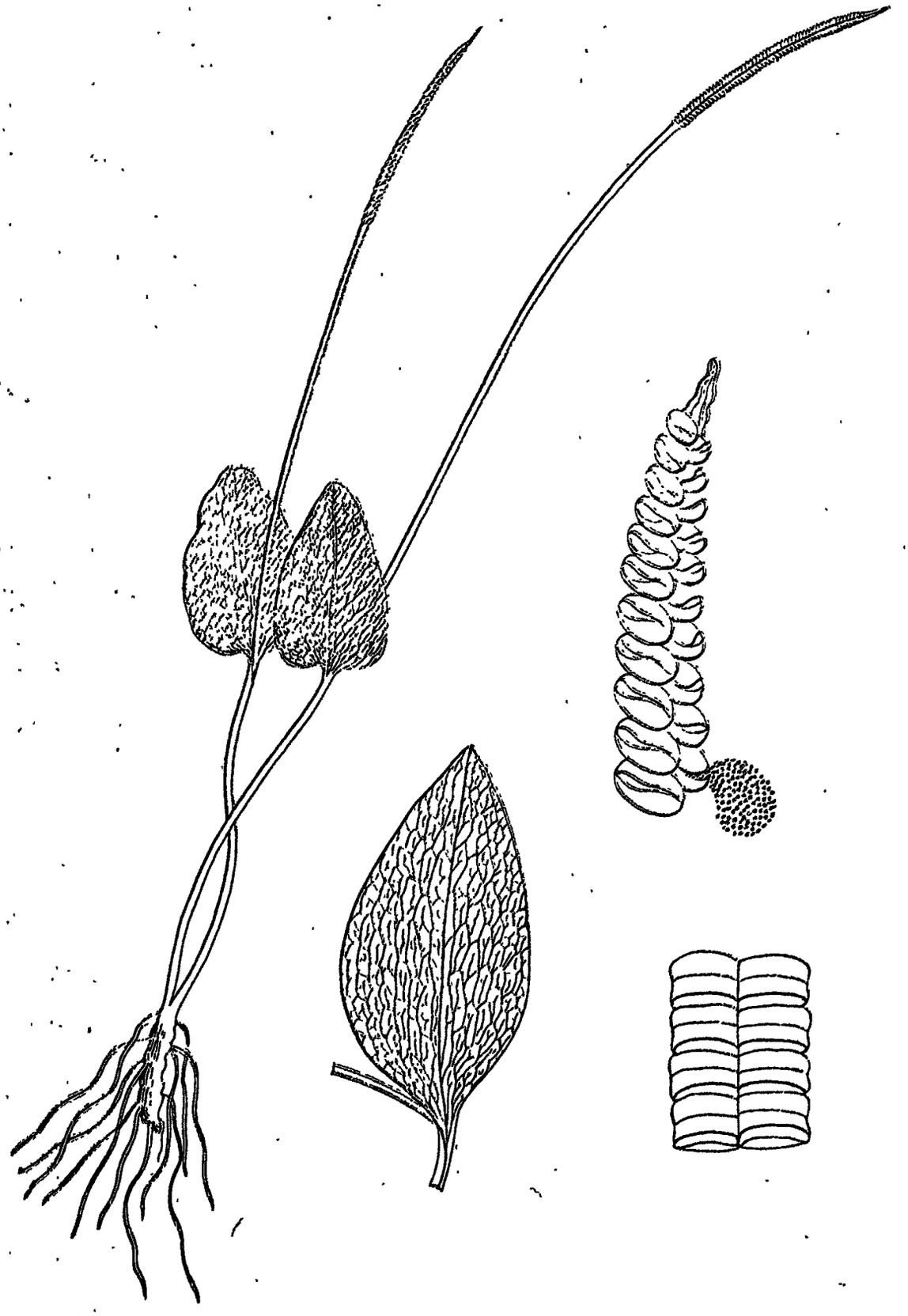
2. Ophioglossum costatum. Var. bastaricum. L.

DISTRIBUTION : Savantwadi, Gaganbawada, Panhala, Kolhapur, Khandala, Lonavala, Matheran, Kaneri Cave, Alibag, Borivali, Andheri, Mahad.

3. Ophioglossum gramineum. Willd.

DISTRIBUTION : Kolhapur, Panhala, Purandar, Khandala, Satara, Bombay.

PLATE NO.1. OPHIOGLOSSUM COSTATUM.
VAR. BASTARICUM. SCHR.



TEXT FIG. 8 OPHIOGLOSSUM RETICULATUM. LINN.

TEXT FIG. 10 ANGIOPTERIS EVECTA. HOFF.

4. Ophioglossum nudicaule. non.L.f.

DISTRIBUTION : Kolhapur, Panhala, Lonavala, Khandala, Castle Rock, N.Kanara, Kalyan.

5. Ophioglossum pendunculosum. L.

DISTRIBUTION : Kolhapur, Radhanagari, Poona, Lonavala, Ganeshkhind, Katraj Ghat, Khandala.

6. Ophioglossum reticulatum L. (Text Fig.No.8)

DISTRIBUTION : Panhala, Lonavala, Mahabaleshwar, N.Kanara, Purandar.

USES : The leaves of O.vulgatum L. boiled in oil or fat are considered a remedy for wounds. This preparation cools inflammation. (Fernie, Chopra et al.)

3. ANGIOPTERIS. Hoffman.

(Deriv.Angio, open; Pteris, fern - the open sporangia)

Sporangia opening by a slit down the side, sessile, very close to one another but not concrete, arranged in linear oblong or boat-shaped sori near the edge of the frond; veins simple or forked, free, fronds very large, bipinnate, often only pinnate, stipes club-shaped at the base, and springing between two fleshy stipules. Pinnae and pinnules articulate with the rachis.

1. Angiopteris evecta. (Forst.)Hoffman. (Text Fig.No.10).

DISTRIBUTION : Savantwadi, Amboli, Goa, Castle Rock, Anmode, Kesari, V.G.Bombay.

TEXT FIG. 11 OSMUNDA REGALIS. LINN.

4. OSMUNDA. Linn.

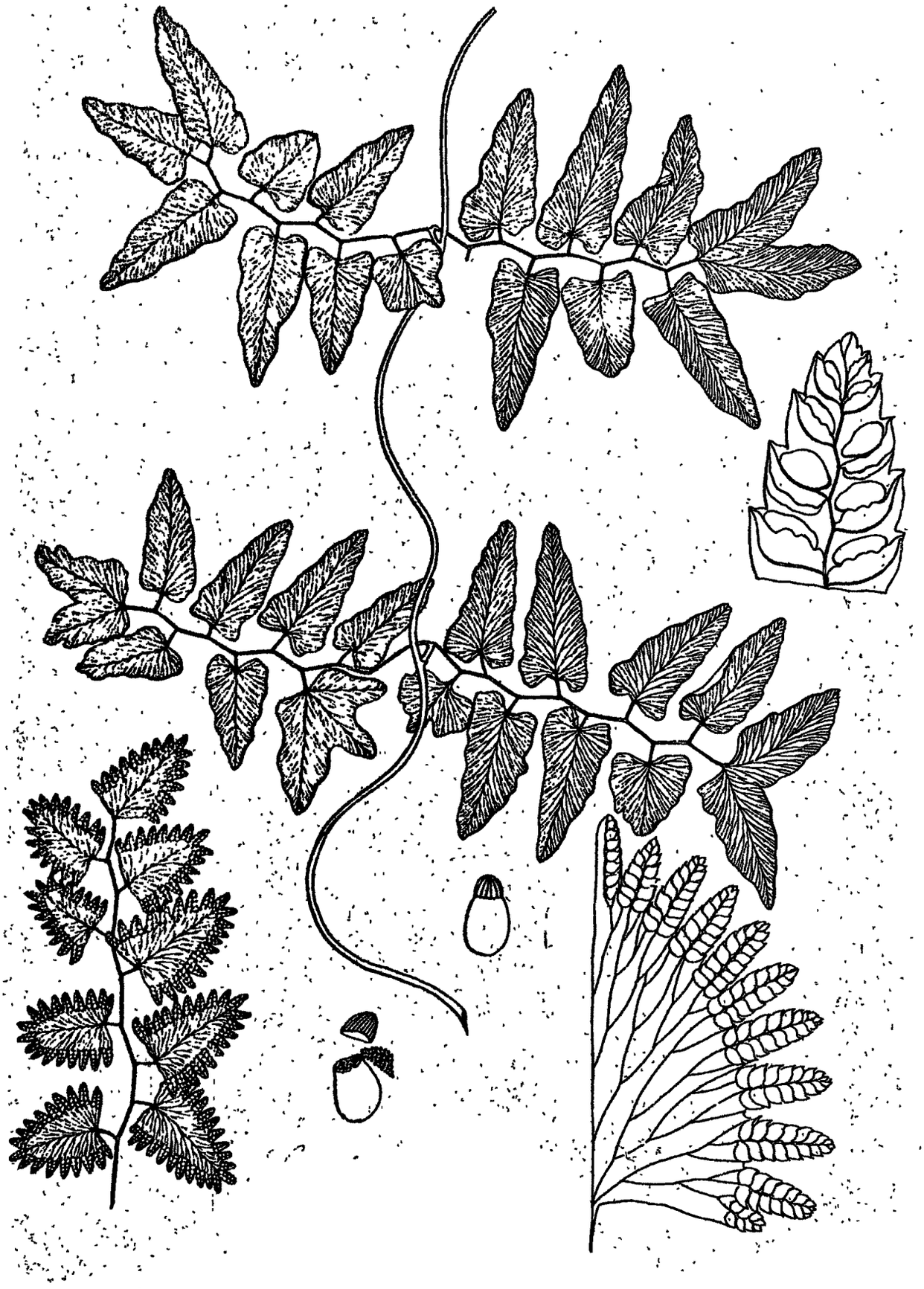
(Deriv. Osmunder, one of the names of Thor, a Ceitic divinity)

Fertile frond wholly, on the upper or middle portion contracted, forming simple or compound panicles bearing sporangia; veins forked free, fronds pinnate or bipinnate, articulated with the rachis.

1. Osmunda regalis. Linn. (Text Fig.No.11)

DISTRIBUTION: Amboli, Mahabaleshwar, Anmode, Castle-Rock, N.Kanara, Silent Valley. (Kerala).

USES : Considered a tonic and styptic and used against rickets. (Chopra et al.) The middle part of the plant boiled in liquid is considered good for wounded persons. +The root stock stamped in water or gin until the liquor becomes a stiff mucilage, has been used to cure back pains (Fernie).



TEXT FIG. 12 LYGODIUM MICROPHYLLUM R. BR.

USES : Plant used as an expectorant. Fresh roots boiled with mustard oil are useful as local application to carbuncles. Externally it is used in rheumatism, sprains, scabies, ulcers, eczema and cut wounds.

2. Lygodium microphyllum. R.Br.(Text Fig.No.12)

DISTRIBUTION : Castle Rock, N.Knara, Silent Valley.

USES : A decoction of leaves given for dysentry. Leaves are also applied as poultices for skin diseases and swelling (Kirtikar et al.)

KEY TO THE GENERA OF FAMILY PTERIDACEAE :

1. Sori spreading on the entire surface of the pinnae ---- ACROSTICHUM.

1. Sori restricted to the margins --- 2.

2. Fronds pinnate ---- PTERIS.

2. Fronds palmate ----- DORYOPTERIS.

6. ACROSTICHUM. Linn.

(Deriv.Gr.Akros, highest; stichos, order - fructification at the top of the fond).

Veins uniform, reticulate, meshes without free included veinlets, no main veins present; fronds pinnate, the upper pinnae smaller and wholly covered with sporangia on the under surface, stipes adherent to caudex.

1. Acrostichum aureum. Linn.

DISTRIBUTION : Goa, Aronda, Vengurla.

USES : The young shoots known as 'Ankur' of this fern are eaten as a vegetable in Goa.

7. PTERIS. Linn.

(Deriv.Greek name for fern, from Gr.Pteryx, a wing in allusion to the prevalence of pinnate form).

Indusium quite continuous, sori linear, continuous, occupying a slender filiform receptacle in the axis of the indusium. Veins free, rarely those of the last division but one or more are less connected by arching veins at the very base.

KEY TO THE SPECIES OF PTERIS :

1. Fronds tripinnate ---- 2.

   2. Ultimate pinnules with more than one row of costular areoles -- P.wallichiana.

   2. Ultimate pinnule with only one row of costular areoles --- P.tripartita.

1. Frends simply pinnate or bipinnate --- 3.

   3. Fronds simply pinnate --- 4.

      4. Pinnae more than 3 cm. wide --- P.pellucida.

      4. Pinnae less than 1.5 cm. wise -- P.vittata.

   3. Fronds with atleast longest pinnae divided into two ---- 5.

      5. Lowest pinnae not pinnate, but with only one branched lobe --- 6.

         6. Fronds having white broad band on the centre of the fond --- --- P.cretica. var. albolineala.

         6. Fronds without a white band on the centre --- P.cretica.

      5. Lowest pinnae if not pinnate, then at least 3-lobed --- 7.

         7. Lowest pinnae of pinnate, then not having more than 10 pairs of lateral secondary pinnae --- 8.

            8. Basal lobe of the basal pair of pinnae is twice as broad than the rest of the pinnules - P.savantwadiensis.

8. Basal lobe of the basal pair of pinnae is as broad as rest of the pinnules --- P.encifolia.

7. Lowest pinna having atleast one pinnate lobe which has at least 15 pairs of lateral pinnules --- 9.

9. Lowest pinnae having more than one lobe (upto 5 lobes) on the abaxial side -- -- P.quadriurita pp.

9. Lowest pinnae having only one lobe on abaxial side --- 10.

10. Copious stiff hairs on the rachis and costate -- P.setigera.

10. No stiff hairs on rachis and costate. -- 11.

11. Veinlets usually once forked and then free -- P.quadriaurita p.p.

11. Lowest pairs of the veinlets of the adjoining veins unite in pair into arch -- P.biaurita

11. Biforked and free as well as arch-forming veinlets are found in the same frond -- P.nemoralis.

TEXT FIG. 13 PTERIS QUADRIAURITA. HOFF.

1. Pteris asperula. J.Sm. (Text Fig.No.13)

P.quadriurita var. setigera. Hook.

DISTRIBUTION : Savantwadi, Amboli, Vishalgad, Mahabaleshwar, Amba Ghat, Khandala, Panchgani, N.Kanara, Castle Rock, Radhanagari, Matheran, S.India.

2. Pteris biaurita. L.

DISTRIBUTION : Amboli, Savantwadi, Dandeli, Anmode, Mahabaleshwar, N.Kanara, Radhanagari.

3. Pteris setigera. Hoff.

DISTRIBUTION : Amboli, Savantwadi, Panhala, Radhanagari, Castel Rock, Anmode.

4. Pteris cretica Linn.

= P.encifolia

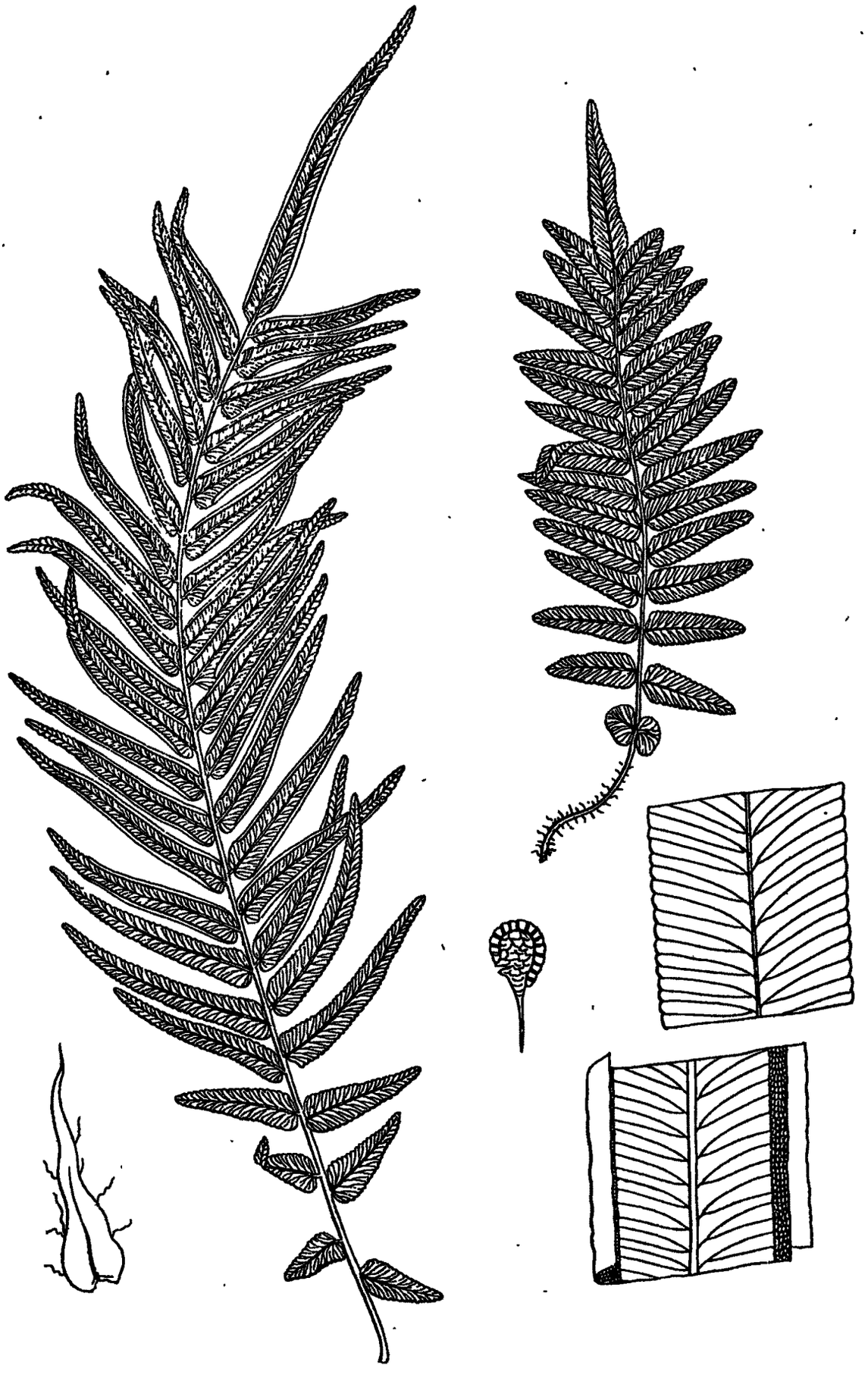
DISTRIBUTION : Poona, Amboli, Savantwadi.

5. Pteris pellucida. Presli.

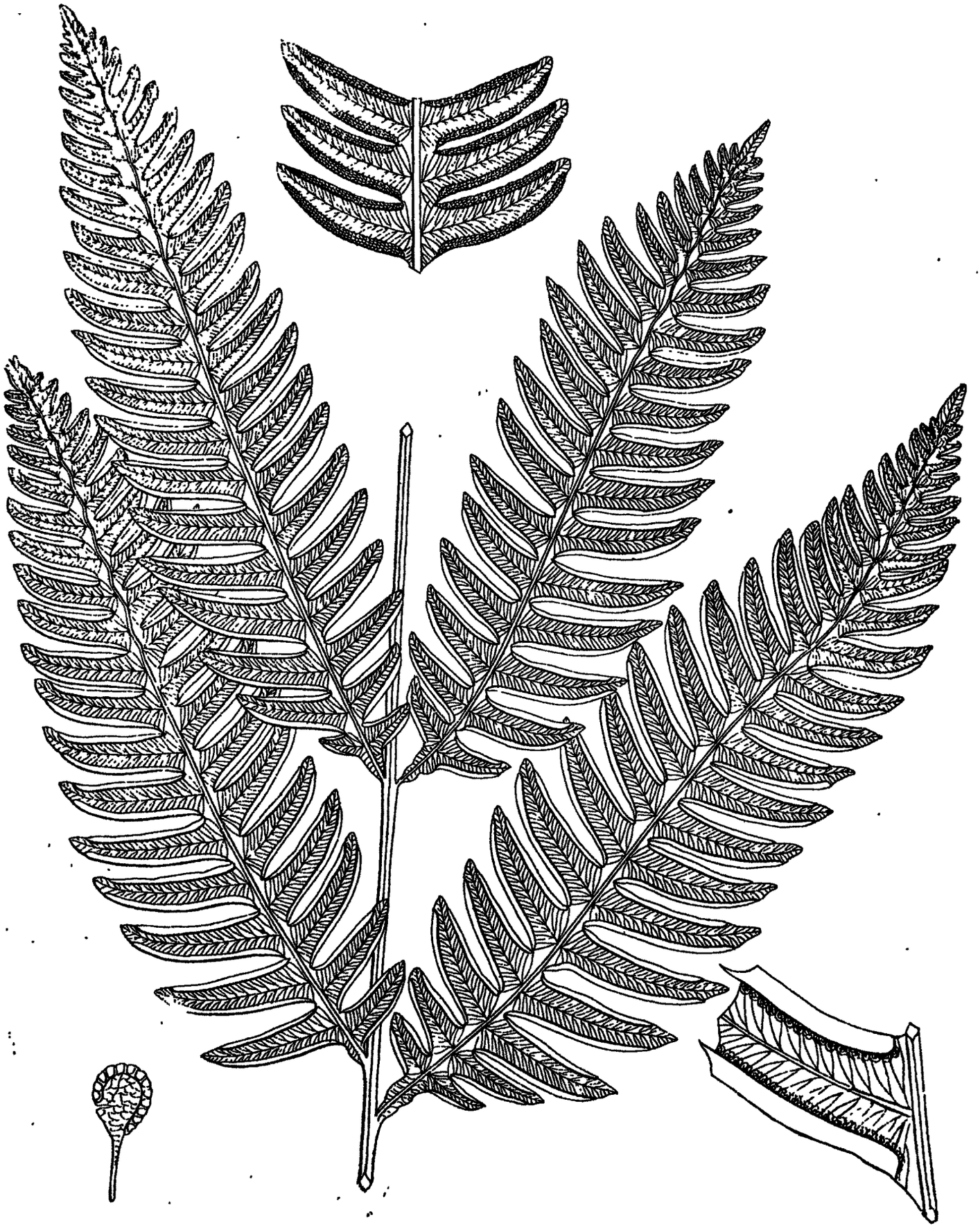
DISTRIBUTION : Savantwadi, Vishalgad, Amboli, Castle Rock, Aronda, Mahabaleshwar, Amba Ghat, Lonavala, Vengurla, Malvan, Goa, Ratnagiri, Matheran, Bombay, Karwar.

6. Pteris savantwadiensis Bole and Almeida.

DISTRIBUTION : Savantwadi, Anmode, N.Kanara.



TEXT FIG. 14 PTERIS VITTATA LINN.



TEXT FIG. 15 PTERIS LONGIPINNULLA. LINN.

TEXT FIG. 16 PTERIS ALMEIDIANA. BOLE, M. ALMEIDA.

7. Pteris vittata. Auctt. (Text Fig. No.14)

DISTRIBUTION : Savantwadi, Amboli, Vengurla, Radhanagari, Shiroda, N.Kanara, Anmode, Castle Rock, Dudsagar, Mahabaleshwar, Poona, Goa.

8. Pteris longipinnula. Wall. (Text Fig.No.15)

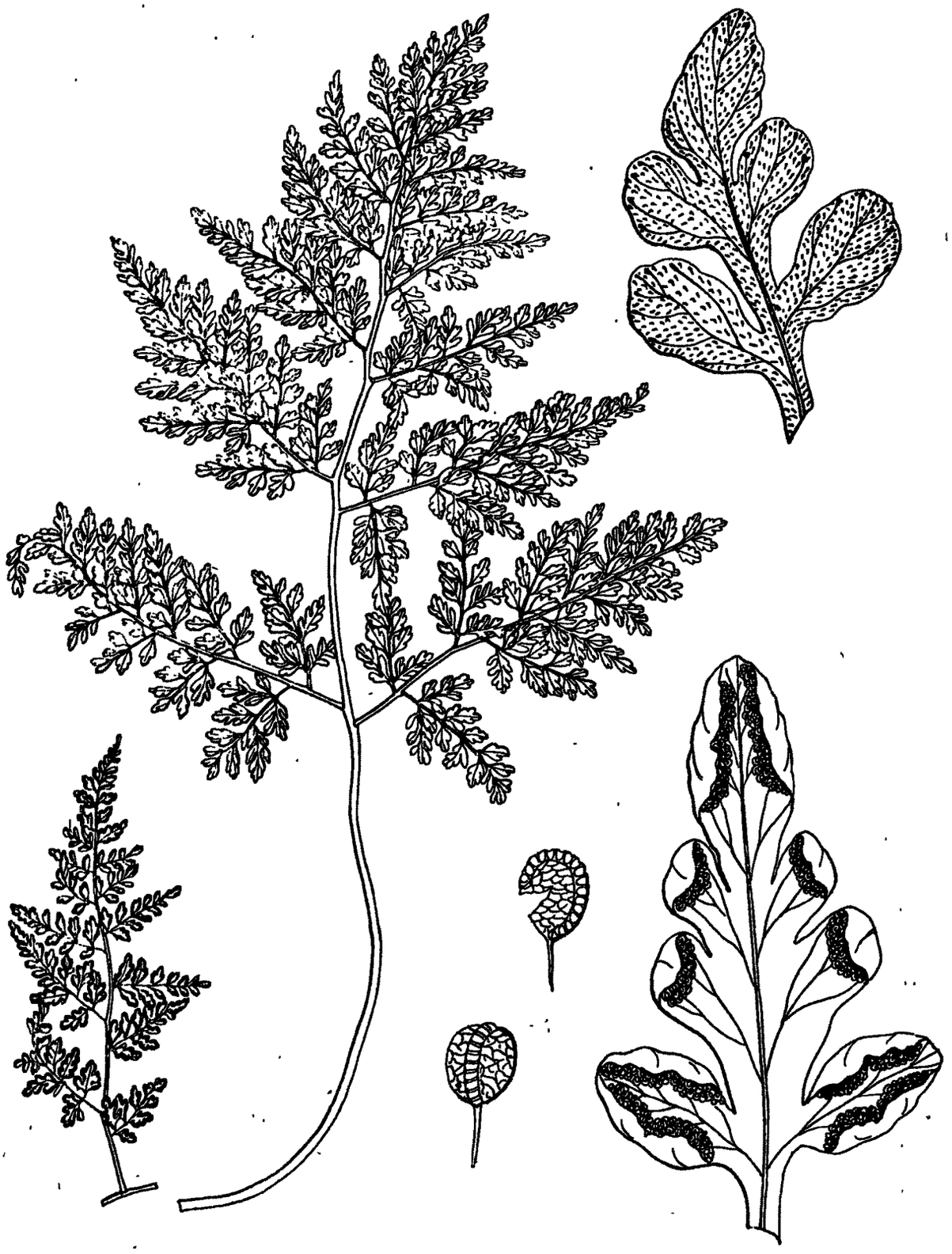
DISTRIBUTION : Silent Valley (Kerala).

9. Pteris pellucens

DISTRIBUTION : Silent Valley (Kerala)

10. Pteris almediana. Bole and Almeida.(Text Fig.No.16)

DISTRIBUTION : Western Ghats.



TEXT FIG 18 CHEILANTHUS TENUIFOLIA. SW.

TEXT FIG. 17 ALEURITOPTERIS FARINOSA. FEE.

KEY TO THE GENERA OF FAMILY SINOPTERIDACEAE :

1. Fronds not ceraceous beneath --- CHEILANTUS.
2. Fronds ceraceous beneath --- ALEURITOPTERIS.

8. CHEILANTHUS. Sw.
= ALEURITOPTERIS. Fee.

(Deriv. Gr.Cheilos, lip; anthos, flower - in allusion to the marginal sori.)

Indusium roundish and distinct, or more or less confluent, but not continuous, sporangia on underside of the frond, veins free.

9. CHEILANTHUS. Sw.

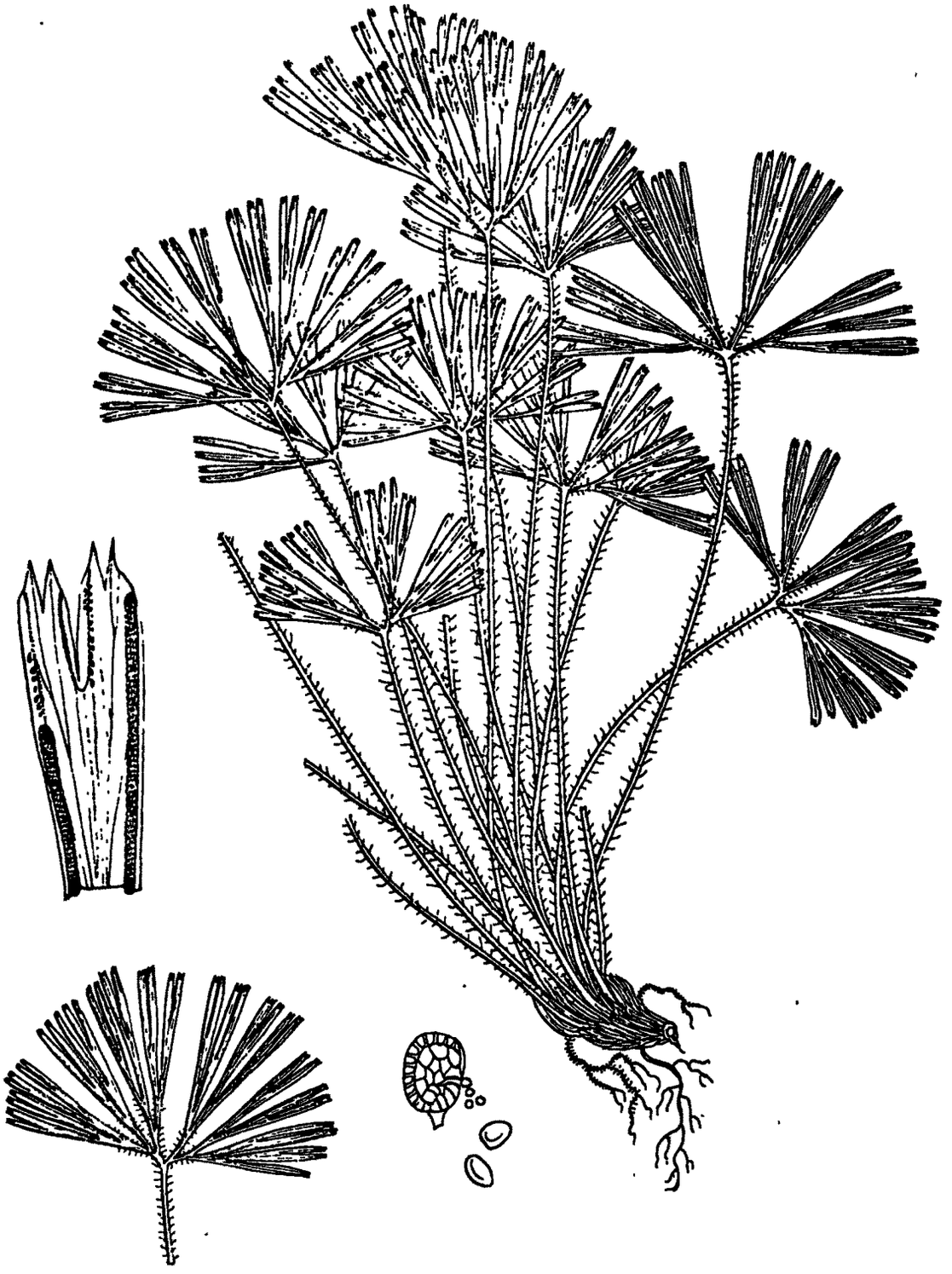
1. Cheilanthus tenuifolia. Burm. (Text Fig.No.18)

Rhizome short, creeping, stipes purple-black, scaly. Frond ovate or triangular, tri-pinnatifid; pinnules linear-acuminate, segments oblong-lanceolate. Main rachis winged above, partial rachises all narrowly winged. Texture almost membranous. Sori circular, eventually confluent.

DISTRIBUTION : Savantwadi, Amboli, Vengurla, Goa, Anmode, Castle-Rock, N.Kanara, Londa.

USES : "The Santals prescribe a preparation from the roots for sickness attributed to witchcraft or the evil-eye" (Caius, 1935).

1. Aleuritopteris farinosa. Fee.(Text Fig.No.17)
= Cheilanthus farinosa. Klf.



TEXT FIG. 19 ACTINIOPTERIS DICHOTOMA. KUHN.

DISTRIBUTION : Savantwadi, Amboli, Khandala, Mahabaleshwar, Katraj Ghat, Purander, Castel Rock.

2. Aleuritopteris albomarginata. Ching.

DISTRIBUTION : Amboli, Savantwadi, Vengurla, Goa, Anmode, Castle Rock, N.Kanara, Poona, Panhala.

10. ACTINIOPTERIS. Link.

(Deriv.Actin, rays; Pteris, a fern).

Fronds fan-like, sori placed on each side of the narrow segment of the fond, linear, elongated, opening towards the midrib.

1. Actiniopteris dichotoma. Bedd. (Text Fig.No.19)
= A. australis. Link.
= A. radiata. Hook.

DISTRIBUTION : Satara, Kolhapur, Sangli, Katraj, Purandar, Khandala, Poona, Panhala.

USES : Used as an anthelmintic (Pandey,1969), as an astringent to arrest hermorrhages (Chunekar and Pandey) and as an alternative in prolonged malarial fevers (Nadkarni, 1954, Chopra et al.)

11. CERATOPTERIS. Brogniart

(Deriv.Gr.Keras, Keratos, a horn; Pteris, a fern. The horned fern - in allusion to the stag-horn looking fronds).

A true water fern. Fronds fragile, fertile fronds decompound with the segments forked and pod-shaped. Sori linear, marginal, almost parallel. Veins of sterile frond

TEXT FIG. 20 CERATOPTERIS THALICTROIDES. (L.) BRONG.

transversely elongated and distantly anastomosing. A very anomalous genus.

1. Ceratopteris thalictroides. Brong. (Text Fig. No. 20)

DISTRIBUTION : Aronda, Vengurla, Savantwadi, Goa, Khandala, Castle-Rock, Bombay, N. Kanara.

KEY TO THE GENERA OF THE FAMILY GYMNOGRAMMACEAE :

1. Fronds simple, cordate or triangular -- HEMIONITES.

1. Fronds pinnate --- 2.

2. Plants less than 6 cm. tall, fronds membranceous --- ANNOGRAMMA.

2. Plants over 25 cm. tall. Fronds herbaceous. --- PITYROGRAMMA.

12. PITYROGRAMMA. Link.

(= GYMNOGRAMME. Desv.)

(Deriv. Gr.Gymnos, naked; gramme, writing)

Sori arising from the veins over the under surface of the fond, linear and usually forked. Habit and mode of growth as Cheilanthes.

KEY TO THE SPECIES :

1. Under surface of the lamina is covered with white mildew --- P.Calomelanos.

1. Under surface of the lamina covered with bright golden coloured mildew -- P.chrysophylla.

1. Pityrogramma calomelonos (L.) Link.

= Gymnogramme calomelons (L.) Kaulf.

DISTRIBUTION : Khandala, Amboli, Savantwadi, Lonavala, N.Kanara, Bombay, Amba Ghats.

2. Pityrogramma chrysophylla Link

DISTRIBUTION : Savantwadi, Castel-Rock, N.Kanara, Poona garden.

13. ADIANTUM. Linn.

(Deriv.Gr.Adiantos, dry; from the curious property of repelling moisture).

Sori marginal, rounded or in a line, usually, numerous and distinct, sometimes confluent and continuous, bearing the sporangia on the underside. Veins free.

KEY TO THE SPECIES :

1. Fronds simply pinnate -- 2.

2. Lateral pinnae upto 10-15 cm long; upto 5-6 pairs. Sori in a continuous line; not interrupted -- -- Adiantum macrophyllum. PP.

2. Lateral pinnae more than 10 pairs. Sori interrupted at short intervals. Fronds rooting at the apex --- 3.

3. Pinnae petiolate, kidney shaped not deeply incised --- A.philipense.

3. Pinnae sessile, fan-shaped, deeply incised --- A.incisum.

1. Fronds bipinnate to decompound --- 4.

4. Sori more or less continuous -- A.macrophyllum P.P.

4. Sori interrupted ---- 5.

5. Pinnae more than 6 cm. long from base to apex --- 6.

6. Pinnae not dimidiate, more than 10 cm. long --- A.peruvianum.

6. Pinnae dimidiate, less than 8 cm. long --- 7.

7. Pinnae sessile, veinlets springing from the marginal vein on the abaxial side --- A. widesianum.

7. Pinnae petiolate, veinlets springing from the apex of the petiole. No prominent vein --- A. trapeziforme.

5. Pinnae less than 5 cm. long --- 8.

8. Pinnae much smaller, upto 5 mm. long --- A. gracillium.

8. Pinnae more than 6 mm. long -- 9.

9. Fronds branching dichotomously with numerous secondary branches arising from the upperside of each branch -- --- A. hispidulum.

9. Fronds with lateral pinnae branches -- 10.

10. Sori semicircular, with a depression and pore in the centre, arrangement just below the axis -- A. cuneatum.

10. Sori not semicircular, usually in short linear band or little curved -- 11.

11. Pinnae longer than broad -- A. formosum.

11. Pinnae as long as broad ---- 12.

12. Pinnae deeply lobed or dissected --- 13.

13. Lobes biforked at the apex -- -- A. farleyance.

13. Lobes not biforked at the apex
--- A.capillusveneris.

12. Pinnae not deeply cut --- 14.

14. Pinnules distinctly wedg-
shaped --- A.tenerum.

14. Pinnules roundish at the margins
at the apex -- A.aethiopium.

1. Adiantum lunulatum. Burm.
(= A.philippense. Linn.)

DISTRIBUTION : Savantwadi, Nipani, Anmode, Vengurla, Lonavala, Amba Ghats, N.Kanara, Mahabaleshwar, Trimbak, Nasik, Panhala, Radhanagari, Castle-Rock, Kolhapur.

USES : One of the constituents of Hansraj, the drug esteemed in India for coughs. It is considered a bronghio-dilator, diuretic (Chopra et al.) and pectoral (Caius). In Western India used extensively in the treatment of fevers of children; the root stock is considered good for fever and elephantiasis. (Kirtikar and Basu).

2. Adiantum cuneatum. Langs.

DISTRIBUTION : Mahabaleshwar, Panhala, Poona.

USES : "In Brazil the leaves are a popular cough medicine. The plant is considered a good sudorific" (Caius,1935).

3. Adiantum trapeziforme. L.

DISTRIBUTION : Khandala, Panhala, Poona, Bombay.

4. Adiantum capillus-veneris. Linn.

DISTRIBUTION : Nasik, Igatpuri, Trimbak, Panchgani, Khandala, Mahabaleshwar, Goa.

USES : According to Walt, the bulk of Adiantum sold medicinally in India is this species. A decoction of the fronds of this plant is considered quite effective in all types of bronchial troubles. (Upholf,1954). An infusion of the herb serves as a shampoo against dandruff and also promotes hair growth (Walt et al.). The plant is considered as an emmenagogue (Nadkarni). The juice of the plant with pepper is recommended for all types of fevers (Nadkarni; Biswas,1955). It is used for hydrophobis by the physicians of the Persian system of medicine (Walt).

KEY TO THE GENERA OF FAMILY DENTADTIACEAE :

1. Sorus served by a single veinlet --- MICROLEPIA.

1. Sorus served by plural veinlets --- PTERIDIUM.

14. MICROLEPIA. Presl.

(Deriv.Gr.Micros, small; Lepis, scale in allusion to the small indusium).

Indusium membranaceous, half cup-shaped, attached at the sides and base. Rhizome creeping; stipe continuous with the rhizome.

1. Microlepia speluncae.(L.) Moore.
   = M. polypodiodes. Presl.
   = M. speluncae var.
   rhomboidea.Sensu.

DISTRIBUTION : N.Kanara, Silent Valley, Bombay.

15. PTERIDIUM. Scpoli

1. Pteridium aquilinum Kuhn.
   = Pteris aqualina L.

Rhizome stout, creeping extensively beneath the surface of the ground. Stipes erect, naked, arising at intervals from the rhizome, dark-coloured at the lower extremity which is covered by the soil. Frond decompound, almost triangular in form, apex pinnate, below it are ovate pinnae which become gradually more and more downwards until the lowest ones are pinnate with lanceolate pinnules cut down into

numerous lanceolate segments, ultimate segments upto about an inch long and 1/6 inch broad, surfaces and rachis naked or hairy-texture thin or almost leathery. This is a common Brake or Bracken. It grows upto seven feet high.

USES : The rhizome is astringent and is useful for diarrhea and inflammation of the gastric and mucous membranes. Boiled in oil or hogs fat, the rhizome is made into an ointment for wounds. A decoction of the rhizome and fronds has been given in chronic disorders arising from obstruction of the viscera and spleen (Wealth of India). It is also used instead of hops. It is also used as packing material.

KEY TO THE GENERA OF FAMILY LINDSAEACEAE :

1. Sori restricted to the apical region of the deeply cut ultimate lobes, ultimate lobes cuneate -- SPENOMERIS.

1. Sori linear along the margins or sometimes interrupted in dimidiate pinnae; not restricted to the apical region, ultimate lobes not cuneate ---- 2.

2. Pinnae dimidiate or unilateral -- LINDSAEA.

2. Pinnae equilateral --- SCHIZOLEGNIA.

16. SPENOMERIS. Maxon.

(= STENOLOMA. Fee)

(Deriv. Stenos, narrow; loma border).

Indusium forming a compressed, almost round or cup-shaped pouch, only open at the top, Rhizome creeping; stipes tufted, not articulated up on the rhizome.

1. Stenoloma chinensis. Bedd.

= S. clavatum Maxon.

= S. chusara. Ching.

= Davallia chinensis.

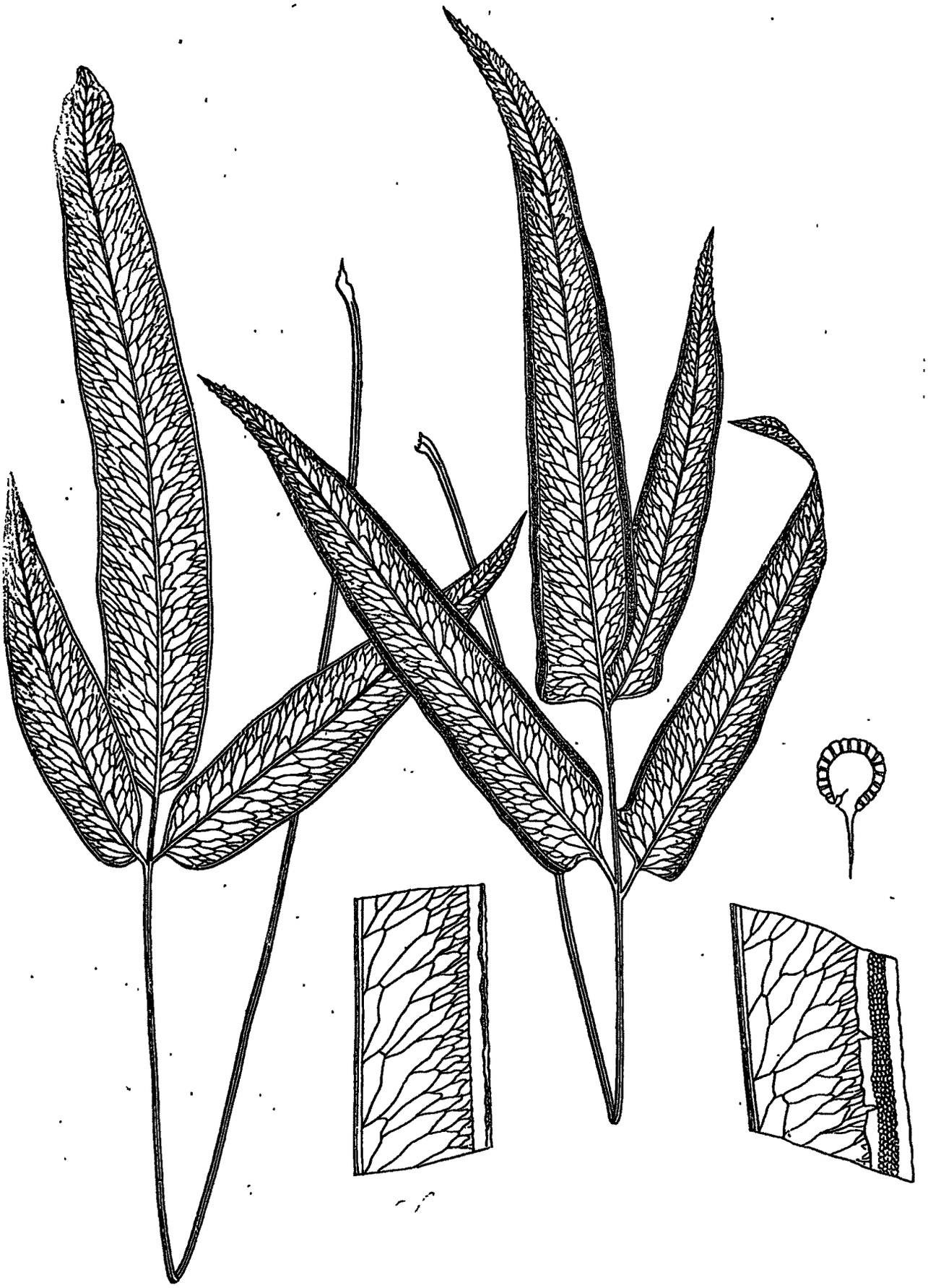
DISTRIBUTION : Castle-Rock, Khandala, Anmode, N.Kanara, Belgaum, Poona.

17. SCHIZOLEGNIA. Alston.

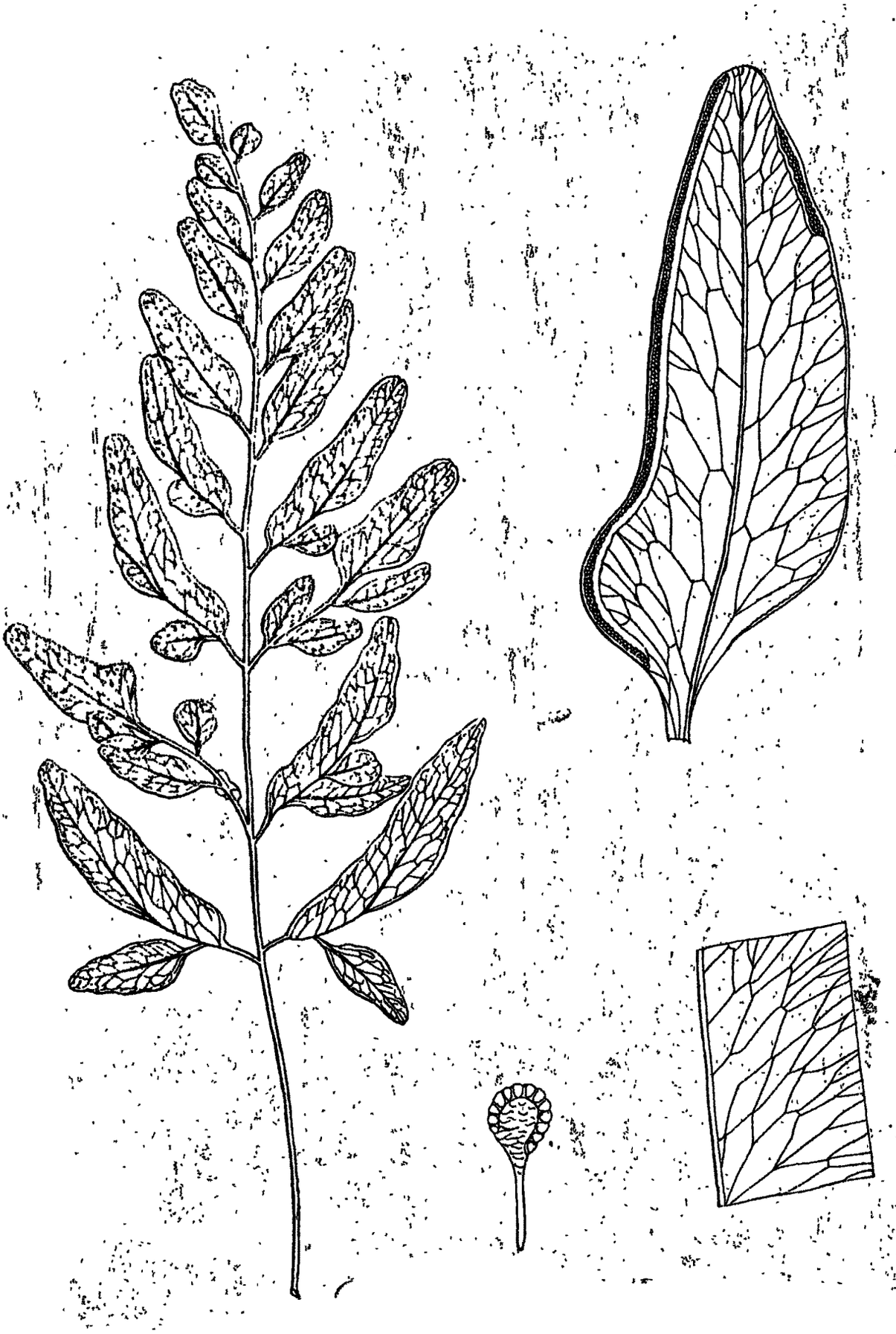
(= SCHIZOLOMA. Gaud.)

(Deriv.Gr.Schizo, I cut; loma, margin).

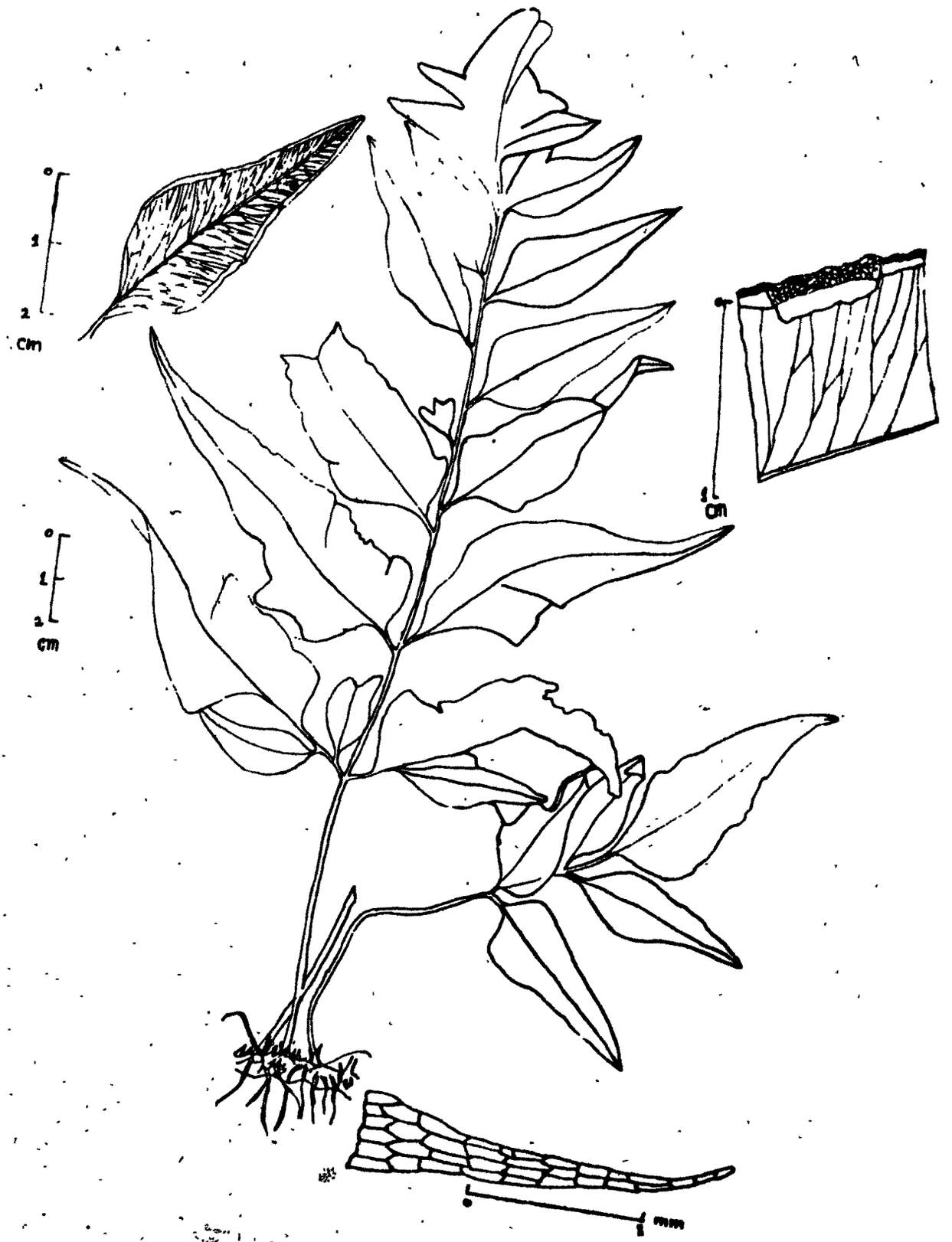
Veins more or less uniting Pinnae unequalsided or equal-sided.



TEXT FIG. 21 SCHIZOLEGNIA ENSIFOLIA. ALSTON.

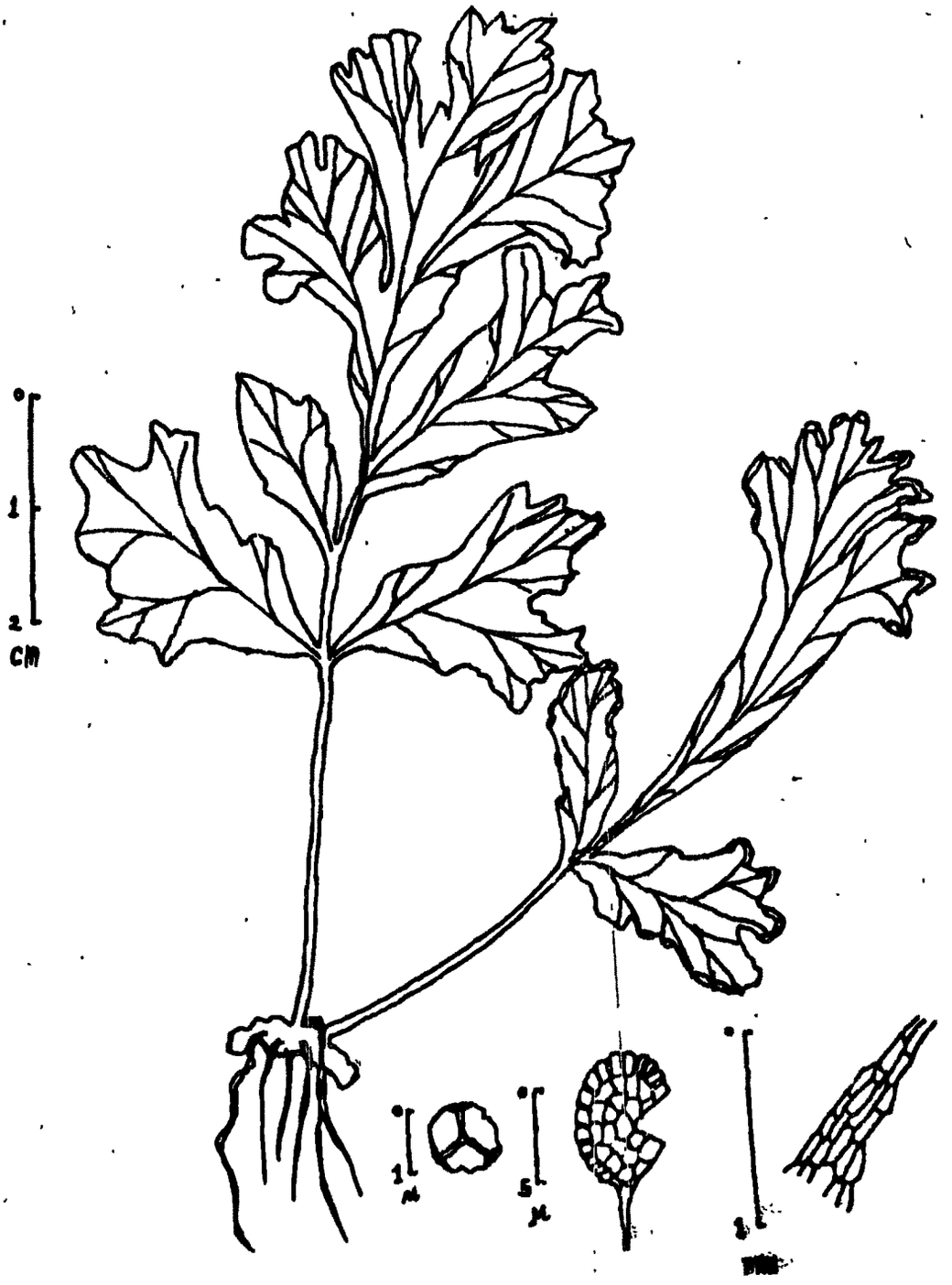


TEXT FIG. 22 SCHIZOLEGNIA HETEROPHYLLA. ALSTON.



TEXT FIG.24 SCHIZOLEGNIA SAVANTWADIENSIS.

BOLE, M. ALMEIDA.



TEXT FIG. 23 SCHIZOLEGNIA INDIA. BOLE, M. ALMEIDA.

KEY TO THE SPECIES :

1. Fronds simply pinnate --- 2.

2. Pinnae linear or lanceolate --- Schizoloma encifolia.
=Schzolegnia encifolia.

2. Pinnae triangular or club-shaped ---S. savantwadiensis.

1. Fronds bipinnate, pinnae lobed --- 3.

3. Veins anastomosing --- S. heterophylla.

3. Veins free --- S. indica

1. Schizolegnia encifolia. Alston (Text Fig.No.21)

DISTRIBUTION : Savantwadi, Kesri, Amboli, Castle-Rock, Radhanagari, N.Kanara, Panhala.

2. Schizolegnia heterophylla Alston (Text Fig.No.22)

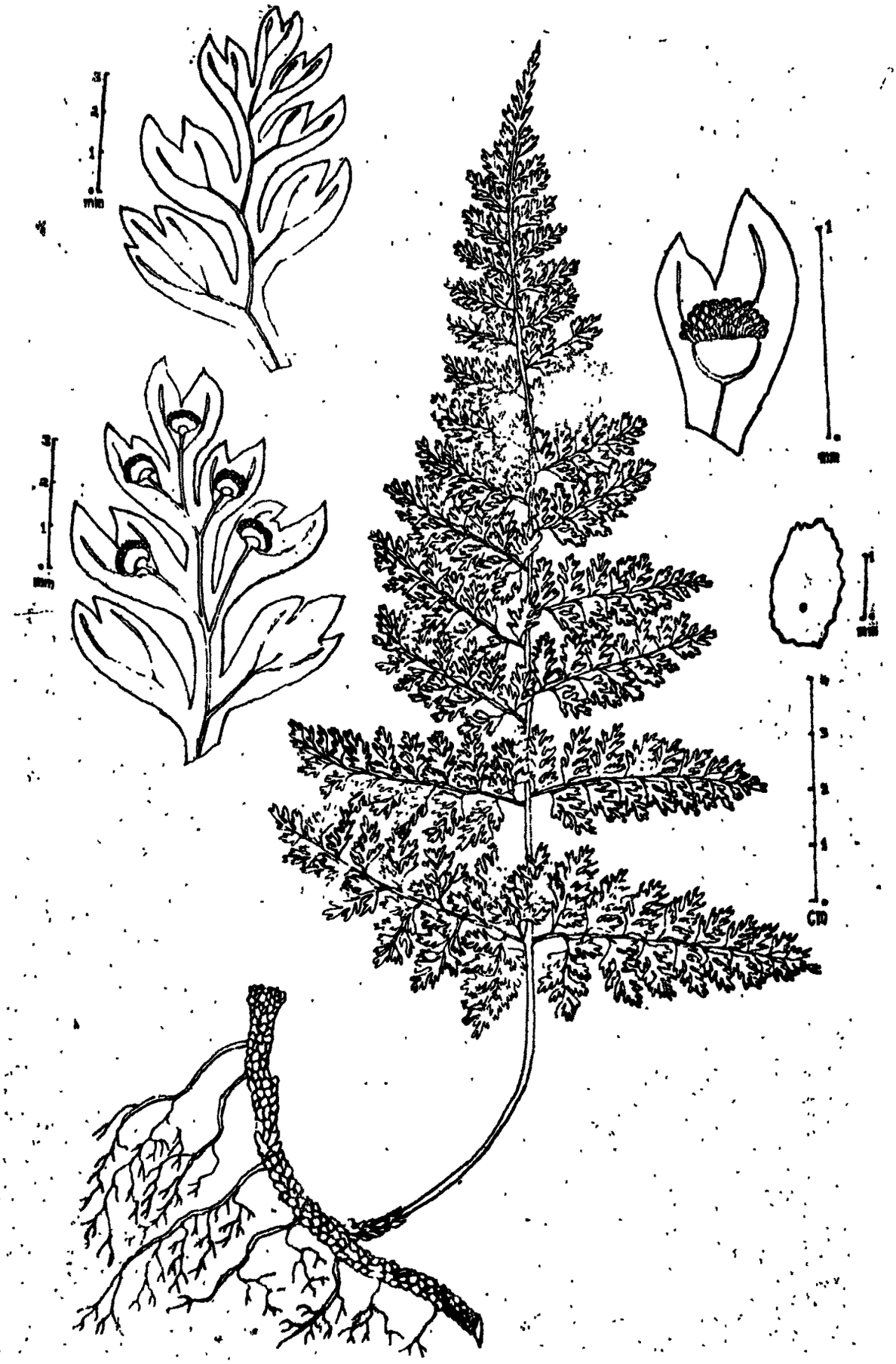
DISTRIBUTION : Savantwadi, Amboli, Castle-Rock, N.Kanara, Radhanagari.

3. Schizolegnia savantwadiensis Bole and Almeida. (Text Fig.No.24).

DISTRIBUTION : Savantwadi.

4. Schizolegnia indica Bole and Almeida. (Text Fig.No.23).

DISTRIBUTION : Castle-Rock, Savantwadi, Amboli, Vengurla.



TEXT FIG. 25 ARAISTEGIA PULCHARA. (DON.) COPEL.

KEY TO THE GENERA OF FAMILY DAVALLIACEAE :

1. Rhizome bearing scales and hairs; roots borne on all sides of old rhizome --- LEUCOSTEGIA.

1. Rhizome bearing scales only; roots usually on the lower surface of the rhizome only ---- 2.

2. Indusium attached at the sides as well as the base ---- DAVALLIA.

2. Indusium attached at the base only -- ARAIOSTEGIA.

18. ARAISTEGIA Copland.
(= LEUCOSTEGIA Presl.)

(Deriv.Gr.Leucos, white; Stegos, a cover)

Indusium small, narrow, thin fixed only by its broad base. Rhizome creeping, stipe articulated with the rhizome.

1. Araistegia pulchra (Don.) J.Sm. (Text Fig.No.25)
= Leucostegia pulchra J.Sm.

DISTRIBUTION : Khandala, Mahabaleshwar, Lonavala, Matheran.

KEY TO THE GENERA OF FAMILY OLEANDRACEAE :

1. Fronds simple, rhizome long-creeping, plants not stoloniferous; sori near midrib - OLEANDRA

1. Fronds pinnate; rhizome not long-creeping, plants stoloniferous, sori away from the mid rib - NEPHROLEPIS

19. NEPHROLEPIS Schott.

(Deriv.Gr.Nephros, Kidney, lepis, scales - in allusion to the indusium being Kidney shaped and scale-like).

Sori round, indusium kidney-shaped or roundish, veins forked, free, with club-shaped apices. Fronds simply pinnate, Pinnae articulated and furnished with white dots above.

KEY TO THE SPECIES OF NEPHROLEPIS

1. Pinnae dichotomously divided -- Nephrolepis biserrata Var. furcans.

1. Pinnae not dichotomously divided --- 2.

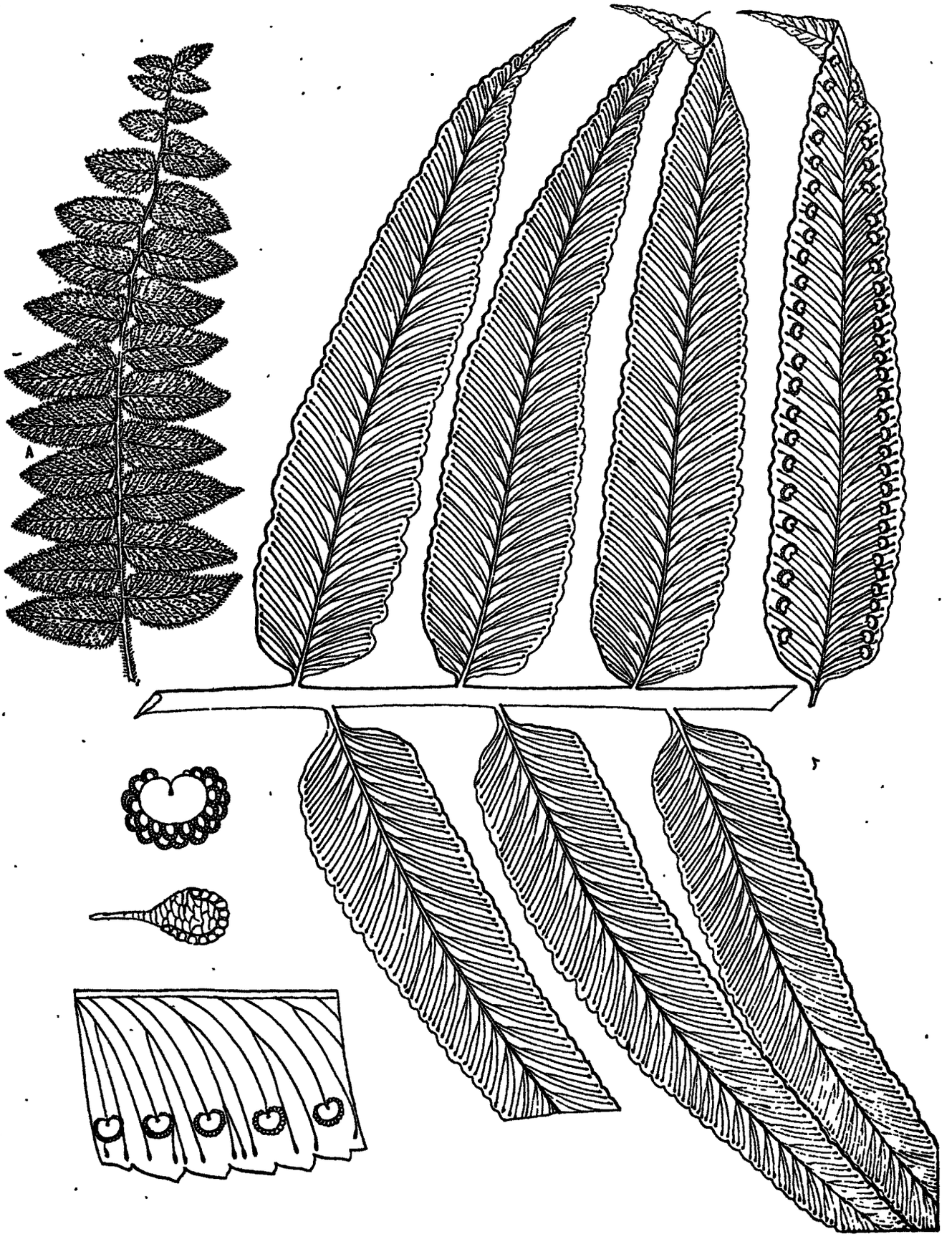
2. Fronds branching if not branching then pinnae orbicular. --- N.duffii.

2. Fronds unbranched; pinnae not orbicular --- 3.

3. Fronds more than 1.5 metre tall, base of pinna acute --- N.biserrata.

3. Fronds less than a metre tall, base of pinnae not acute ---- 4.

4. All pinnae less than 3 cm. long -- 5.



TEXT FIG. 26 NEPHROLEPIS ACUTA. LINN.

5. Pinnae membranaceous, margins deeply serrate --- N. delicatula.

5. Pinnae herbaceous, margins almost entire --- N. cordifolia.

4. At least few pinnae more than 10 cm long --- 6.

6. Pinnae irregularly lobed near the base, deeply serrate, more than half way to the rachis; sori on midrib - N. hirsutula.

6. Pinnae not lobed near the base, serrulate, sori intramarginal --- N. exaltata.

1. Nephrolepis delicatula. Dene.

DISTRIBUTION : Poona, Lonavala, Panchgani.

2. Nephrolepis exaltata var. Virians. Linn.

DISTRIBUTION : Amboli, Savantwadi, Mahabaleshwar, Radhanagari, Panhala, Castle-Rock, Poona, N.Kanara.

3. Nephrolepis exaltata. (Linn.)Schott.

DISTRIBUTION : Savantwadi, Amboli, N.Kanara, Poona, Panchgani, Panhala, Castle-Rock, Anmode, Phonda, Vengurla, Satara.

4. Nephrolepis acuta. Linn. (Text Fig.No.26).

DISTRIBUTION : Aronda, Savantwadi, Vengurla, Castle-Rock, N.Kanara.

KEY TO THE GENERA OF FAMILY HYMENOPHYLLACEAE :

1. Indusium more or less two-lipped. -- HYMENOPHYLLUM.

1. Indusium tubular or cylindric the mouth truncate -- TRICHOMANES.

20. TRICHOMANES. Linn.

(Deriv. Thrix, hair; manon, solf)

Sori always terminating a vein, more or less sunk in the frond; indusium tubular or slightly two-lipped; receptacle elongated, columner, often considerably protruding beyond the mouth of the indusium. Found on moist trunks of trees during the monsoon.

KEY TO THE SPECIES

1. Receptacle of the sori protruding beyond the mouth of the indusium - Trichomanes intramarginale.

1. Receptacle of the sori embedded in the indusium --

-- T. latermarginale. = Crepidomane latermarginale. L.

= Trichomanes latermarginale. Eaton.

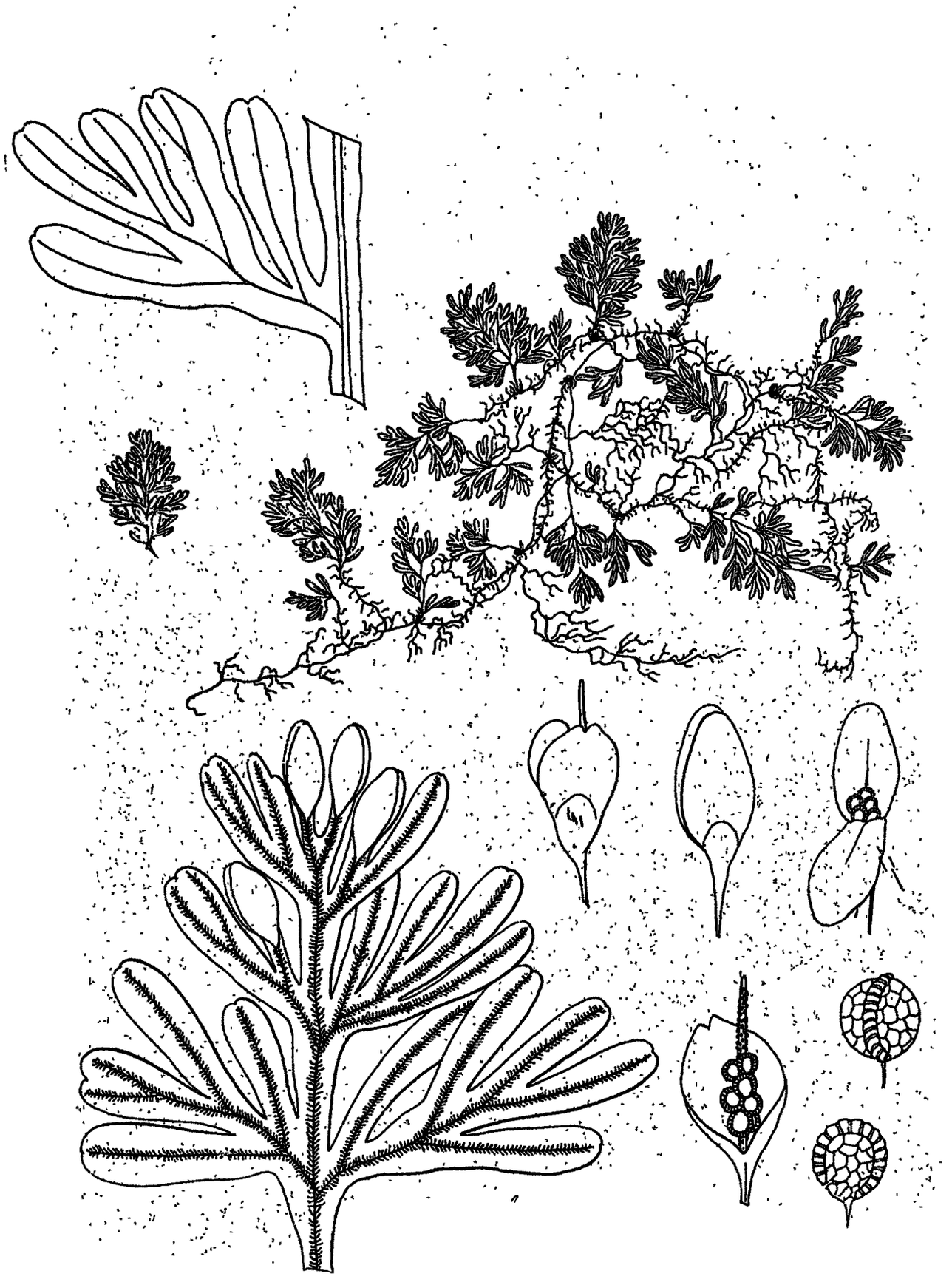
= Trichomane kurzii. Bedd.

= Crepidomanes latermarginale. Copel.

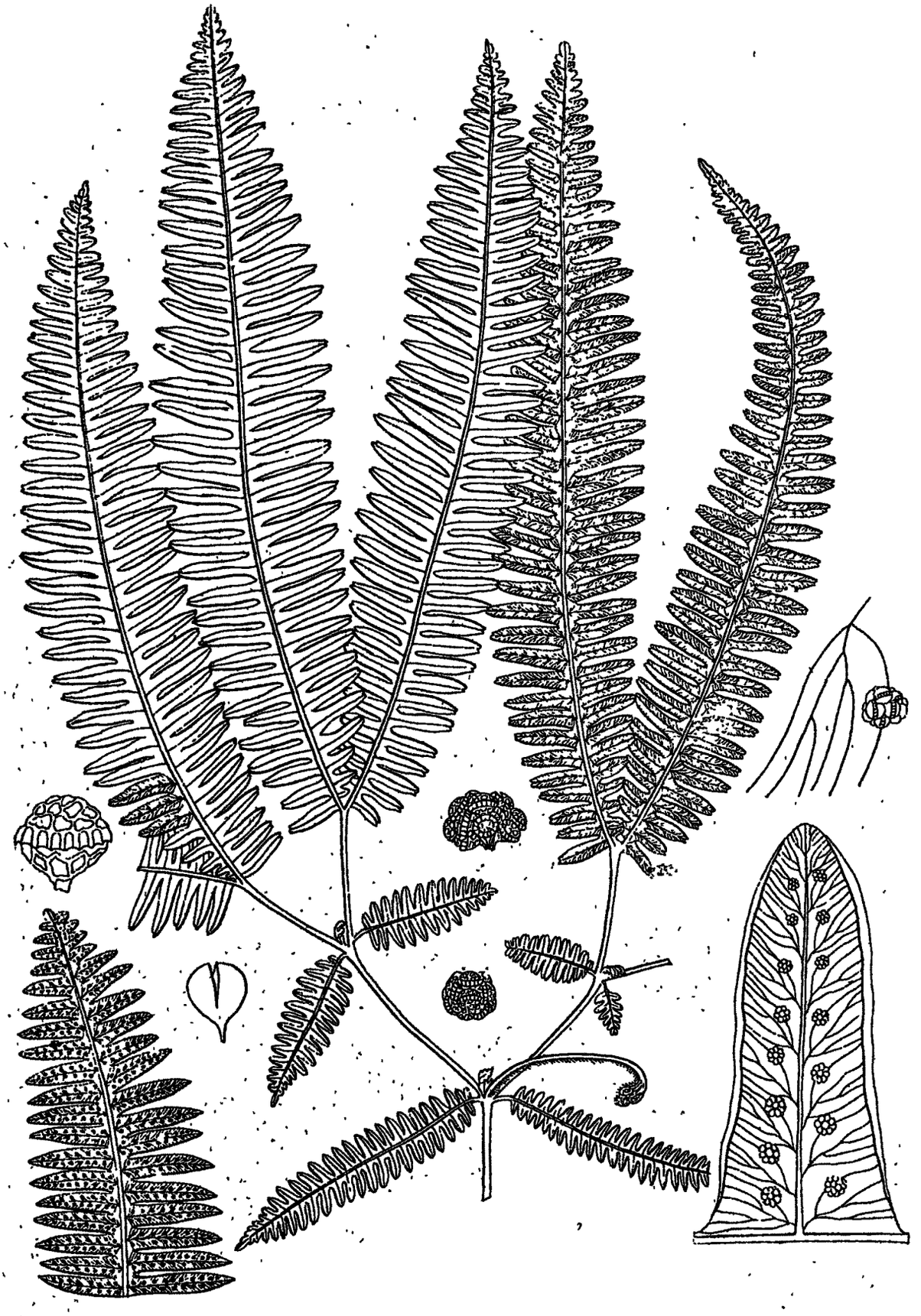
DISTRIBUTION : Vishalgad, N. Kanara, S. India.

21. HYMENOPHYLLUM. Smith. (Text Fig. No. 27)

(Deriv. Hymen-membrane, Phyllon-leaf-in allusion to the filmy texture).



TEXT FIG. 27 HYMENOPHYLLUM POLYANTHOS. SW.



TEXT FIG. 28 DICRANOPTERIS DICHOTOMA. WILLD.

Sori marginal, indusium more or less two valved, receptacle elongated, columner, protruding beyond the mouth of indusium or included within it.

1. Hymenophyllum polyanthos.Sw. (Text.Fig.No.27)
   = Mecodium polyanthos.(Sw.Copel.

DISTRIBUTION : Vishalgad, Western Ghats.

22. DICRANOPTERIS.Bernhard.
(= GLEICHENIA. R.Br.)
(Named after W.F.von Gleichen)

Caudex creeping, stipes forked, segments small, almost round or pectinate.

1. Dicranopteris.dichotoma.Thumb.(Text Fig.No.28)
   = G.dichotoma. Willd.
   = G.linearis.Burm.

DISTRIBUTION : Savantwadi, Anmode, Aronde, Goa, Mahabaleshwar, Castle-Rock, N.Kanara, S.India.

KEY TO THE GENERA OF FAMILY CYATHEACEAE :

23. CYATHEA. Smith.

(= ALSOPHILA. R.Br.)

(Deriv.Gr.Kyathos - a cup - in allusion to the indusium).

Caudex arborescent, indusium globose, ultimately rupturing at the apex so as to form a cup holding the sorus.

KEY TO THE SPECIES OF CYATHEA :

1. Sori indusiate, if exindusiate then hairy on the lower surface of pinna rachis axis very dark ---2.

2. Sori indusiate --- C.spinulosa.

2. Sori exindusiate --- C.latebrosa.

1. Sori evixdusiate --- 3.

3. Axes very dark, not hairly beneath ... C.gigantea.

3. Axes not very dark; hairy on the lower-surface .... C.spinulosa.

1. Cyathea spinulosa Wall.

DISTRIBUTION : N.Kanara, Castle-Rock.

24. ALSOPHILLA.R.Br.

(Deriv.Gr.Grove-loving)

Caudex arborescent; Sori round, naked.

(Distinguished from Cyathea by the absence of indusium)

1. Alsophilla glabra

= C. gigantea Holtt

= Cyathea glabra Bedd.

DISTRIBUTION : Anmode, South Kanara, Radhanagari, Castle-Rock.

2. Cyathea latebrosa. Copel.

= Alsophilla latebrosa. Hook.

DISTRIBUTION : N.Kanara, Gholana stream.

KEY TO THE GENERA OF FAMILY : THELYPTERIDACEAE

1. Veins free, or the lowest veins of adjascent groups just meeting at the sinus ... LASTREA.

1. Veins anastomosing .... 2.

2. Fronds proliferous, with many buds ...AMPELOPTERIS.

3. Sori elongated or confluent ... MENISCIUM.

4. Areoles in two strict rows ... CYCLOSORUS.

5. Areoles few, large, not regular ... ANISOCARPIUM.

25. LASTREA. Bory.

(After chev.de Lastre, a French nobleman)

Sori some what round on the back or on the apex of veinlets. Indusium kidney-shaped attached by the sinus. Veins all free. Fronds pinnate or compoundly 2-4 pinnate.

1. Fronds tripinnate ---2.

2. Stipe paleaceous with hard scars of palea at the base ..... L.ornata

2. Stipe without palea ... L.setigera.

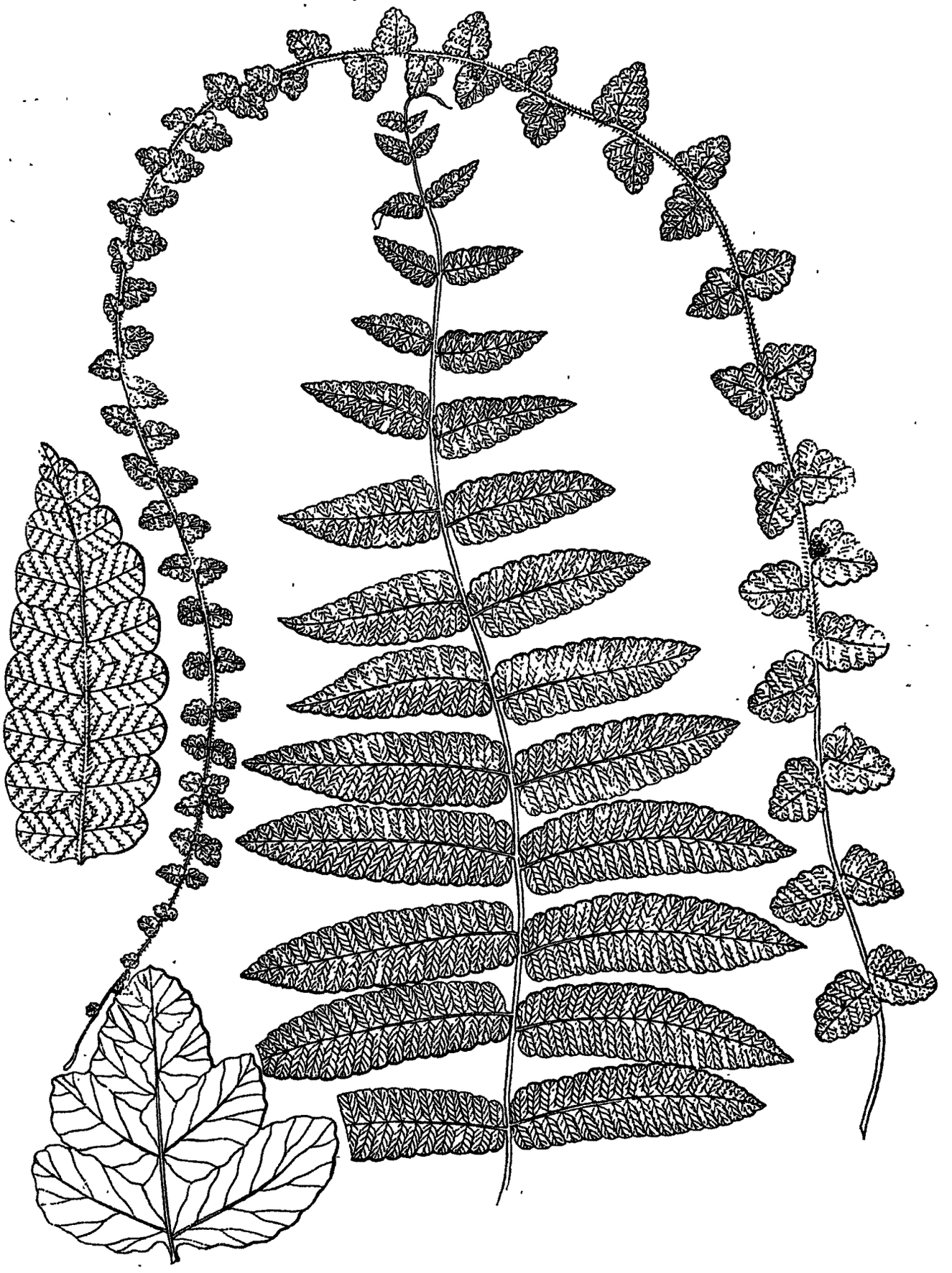
1. Fronds pinnate ... L.falciloba

1. Lastrea tenericaulis. Moore.

= L.flaccida.Bedd.

= L.setigera.Bl.

DISTRIBUTION : Panhala, N.Kanara, Ratnagiri, Poona gardens, S.India.



TEXT FIG. 29 AMPELOPTERIS PROLIFERA. PRESL.

2. Lastrea falciloba Bedd.

= Thelypteris ciliata Ching

= L.Calcarata var. ciliata Bedd.

DISTRIBUTION : Amba Ghat, Castle-Rock, N.Kanara, S.India.

3. Lastrea sparsa

DISTRIBUTION : Panhala, Mahabaleshwar.

4. Lastrea ornata Ching.

= Phegopteris ornata Bedd.

DISTRIBUTION : Castle-Rock, N.Kanara, S.India.

26. AMPELOPTERIS Kunze

(= GONIOPTERIS. Presl.)

(Deriv.Gr.Gonia, angle; Pteris,fern, the Veinlets meeting and forming angles.)

1. Ampelopteris elegans. Kunze (Text Fig.No.29).

= A.prolifera. Retz.

= Hemionitis prolifera. Retz.

= Polypodium proliferum.Roxb.

= Goniopteris prolifera.Presl.

Rhizome stout, creeping stipes tufted, very variable in length. Fronds pinnate of two kinds; some of them very long, whip-like and prostrate, with the pinnae much reduced and almost triangular or rounded, such frond often root at the apex and produce buds in the axils giving rise to new plants. These fronds are always sterile. Others are not so long and have longer bluntly lobed or crenated pinnae. Rachis and lower

surface often slightly hairy. Texture herbaceous to almost leathery. Vein-lets fine, 6-10 on each side anastomosing at an angle with an excurrent veinlet connecting the angles. Sori medial, fine, oblong or even confluent in age (meniscoid).

DISTRIBUTION : Savantwadi, N.Kanara, Anmode, Dandeli.

27. CYCLOSORUS Link.

(= NEPHRODIUM Schott)

(Deriv.Gr.Nephros - Kidney - in allusion to the shape of the indusium).

Sori round; indusium kidney-shaped (often like that of Athyrium or Asplenium in N.subpectinatum) or sometimes absent. Veins pinnate, one or more of the lower veinlets anastomosing at an angle with corresponding ones of the next group; producing from their junction an ex-current veinlet which is either free or jointed in the angle of the next superior pair. Fonds pinnate, pinnae as a rule pinnatifid.

KEY TO THE SPECIES :

1. Sori closely arranged restricted to the pinnae-lobes only---2.

   2. Pinnae membranaceous, pubescent on the ventral surface, ± 15 cm long .... C.extensus.

   2. Pinnae coriaceous, glabrous on the ventral surface, more than 20 cm long spreading ... C.pteroides

   2. Pinnae coriaceous, tomentose on the ventral surface, ± 10 cm long ascending ... C.gongyloides

1. Sori not closely arranged, extending upto the midrib of the pinnae ..... 3.

   3. Fronds becoming dark-brown or black on drying ...4.

      4. Pinnae less than 2.5 cm across .... C.crinipes

      4. Pinnae ± 5 cm across ... C.megaphyllus

3. Fronds not turning black on drying, becoming straw-coloured .....5.

   5. The basal pinnae with a pinnate lobe near the base of the acroscopic side ..... 6.

      6. One pair of veinlets anastomoising... C.subpubescens.

      6. 1-1/2 - 2-1/2 pairs of the veinlets anastomosing ... . C.sumatranus.

   5. The basal pinnae without any pinnate lobe .....7.

      7. Fronds auriculate below the normal pinnae...C.truncatus.

      7. Fronds not auriculate below the normal pinnae ... ... C.parasiticus.

1. Cyclosorus parasiticus (L.)Farewell

   = C.parasitica Farewell.

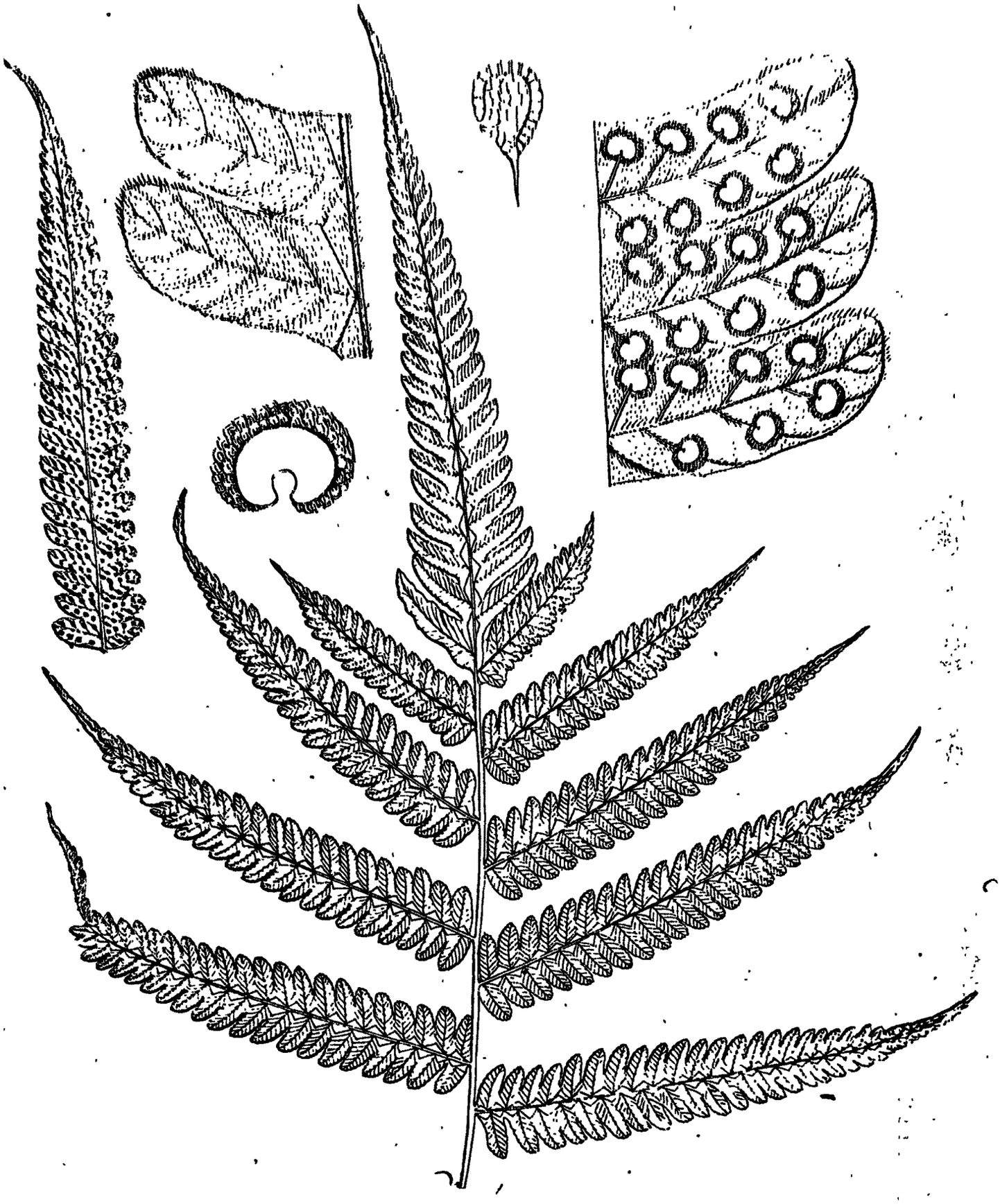
   = Nephrodium molle R.Br.

DISTRIBUTION : Savantwadi, Amboli Panhala, Radhanagari, Vishalgad, Amba Ghat, Anmode, Castle-Rock, Khandala, Mahabaleshwar, Matheran, N.Kanara.

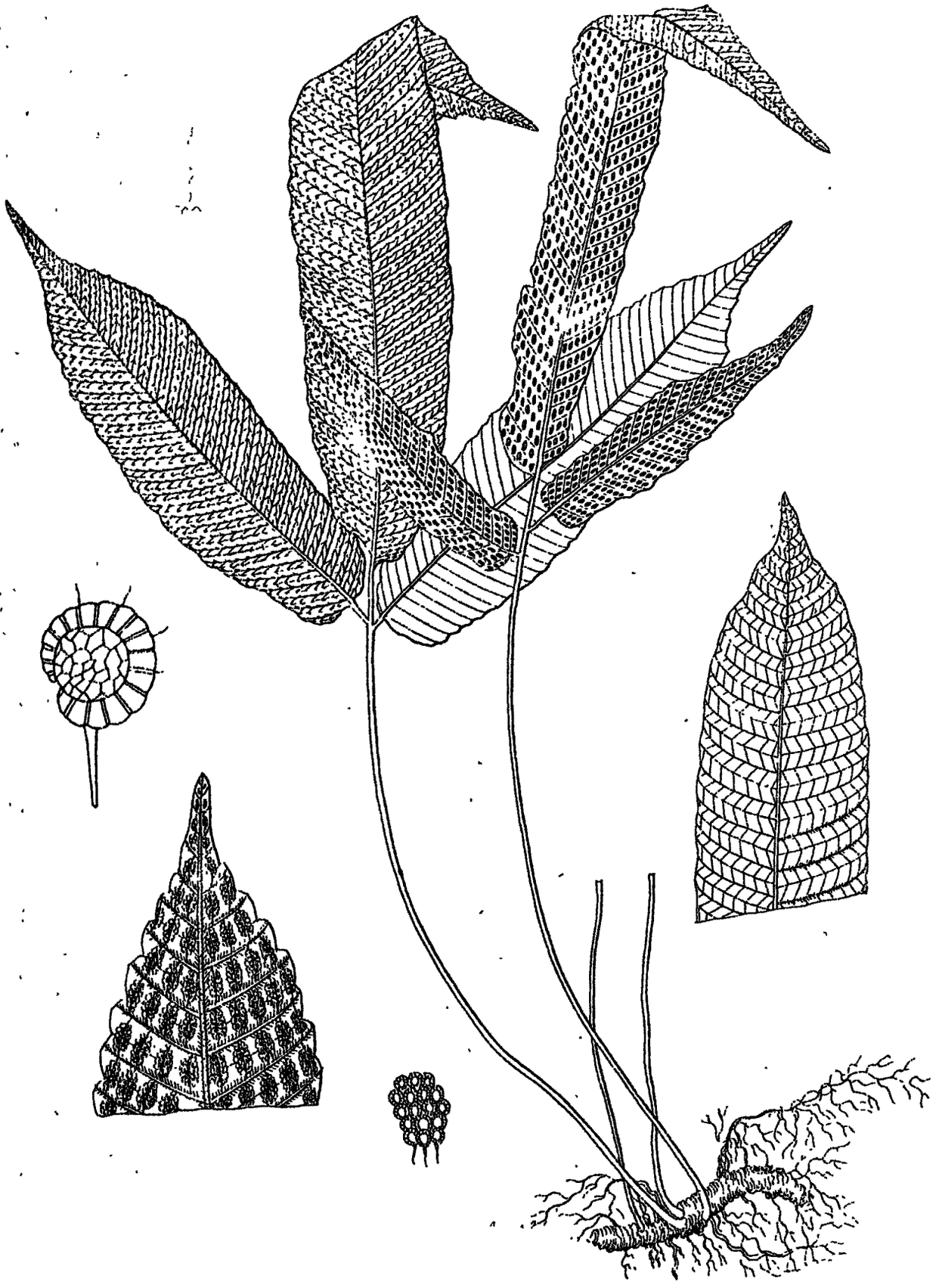
2. Cyclosorus truncatus Poir

   = N.truncatus Presl

DISTRIBUTION : Amboli, N.Kanara, Vengurla, Radhanagari, S.India.



TEXT FIG. 31 NEPHRODIUM MOLLE. DESV.
(CYCLOSORUS DENTATUS) LINK.



TEXT FIG. 30 MENISCUM TRIPHYLLUM. SW.

3. Nephrodium molle var. aboinense Presl. (Text Fig.No.31)

DISTRIBUTION : Amboli, Vishalgad, Savantwadi.

4. Cyclosorus pteroides. Retz.

DISTRIBUTION : Castle-Rock, N.Kanara.

5. Cyclosorus dimorpha

DISTRIBUTION : Castle-Rock.

6. Cyclosorus gongyloides Link.

= N. unitum non R.Br.

DISTRIBUTION : Anmode, N.Kanara, Goa, S.India.

7. Cyclosorus sumatranus. Ching.

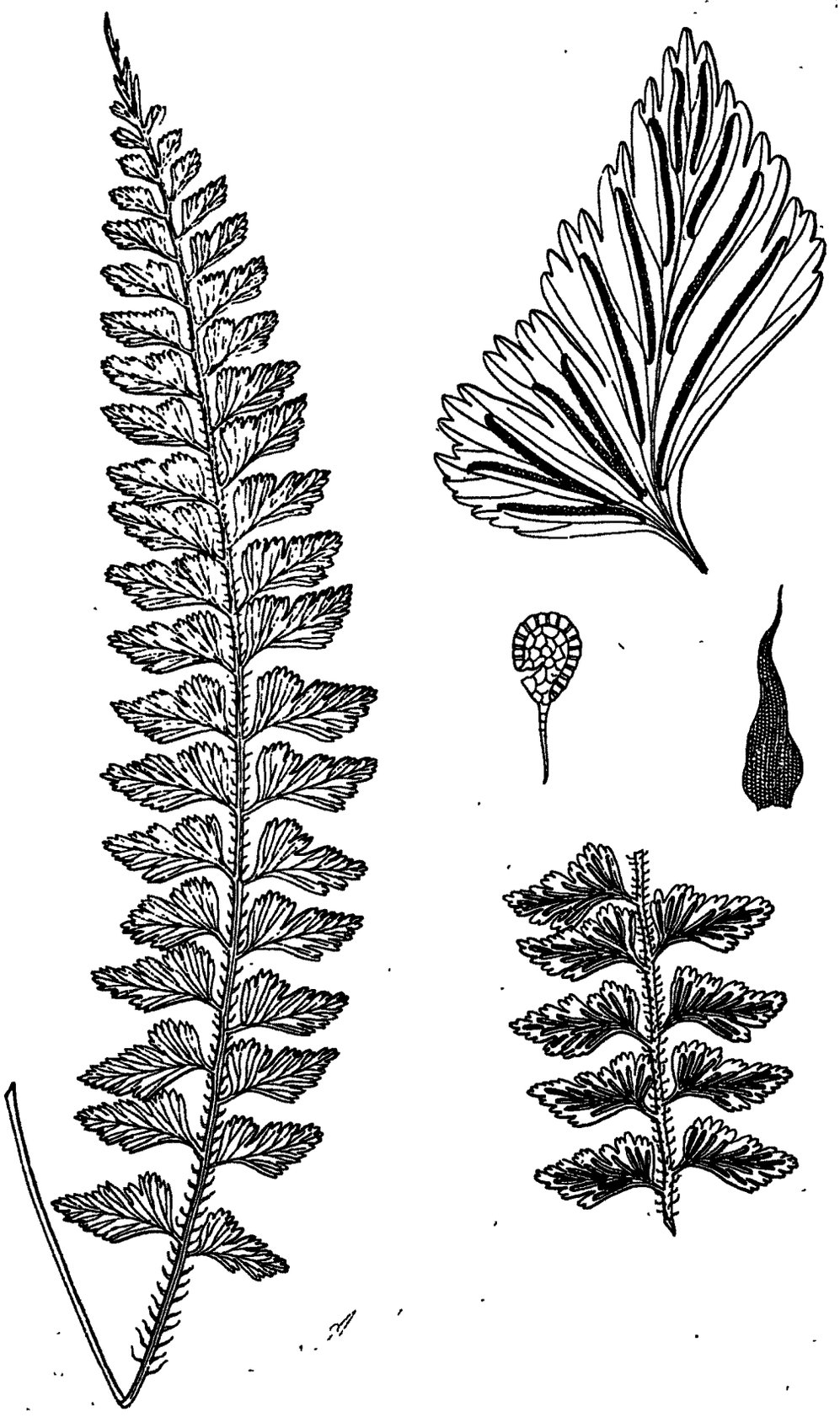
= N. molle var. major. Bedd.

DISTRIBUTION : Savantwadi, Amboli, Anmode, N.Kanara, Radhanagari, Phonda, Castle-Rock.

28. MENISCIUM Schreb

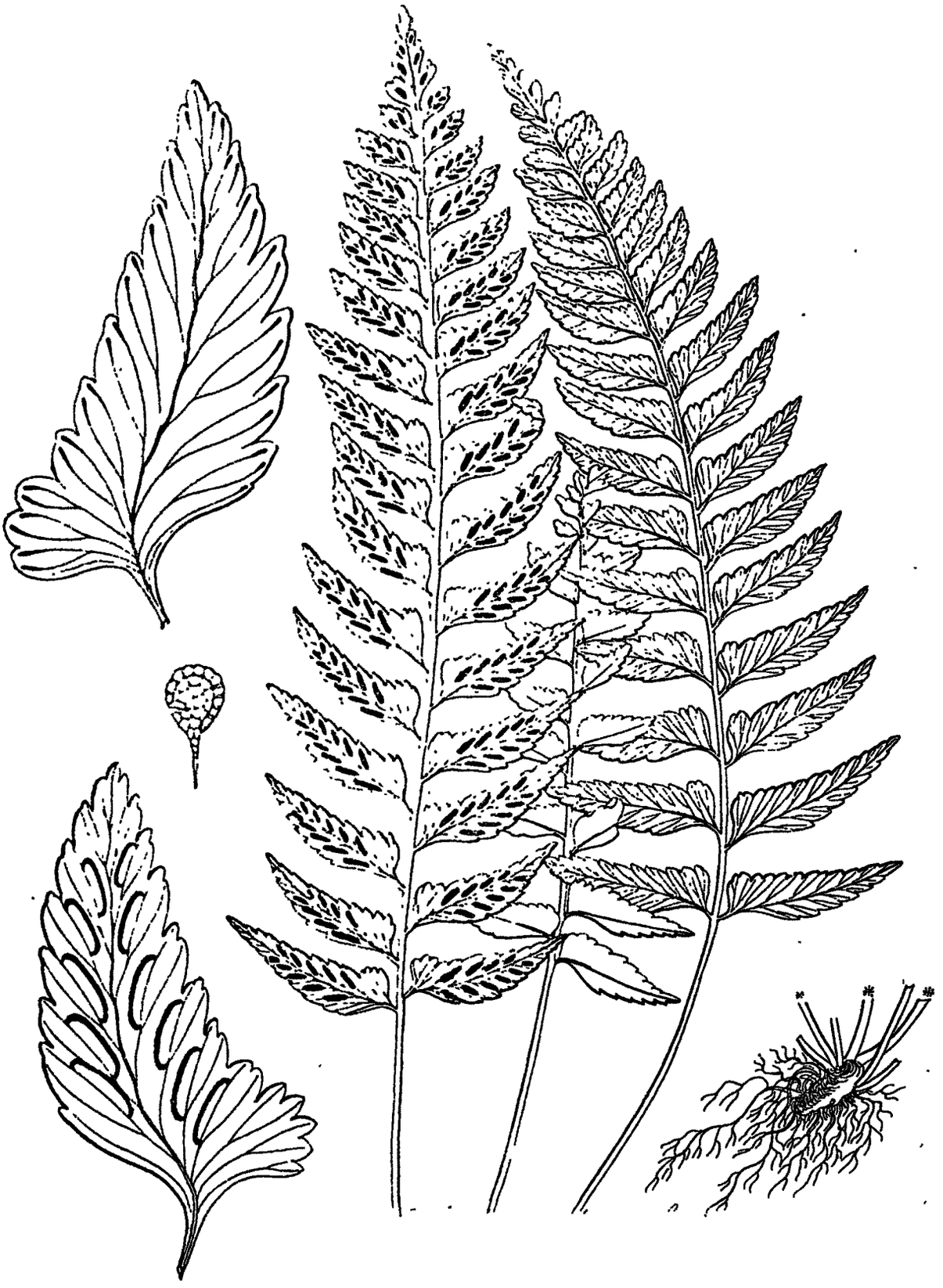
1. Meniscium triphyllum Sw. Rhizome firm, wide-creeping, with chesnut lanceolate-linear scales at the extremities; stipes sldender, slightly pubescent, of the fertile frond 1 foot or more, of the sterile often shorter fronds. 3-foliate or with 5 or more pinnae, the terminal one much the largest, all oblong-lanceolate with a broad base and acute apex, about 4-6 inches long by 3/4 - 1-1/2 inch broad, stalked or subsessile, margin entire or subrepand, the fertile ones often narrower, texture herbaceous, slightly pubscent beneath, areoles 6-9 between midrib and margin. (Text Fig. No.30)

DISTRIBUTION : Silent Valley (Kerala).



TEXT FIG. NO. 33. ASPLELIUM PANICAULE. WALL.

TEXT FIG. 35 ASPLENIUM LACINIATUM. DON.



TEXT FIG. 34 ASPLENIUM TRAPEZIFORME. WALL.

5. Rhizome erect; stipes in a close caudex, pinnae very shortly petiolate ...

... A. trapeziforme

1. Aspenium panicaule Wall. (Text Fig.No.33)

DISTRIBUTION : N.Kanara.

2. Asplenium laciniatum Don Prodr. (Text Fig.No.35).

DISTRIBUTION : Panhala, Panchgani, Mahabaleshwar, Radhanagari, N.Kanara, Lonavala.

3. Asplenium cheilosorum Kze.

DISTRIBUTION : Silent valley (Kerala)

4. Asplenium trapeziforme.Wall. (Text Fig.No.34)

= A. lunulatum. var. trapeziforme

DISTRIBUTION : Purandar, Panchgani, Silent Valley (Kerala) N.Kanara, Mahabaleshwar, Castle-Rock.

5. Asplenium nidus var. Phyllitidis J.Sm.

= Thamnopteris phyllitidis Presl.

DISTRIBUTION : Poona-Katraj Ghat.

6. Asplenium unilaterale Lam.

DISTRIBUTION : Amboli, N.Kanara, Anmode.

KEY TO THE GENERA OF FAMILY ATHYRIACEAE :

1. Sori slightly covered at the distal end, opening from the sides along the entire length ...2.

   2. Sori only one on the acroscopic side of the vein annuals ... ATHYRIUM

   2. Sori on both sides of the vein, perennials... ... DIPLAZIUM

1. Sori not curved at the distal end opening from the distal end .... DIPLAZIOPSIS

30. ATHYRIUM Roth.

Veins free, sori more or less curved, sometimes horse-shoe-shaped, rarely quite uniform as in Lastrea.

KEY TO THE SPECIES OF ATHYRIUM :

1. Fronds simply pinnate, or sometimes lobed with much larger acroscopic lobe to each pinna, pinnae sessile... .... A. falcatum.

1. Fronds bipinnate or tripinnate; no large lobe to the acroscopic side of the pinnae, at least lower pinnate petiolate .... 2.

   2. Fronds upto 30 cm tall ... 3.

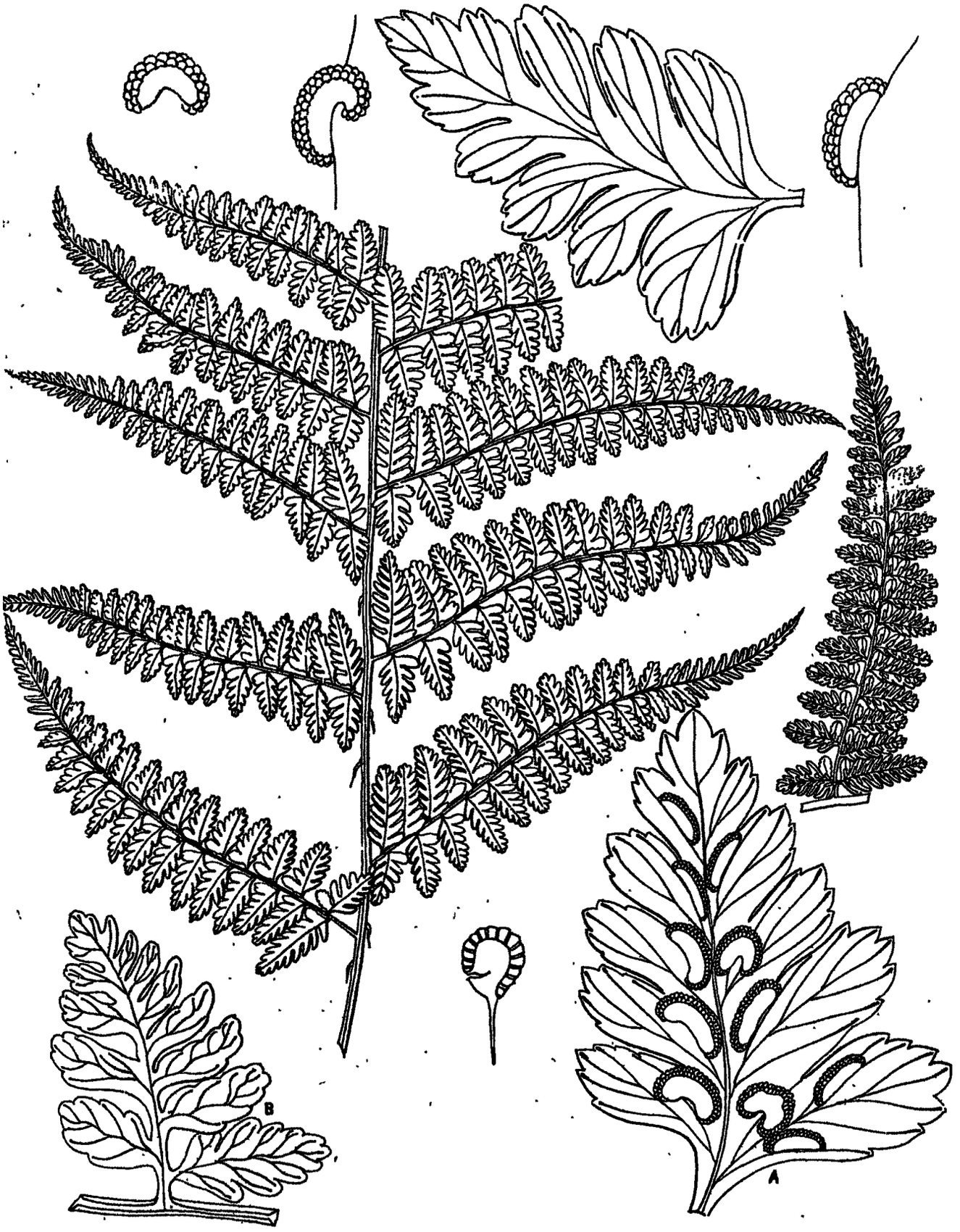
      3. Sori usually kidney-shaped ...A. anisopteris.

      3. Sori ovate, running along the veins... ... A. hohenackerianum.

   2. Fronds above 40 cm tall ....4.

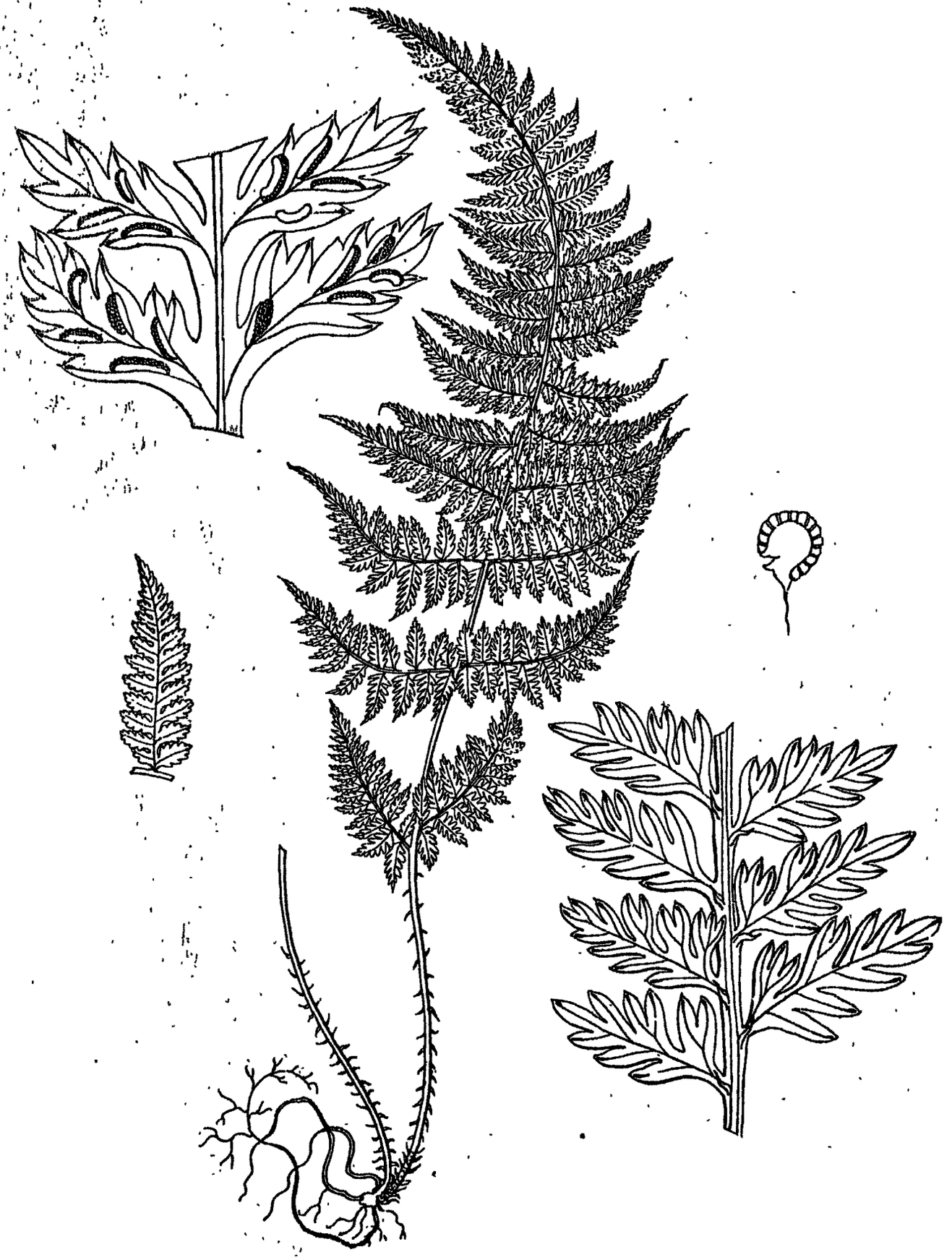
      4. Fronds tri-pinnate ... A. spinulosum.

TEXT FIG. 37 ATHYRIUM HOHENACKERIUM. KUNZE.



TEXT FIG. 36 ATHYRIUM PECTINATUM. WALLICH.

TEXT FIG. 38 ATHYRIUM FALCATUM. BEDD.



TEXT FIG. 39 ATHYRIUM FILIX-FOEMINA. BERNH.

4. Fronds bipinnate ... 5.

5. Lobes ovate, margins and apex serrate ...

... A.filix-foemina. var. flabellata.

5. Lobes deltoid, margins and apex fimbricate...

... A.filix-foemina var. pectinata.

5. Lobes. linear-lanceolate, margins and apex serrate... A.filix-foemina var. angustatum.

1. Athyrium hohenackeriaum Bedd. (Text Fig.No.37)

= A.filix-foemina var. pectinata (Text Fig.No.36)

DISTRIBUTION : Amboli, Savantwadi, Vengurla, Panhala, Vishalgad, Amba Ghat, Mahabaleshwar, Radhanagari, Lonavala, Poona, N.Kanara, Panchgani.

2. Athyrium falcatum Bedd. (Text Fig.No.38)

= Asplenium drepanophyllum. Baker.

DISTRIBUTION : Purandar, Lonavala, Khandala, Mahabaleshwar, Matheran, S.India.

3. Athyrium hohenackerianum var. angustatum Bedd.

DISTRIBUTION : Savantwadi, Amboli.

4. Athyrium filix-foemina (L.)Roth. (Text Fig.No.39).

DISTRIBUTION : Mahabaleshwar, Panchgani.

31. DIPLAZIUM Sw.

(Deriv.Diplazo-I double- in allusion to the double indusia).

Veins free, some of the sori double, that is, on each side of the vein, other single as in Asplenium.

KEY TO THE SPECIES OF DIPLAZIUM :

1. Fronds bipinnate ....2.

2. Basal pinnae-lobes 3-6 mm broad, sori crowded on the pinnules +_ mm long ....3.

3. Pinnae-lobes deeply cut more than half the distance to the midrib, basal lobe not irregularly inlarged ....4.

4. Veins of the lobes not biforked...

... Diplazium asperum

4. Few veins of the lobes biforked...

D.japonicum.

3. Pinnae-lobes not deeply cut at the most reaching half the distance to the midrib, basal to be irregularly inlarged ....

... B.esculentum.

2. Basal pinnae lobes more than 8 mm broad, sori quite distant on the fonds ± 8 mm long ...

... D.dilatalum.

1. Fronds simply pinnate.... D.sylvaticum

1. Diplazium latifolium Moore.

= D.maximum Don.Chr.

DISTRIBUTION : N.Kanara.

2. Diplazium esculentum Sw.

= Anisogonium esculentum Copel.

DISTRIBUTION : Savantwadi, Vengurla, Amboli, Panhala, Mahabaleshwar, Kolhapur, Ramling, N.Kanara, Castle-Rock, Phonda, Bombay, S.India, Gaganbawada.

3. Diplazium schkuhril Thwaites.

DISTRIBUTION : Silent Valley (Kerala).

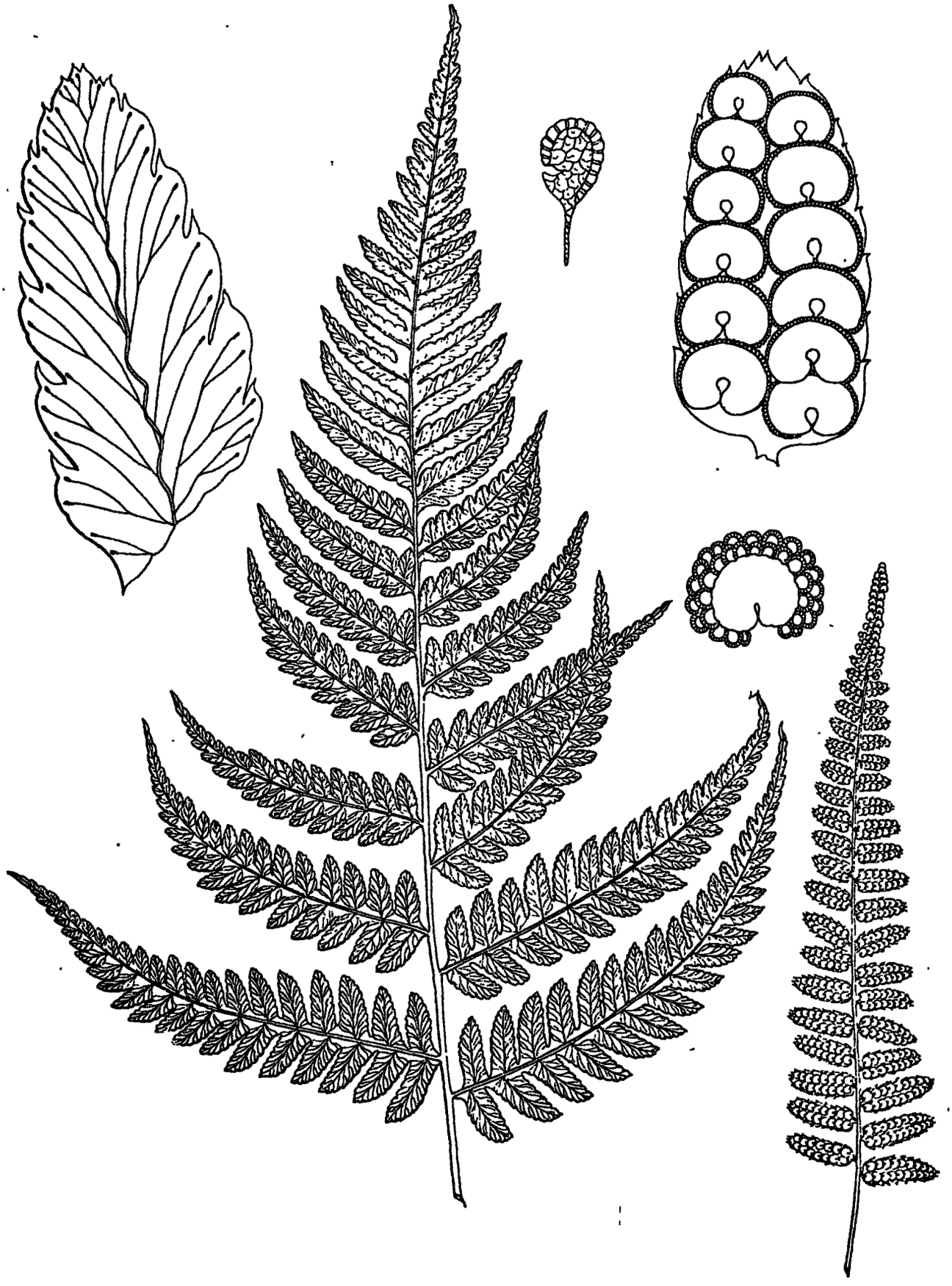
4. Diplazium japonicum Bedd.

DISTRIBUTION : Silent valley (Kerala).

KEY TO THE GENERA OF FAMILY ASPIDIACEAE

1. Veins free .... 2.
   2. Indusium stalked .... PERANEMA
   2. Indusium not stalked .... 3.
      3. Every sinus is occupied by tooth...PTERIDRYS.
      3. No tooth in the sinus ....4.
         4. Indusium hairy, whole plant covered with silky unicellular hairs.... HYPODEMATIUM.
         4. Indusium glabrous, plants not covered with unicellular hairs ... 5.
            5. Ultimate pinnules shortly petiolate .... POLYSTICHUM.
            5. Ultimate pinnules sessile or with decurrent rachis... 6.
               6. Incision of the pinnules reaching upto the rachis at least in the lower pinnules ... DRYOPTERIS.
               6. Incision of the pinnules never reaches upto the rachis... CTENITIS.

1. Veins anastomising .... 7.
   7. Areoles large, uniform, with 2-3 unforked included veinlets... PHANEROPHEBIA
   7. Areoles of irregular shape, with single included vein-let, sometimes biforked...8.
      8. Areoles restricted to the midrib and lateral vein only ... PLEOCNEMIA.



TEXT FIG. 32 LASTREA COCHLEATA. MOORE.

8. Areoles extending more or less upto the margins of the pinnae ....9.

9. Fronds dimorphic ... QUERCIFILIX.

9. Fronds not dimorphic ... TECTARIA.

32. DRYOPTERIS. Adanson.

Fronds truncate at the base, generally dimorphic, pinnate or sub-pinnate in the sterile, bipinnate in the fertile, involucres very large and completely covering the under surface of the contracted fertile pinnules, but the broader fronds are sometimes partially or even wholly in fructification; rachis glabrous or sometimes scaly.

1. Dryopteris cochleta. C.Chr. (Text Fig.No.32)
= Lastrea filix-mas. Linn.
var. Cochleta. Don.

DISTRIBUTION : Mahabaleshwar, Castle-Rock, N.Kanara, Silent Valley.

USES : One of the oldest anthelmintic drugs, commonly known as Male Fern, and used since ancient times for expelling tape-worm from intestines. According to steinmetz its application may cause paralysis of the muscles and nerves and even blindness. This may be due to the presence of the enzyme thiaminase, which destroys, thiamin (Pohl,1955).

33. HYPODEMATIUM. Kunze.

1. Hypodematium crenatum Kunze
   = Nephrodium crenatum Clarke.
   = Lastrea crenata (Fork) Bedd.

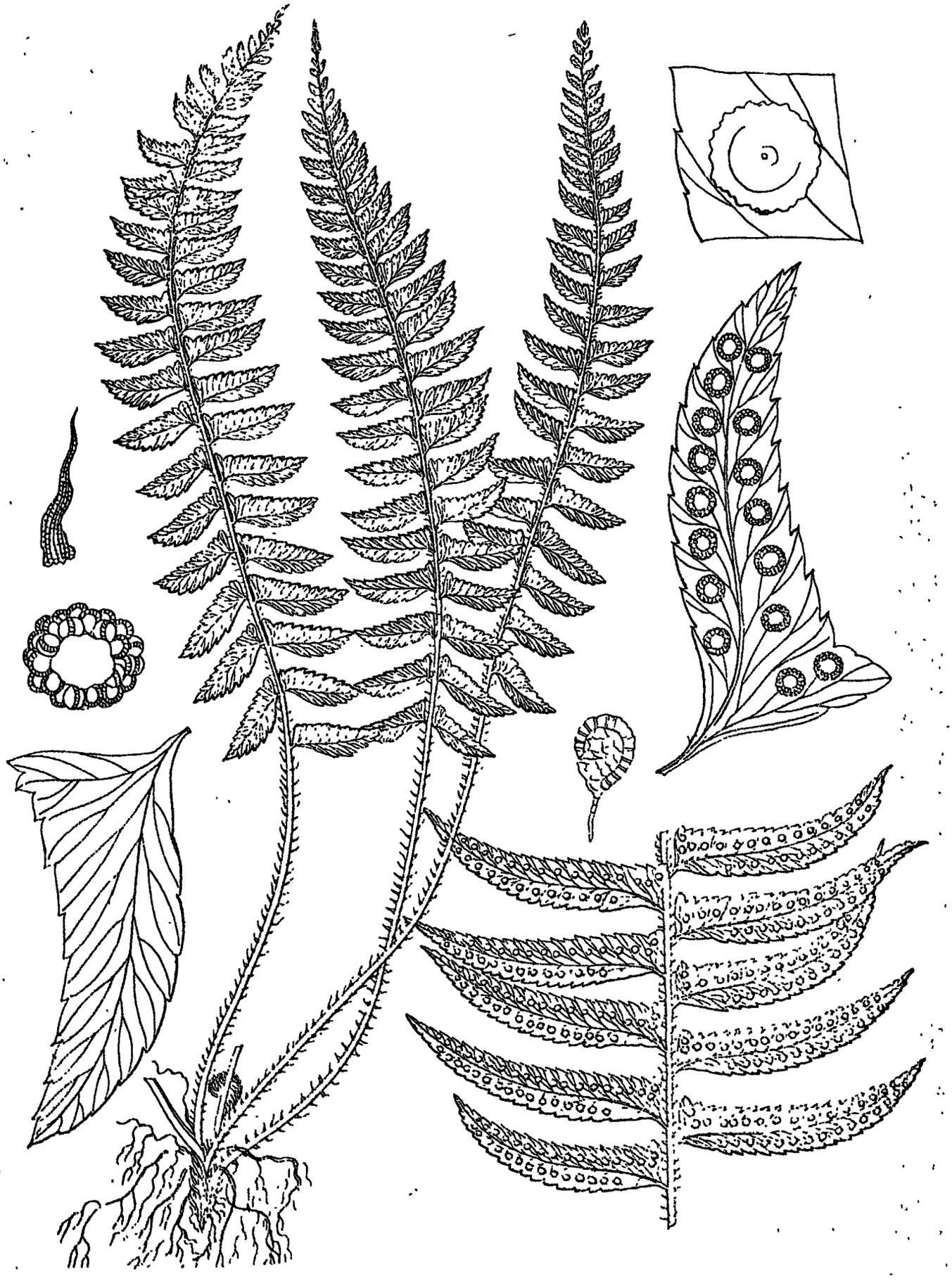
Rhizome short-creeping, thick, fleshy, densely covered with scales, with few fronds arising from the dorsal surface, linear-acuminate, ± 2.5 cm long and ± 2 mm broad, membranaceous, golden-yellow to dark brown in colour, massive and covering the entire rhizome completely. Stipes 10-15 cm long, pubscent, slightly triangular. Fronds ± 30 cm long and ± 25 cm broad, quadripinnatifid to quadripinnate, more or less triangular in shape, the lowest pair being larger and gradually becoming smaller towards the apex. Largest pinnules ± 1.5 cm long and ± 8 mm broad, lobed deeply or upto the half the distance to the midrib, lobes usually deltoid, covered completely with brown, rusty, tomentose, unicellular hairs. Veins not very prominent, giving out biforked veins bearing sori in the centre. Sori indusiate thick, kidney-shaped, 4-6 on either side of the mid rib, indusium densely hairy, raised above the surface of the lamina, opening from outsides towards the midrib, attached to the lamina near the curved depression.

DISTRIBUTION : Panhala, Ratnagiri, Savantwadi, Panchgani, Amboli, Purandar, Mahabaleshwar, Rádhanagari, Phonda.

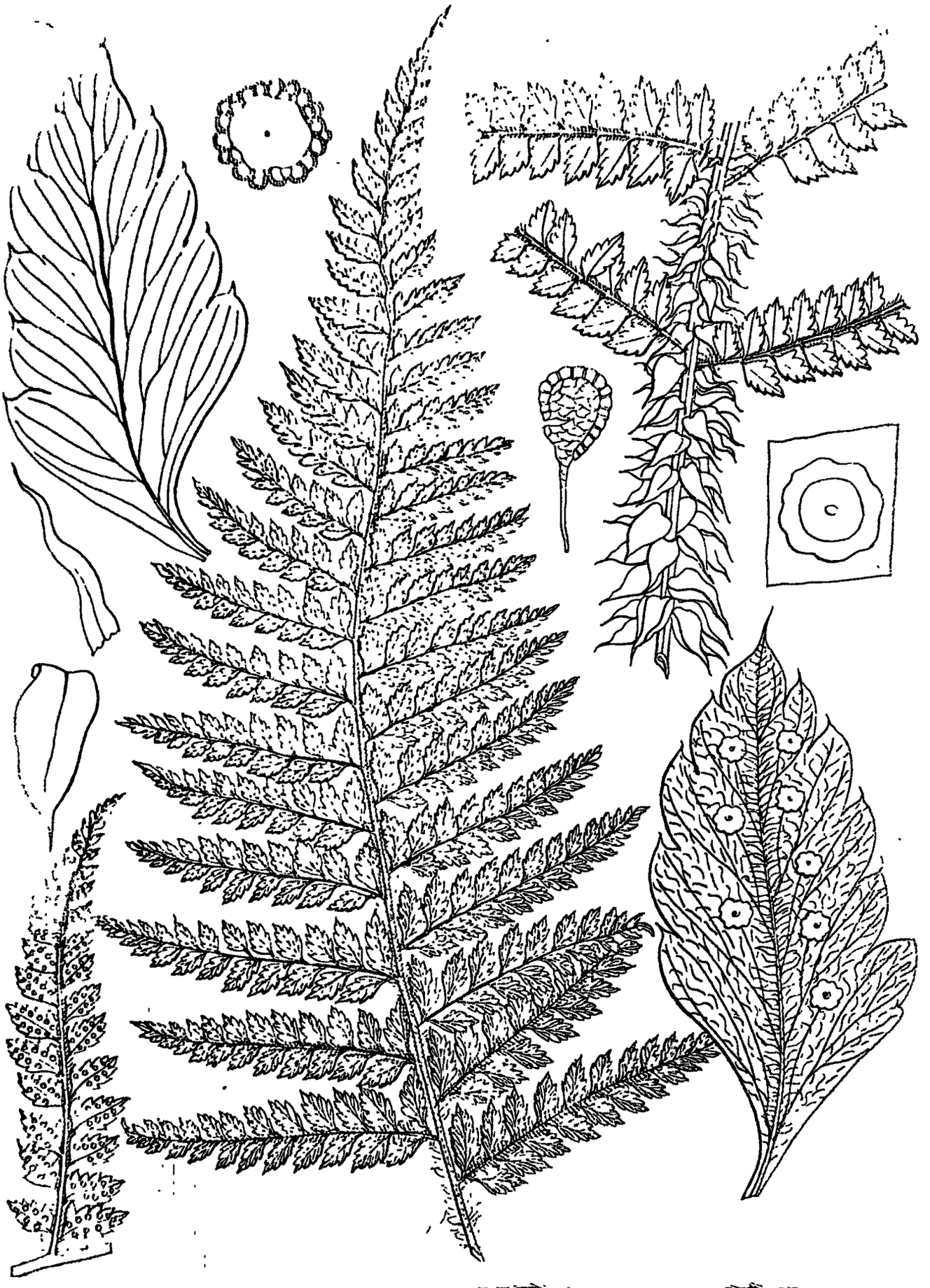
34. POLYSTICHUM. Roth.

(Deriv. Gr. Poly-many; stichos-order).

Sori subglobose, dorsal or terminal on the veinlets;



TEXT FIG NO. 40. POLYSTINUM AURICULATUM. ROTH.



TEXT FIG NO. 41. POLYSTICHNUM ACULEATUM. ROTH.

indusium orbicular, fixed by the centre, veins all free, texture generally coriaceous and teeth tenerally awned.

KEY TO THE SPECIES :

1. Fronds simply pinnate, margins spinulose-serrate... ... Polystichum auriculatum (Text Fig.No.40).

1. Fronds bipinnate, margins with awned teeth... ... P.aculeatum.

1. Polystichum aculeatum Roth. (Text Fig.No.41).
= Polypodium aculeatum. Linn.

DISTRIBUTION : Silent Valley (Kerala)

2. Polystichum acanthophyllum

DISTRIBUTION : Silent valley (Kerala).

35. TECTARIA Cavanilles.
(= ASPIDIUM.Schott.)

(Deriv.Gr.Aspidos-shield-in allusion to the shape of the indusium).

Indusium orbicular or reniform or sometimes irregular and abnormal, being linear and curved, or sometimes absent, veins compoundly anastomosing with generally free veinlets in the areoles, receptacles compital or often at the apex of the free veinlets, fronds very various, from simple to tripinnatifid; often membranaeeous and flaccid.

1. Bolbitis presliana (Fee) Ching.

= Gymnopteris presliana Bedd.

= Pacilopteris presliana Bedd.

DISTRIBUTION : Doodsagar, N.Kanara, Amboli, Anmode, Savantwadi, Radhanagari, Castle-Rock, S.India.

2. Bolbitis subcrenata Ching.

DISTRIBUTION : Rajapur, Khandala, Castle-Rock, N.Kanara, Amboli.

3. Bolbitis Kanarensis Nair.

DISTRIBUTION : Castle-Rock, Godgewadi, Khandala.

4. Bolbitis virens Wall.

= Gymnopteris contaminans (Wall)Bedd.

DISTRIBUTION : Khandala, Amba Ghat, Amboli, Lonavala, N.Kanara, Savantwadi, Castle-Rock, Anmode, Vengurla, Aronda, Radhanagari.

37. EGENOLFIA Schott.

(= POLYBOTRYA h.b.k.)

(Deriv.Poly-many, botrys-bunch-in allusion to the fructification)

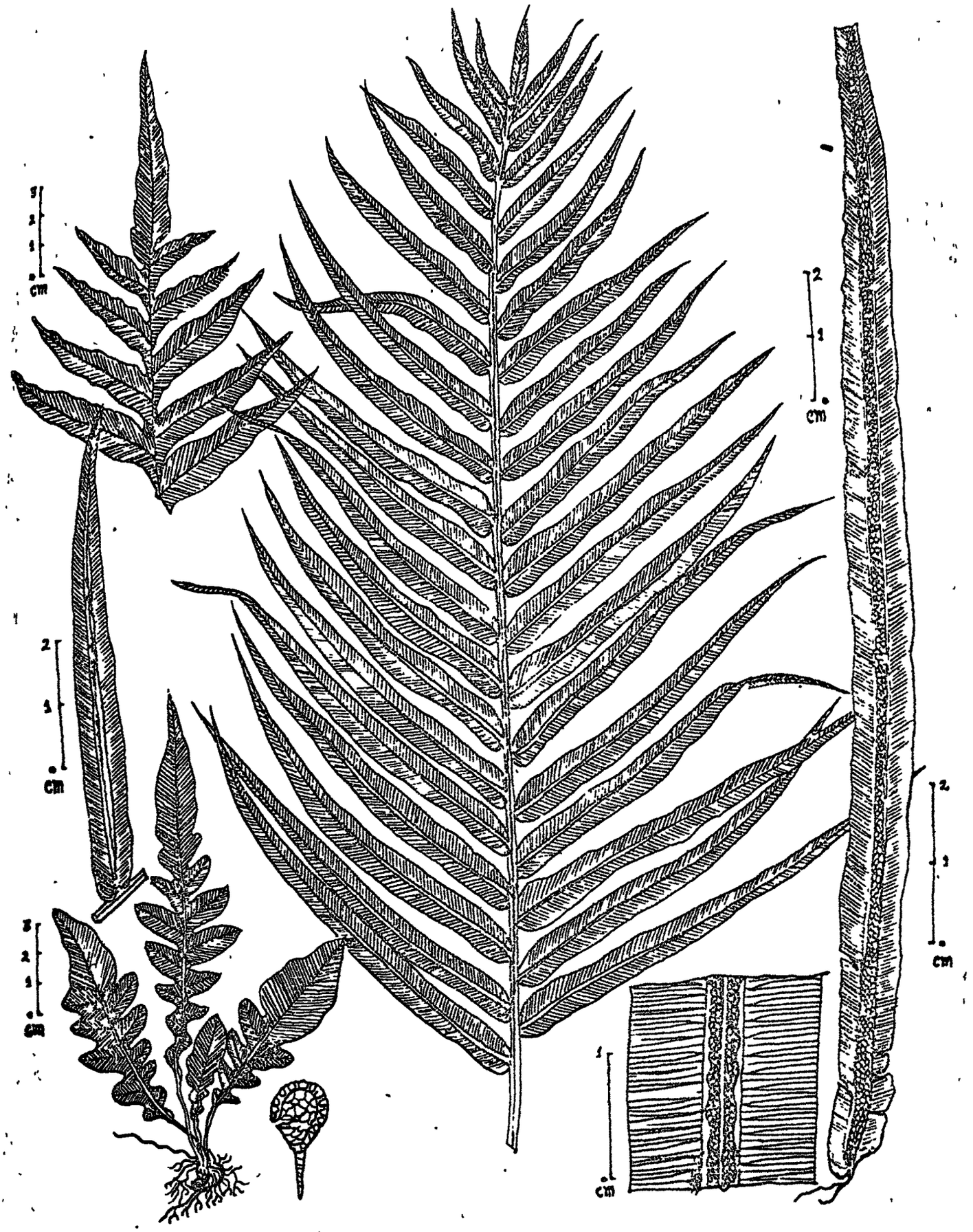
Fronds pinnate, bipinnatified or subbipinnate, the sterile not lomarioid in habit, generally viviparous, fertile much contracted, veins pinnate, all free, stipes adherent to the rhizome.

1. Egenolfia appendiculata Schott.

= Polybotrya appendiculata Willd.

DISTRIBUTION : Radhanagari, Savantwadi, Amboli, Mahabaleshwar, Castle-Rock, Anmode, N.Kanara.

PLATE NO.2. BLECHNUM ORIENTALE. LINN.



TEXT FIG. 42 BLECHNUM ORIENTALE. LINN.

KEY TO THE GENERA OF BLECHANACEAE :

1. Indusium present ... BLECHNUM

1. Indusium absent .... STENOCHLAENA

38. BLECHNUM. Linn.

(Deriv. one of the Greek names for fern).

Sori linear, continuous or nearly so, parallel with and usually continuous to the midrib, indusium membranous, distinct from the edge of the frond; fronds, uniform or only slightly dimorphous, generally pinnae or pinnatifid, veins free.

1. Blechnum orientale Linn. (Text Fig.No.42)

DISTRIBUTION : Goa, Savantwadi, Mangaon, Anmode, Castle-Rock, Amboli, Radhanagari, Ratnagiri, N.Kanara, Satara Mahabaleshwar, Vengurla.

USES : Used as poultice for boils in Malay peninsula, Rhizome used as an anthelmintic in China (Caius, 1935).

39. STENOCHLAENA J.Sm.

(Deriv.Gr.Stenos-narrow, Chalaena-cloak-in reference to the narrow involute margin)

Fronds of two forms, the fertile fronds contracted and very narrow, the barren fronds simply pinnate, the pinnae leathery in texture, veins simple or forked, fine and close, generally quite free to the margin, rarely anastomosing, stipes adherent to the rhizome, pinnae articulate with the rachis.

1. Stenochlaena scandens J.Sm.

= S.palustris Bedd.

DISTRIBUTION : Kesari-Savantwadi, Anmode, Castle-Rock, N.Kanara, Vishalgad, Goa.

2. Stenochlaena sorbifolia L.

DISTRIBUTION : Silent Valley (Kerala)

KEY TO THE GENERA OF FAMILY POLYPODIACEAE

1. Nest-leaves present, quite different in shape from fertile leaves. ....2.

   2. Fertile fronds repeatedly forked... PLATYCERIUM

   2. Fertile fronds pinnate ... DRYNARIA.

1. Nest-leaves not present ...3.

   3. Fronds simple .... 4.

      4. Fronds covered with stellate hairs when young, these usually persisting in part on old fronds ... PYRROSIA

      4. Fronds not bearing stellate hairs....5.

         5. Sori acrostichoid, fronds dimorphic... ...LEPTOCHILUS

         5. Sori round, fronds not dimorphic ...6.

            6. Sori in a single row on each side of the midrib, when young covered with umbrella shaped paraphysis... ... PLEOPELTIS.

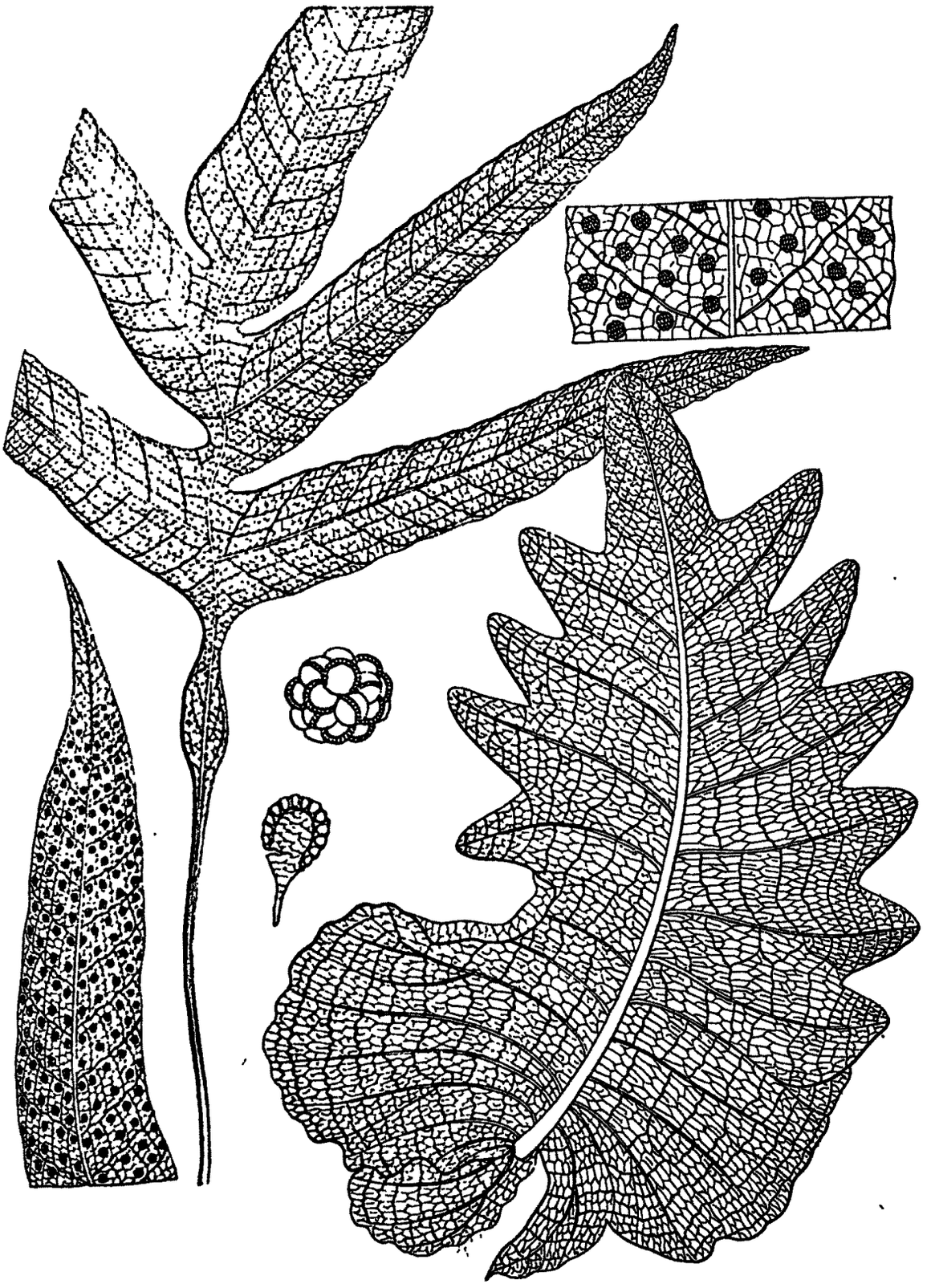
            6. Sori not restricted to one row on either sides of the midrib, if not so then not covered with umbrella-shaped paraphysis...7.

               7. Sori not sunk in the cavities in the fronds .... MICROSORIUM.

               7. Sori sunk in the cavities of the fronds .... PHYMATODES pp.

   3. Fronds pinnate or pinnately lobed .... PHYMATODES P.P.

PLATE NO. 3. DRYNARIA QUERCIFOLIA. SM.



TEXT FIG. 43 DRYNARIA QUERCIFOLIA. (L.) SM.

40. DRYNARIA Bory.

(Deriv.Dryd - the sterile fronds resembling oak-leaves, a tree sacred to the Dryads.)

Rhizome short, thick and Fleshy. Fronds rigid, the sterile when present like an oak-leaf; fertile frond pinnatifid or pinnate, rarely simple. Veins copiously anastomosing forming square or hexagonal areoles. Sori small, round or oval, numerous.

1. Drynaria quercifolia (Bory) J.Sm. (Text Fig.No.43).

DISTRIBUTION : Savantwadi, Vengurla, Mahabaleshwar, Goa, N.Kanara, Ajra, Chandgad.

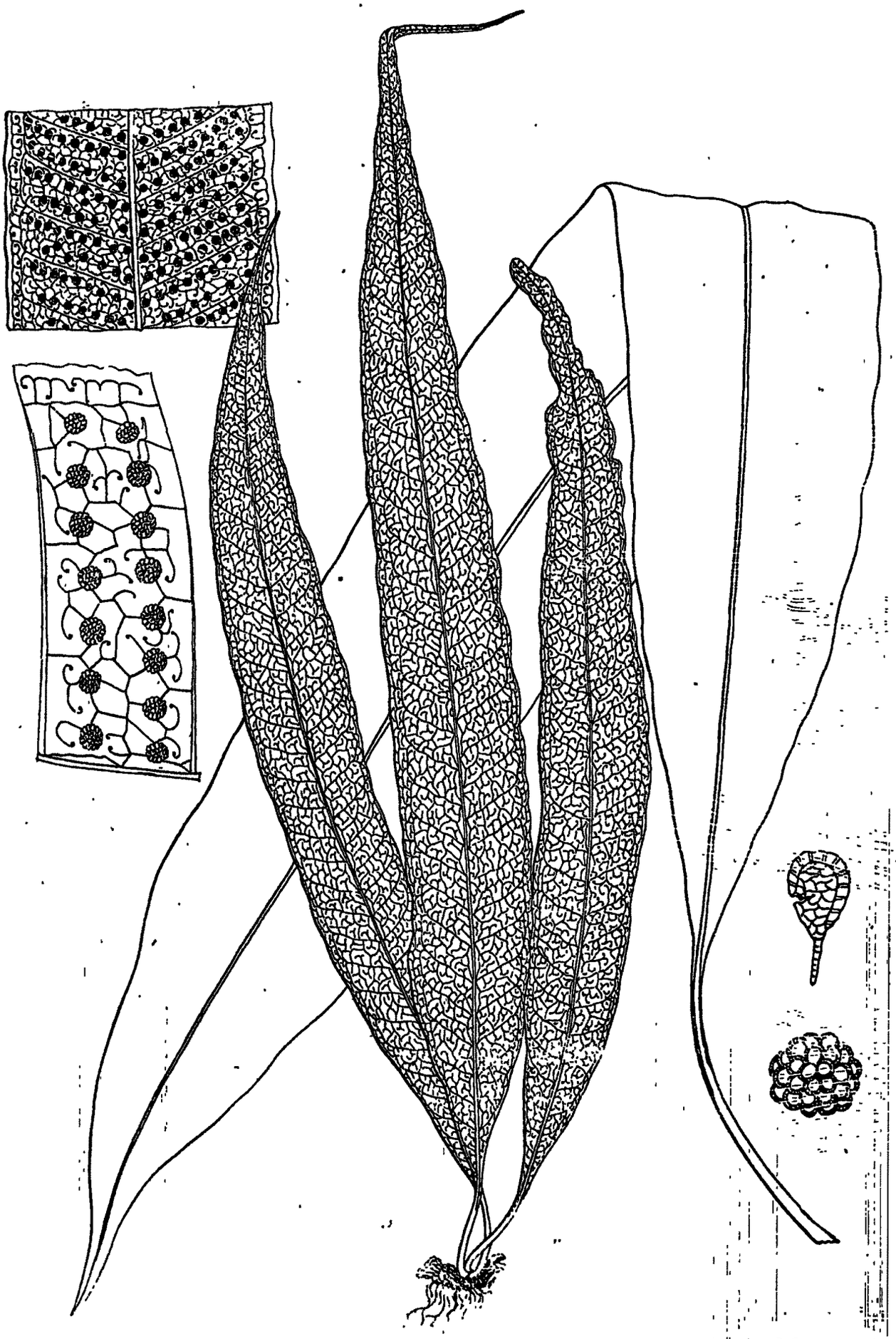
USES : Plants used in phthisis, hectic fevers, dyspesia and cough. Rhizomes used as bitter astringent. Fronds used in Malaya poulticing swellings (Chopra,1938). Aqueous extract of the plant possesses antibacterial properties (Burkill et al. 1951).

"The Ayurvedists describe the rhizome as a bitter tonic, astringent to the bowels and useful in the treatment of typhoid fever. The plant is commonly used in the treatment of phthisis hectic fever and cough".

41. LEPTOCHILUS : Kaulfuss.

KEY TO THE SPECIES

1. Main lateral veins indistinct... L.axillaris.
1. Main lateral veins distinct only upto the half the distance towards the margin....L.lanceolata.
1. Main lateral veins distinct from the midrib to the margins .... L.decurrens.



TEXT FIG. 44 MICROSORIUM MEMBRANACEUM. CHING.

1. L.decurrents Blume.

= Paraleptochilus decurrens ⊂ Cope.

= Gymnopteris variabilis Bedd.

DISTRIBUTION : N.Kanara, Amboli, S.India.

2. Leptochilus lanceolata fee.

= Gymnopteris variabilis var. lanceolata Bedd.

DISTRIBUTION : Rajapur Amboli, Mahabaleshwar, Radhanagari, Amba Ghat.

42. MICROSORIUM. Link.

(= PLEOPELTIS H and B.)

(Deriv.Pleo-full; peltis-sheild-the sori often furnished with round scales).

Fronds simple, pinnatifid or pinnate. Veins compisouly anastomosing with free included veinlets.

1. Microsorium punctata. Copel.

= Pleopeltis punctata Bedd.

DISTRIBUTION : N.Kanara, Bombay, Gardens, Poona-gardens, S.India, Kolhapur.

2. Microsorium membranaceum. Ching. (Text Fig.No.44)

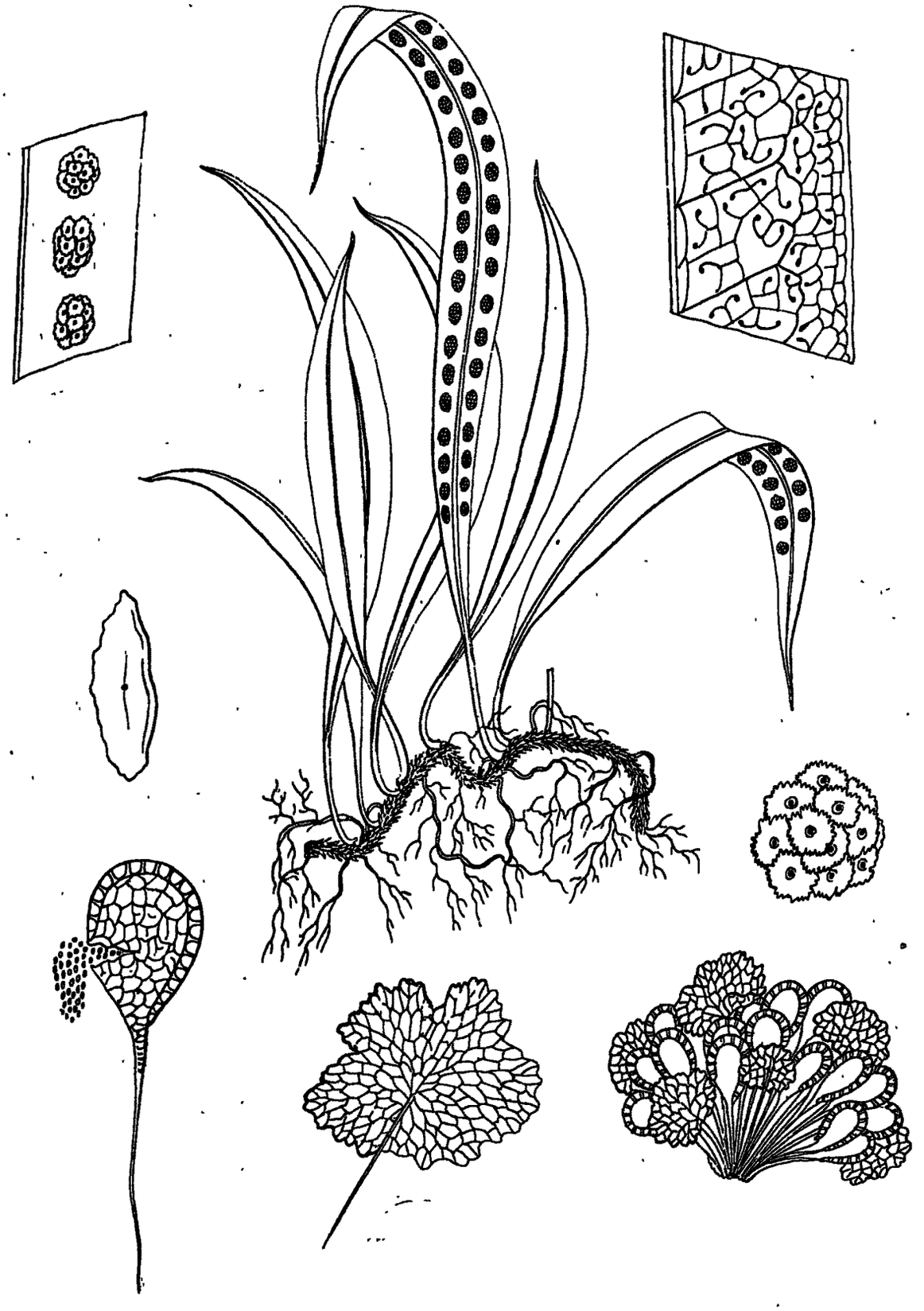
= Polypodium membranaceum. Dong.

= Pleopeltis membranaceum Bedd.

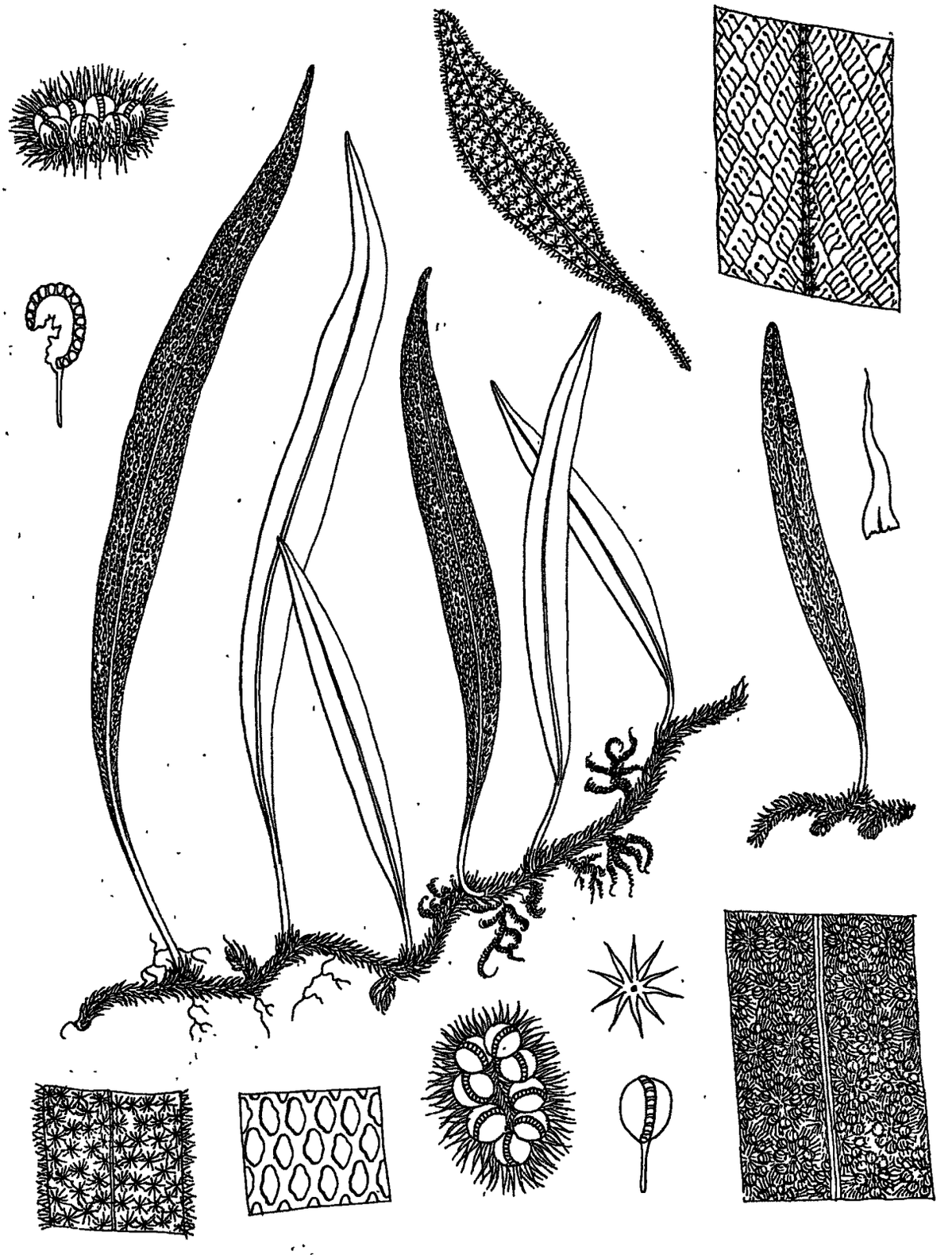
~~= Pleopeltis membranaceum~~

DISTRIBUTION : Panhala, Ajra, Chandgad, Radhanagari, Savantwadi, Ramling-Kolhapur, Amboli, Khandala, Poona, N.Kanara, Nasik, S.India, Goa.

PLATE NO. 4. PLEOPELTIS LINEARIS. MOORE.
AND DRYNARIA QUERCIFOLIA. SM



TEXT FIG. NO. 45. PLEOPELTIS WIGHTIANA. BEDD.
(P. LINEARIS. MOORE).



TEXT FIG NO. 46 PYRROSIA ADANASCENS CHING
(NIPHOBOLUS ADANASCENS KAULF)

3. Microsorium himaleyansis

DISTRIBUTION : Silent valley (Kerala).

43. PLEOPELTIS. Humboltd.

1. P.wightiana Bedd. (Text Fig.No.45)

= P.linearis Moore.

= Lepisorus linearis Ching

= L. nudus (Hook)Ching.

DISTRIBUTION : Savantwadi, Amboli, Khandala, Radhanagari, Castle-Rock, Ajra, Chandgad, Anmode, Phonda, Mahabaleshwar, Purandar.

2. Lepisorus amaurolepida Sledge.

DISTRIBUTION : Radhanagari, Phonda.

44. PYRROSIA Mirbel.

1. Pyrrosia adnascens. Ching. (Text Fig.No.46)

= Niphobolus adnascens Kaulf.

= Polypodium adnascens Forst.

= Pyrrosia lingua. Farewell.

Rhizome long, wiry, creeping elliptic, scaly, bearing fronds 1-4 cm apart, scales covering the rhizome completely, 2-5 mm long, oblong acuminate, hairy along the margins, pale yellow with brown tinge in the centre, stipes very short, upto 1-1.5 cm long, paleaceous at the base, clothed with stellate hairs with red-brown centre. Fronds simple, 2-8 cm long and ± 1 cm broad, oblong-lanceolate, acute at the apex, decurrent at the base, entire along the margins densely covered with

stellate hairs on the ventral surface scarsely stellately hairy on the ventral surface. Texture leathery and fleshy, veins not visible. Fertile fronds little bigger than the sterile ones only later half of the frond with fructifications. Sori circular exindusiate, embedded in thick mass of stellate hairs. It is epiphytic.

DISTRIBUTION : Savantwadi, Ajra, Chandgad, Khandala, Vengurla, Amboli, Ratnagiri, Radhanagari.

45. MARSILEA Linn.

Small herbs with a slender creeping rhizome terminating in a 3-sided apical cell giving rise to 2 dorsal rows of leaves and a ventral row of roots. Aquatic or sub-iquatic (marshy). Mature leaves cruciform, consisting of two contiguous pairs of opposite leaflets, sori numerous on a gelatinous receptacle attached to the wall of the bean-shaped, bilateral sporocarp by its ends, and extruded in the for of a ring. Mature sporocarps with very firm shell (45-layered) oblong or globose, wall coriaceous placed in the axils of leaves or on their petiole. Each sorus with few macrosporangia - containing normally one functional megaspore and many microsporangia containing numerous microspores.

KEY TO THE SPECIES OF MARSILEA

1. Sporocarps oval or bean-shaped, 2-3 or more at each node...2.

2. Sporocarps not ribbed, black at maturity ...3.

3. Plants slender and weak hairy .... M.gracilenta

3. Plants robust and glabrous .... M.minuta.

2. Sporocarps ribbed, brown at maturity .... M.poonensis.

1. Sporocarps rectangular or squarish one at each node ... M.aegyptiaca.

1. Marsilea minuta L.

DISTRIBUTION : Khandala, Savantwadi, Nipani, Radhanagari, Kolhapur, Goa, All over India.

2. Marsilea major Hanes.

DISTRIBUTION : Savantwadi, Vengurla, Nipani, Kolhapur, Radhanagari, Maharashtra.

46. AZOLLA Lamark.

1. Azolla filiculoides Lamk.

= A.pinnata R.Br.

= Salvinia imbricata Roxb.

A small pretty floating aquatic, usually reddish towards the end of the rainy season with very small imbricate rhomboid obtuse upper leaf-lobes (or float corposcies). Root-fibres fascled and conspicuously feathered. Sori paired. Massulae with glochidia macrospores with nine swimming bladders. Fruiting in November Sporocarps (borne on the submerged leaf lobe) containing mega-sporangia are ellipsoid and those with microsporangia are spherical (The repeated dichotomous branching with the stronger branches alternately to the right and left results in

a more or less deltoid form to the whole plant attaining about 1" - 1.5" diameter at the base). The upper leaf lobes are sometimes somewhat oblong (or broad ovate), obtuse papilose firm in texture, lower membranous, of but one layer of cells. The roots solitary and have a distinct membranous root cap.

DISTRIBUTION : Kolhapur, Savantwadi, Sindhudurg, Vengurla, Panhala, Khandala, Bombay gardens, Maharashtra.

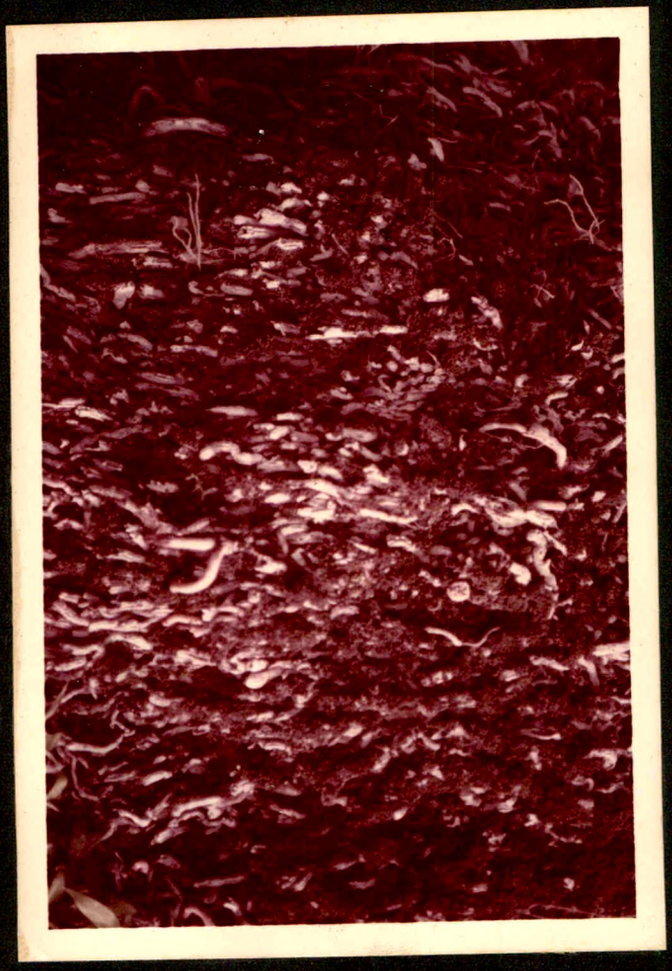
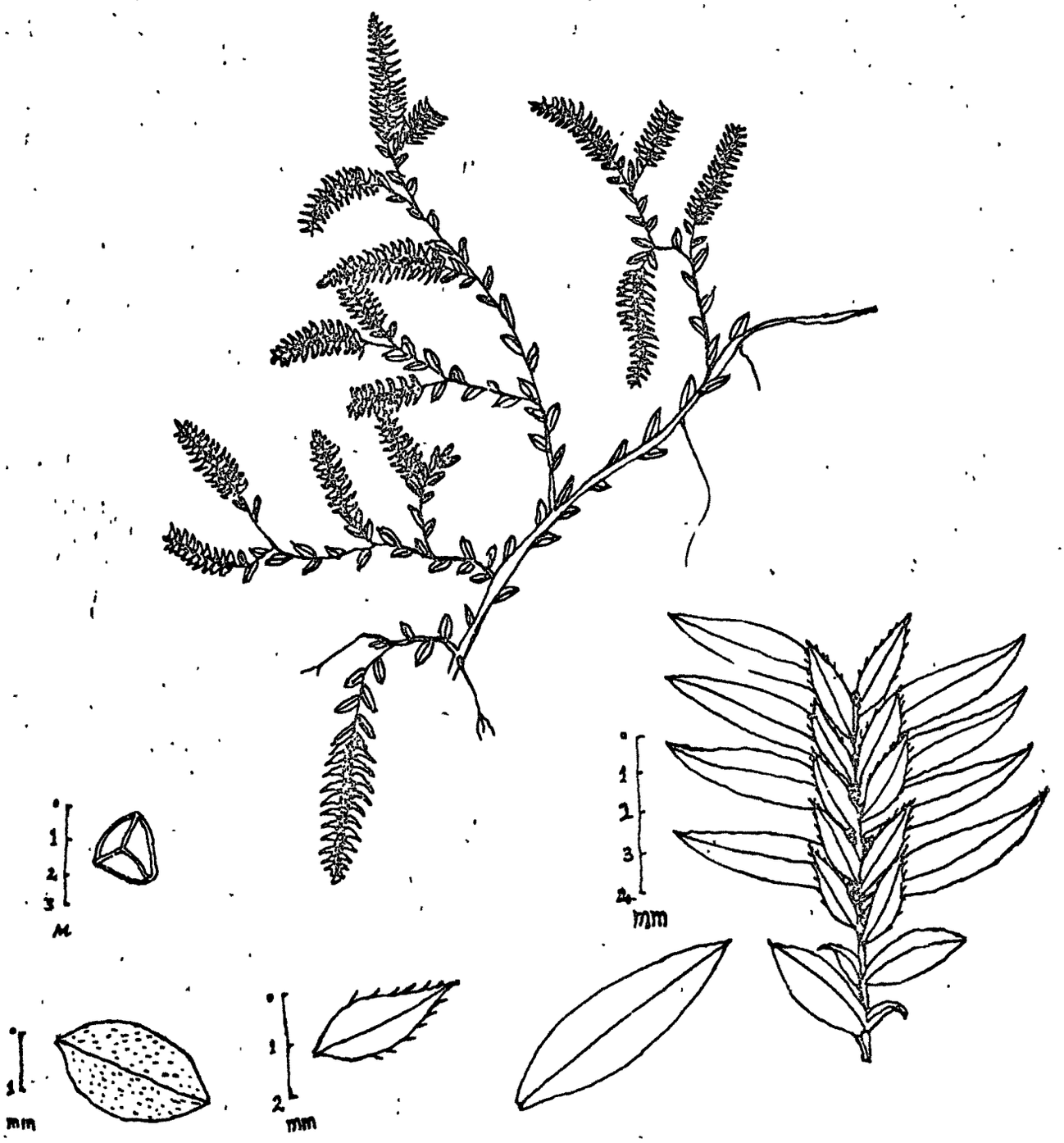


PLATE NO. 5. PSILOTUM TRIQUERTRUM. SW.



TEXT FIG. 6 SELAGINELLA BLATTERI. BOLE; M. ALMEIDA,

The genera Adiantum, Aspidium, Athyrium, Microscrium and Pteris seems to be common at most of the localities.

Along with these ferns 5 genera and 14 species belonging to 5 families of fern allies were also collected.

Family	Genus	Species
1) Psilotaceae	Psitotum Swartz	triquetrum. Sw.
2) Equisetaceae	Equisetum Linn.	debile Roxb
3) Lycopodiaceae	Lycopodium Linn.	Cernnum Linn.
		Phlegmaria L.
		hamiltonia Spring.
4) Selaginellaceae	Selaginella Palisot.	Ciliaris Spring
		delicatula. Alston
		blatteri Bole, Almeida
		miniatospora Baker
		reticulata Spring
		prolifera Baker
		S. uncinata Spring.
		S. willdenowii Baker
5) Isoetaceae	Isoetes Linn.,	coromandeliana L.

Among them Selaginella is one of the common constituent of pteridophyte flora of Western Ghats.

In the present study of fern flora of the Western Ghats, following are the ferns recorded for the first time :

Family	Genus	Species
Ophioglosaceae	Botrychium Sw.	Subcarnosum Wall.
Pteridaceae	Pteris Linn.	Setigera Hoff.
Aspleniaceae	Asplenium Linn.	Cheilosorus Kze.
Athyriaceae	Diplazium Sw.	Schkuhril Thwaites
		D. japonicum Bedd.
Aspidiaceae	Polystichnum. Roth	aculeatum Roth.
		acanthophyllum
Blechnaceae	Stenochlaena. JSm.	S. sorbifolia L.
Polypodiaceae	Microsorium. Link.	himaleyansis.

During the collection of ferns it was noted that Psilotum triquestum is found in abundance of Savantwadi, Talkat, Redi, Vengurla, Zolambe. It grows on roots of Palms, coconut and Arachea plants luxuriantly. The interesting feature is that it is never found in fertile condition. It may be due to direct exposure of the plants to dry conditions during winter season.

Acrostichum aureum - a brakish water fern shows phenomenon of secretion of salt, from the upper epidermis. It is observed that the fertile pinnae secrete more salt as compared to sterile pinnae.

Ophioglossum costatum var. bastaricum Balkrishnan et al. a species which include the plants large in size is not common as other species. It is recorded for the first time from Savantwadi, Gaganbawada in abundance. The plants found are larger in size, contain more number of sporangia than in previously recorded plants of O. costatum var. bustaricum. According to G. Panigrahi and Dixit (1969) it is a biotype and subjected to variation according to environmental conditions. It is intended to carry on further field and experimental work to settle the differing taxanomic views on the variability seen in the specimens of this species.

Among the different localities visited for fern collection, those where there is thick, more or less undisturbed forest as at Castle Rock, Anmode, Amboli, Karwar, Savantwadi, Gaganbawada etc., the ferns are growing luxuriantly forming locally abundant and conspicuous group of plants. Here they are rich in number and variety of the members, whereas at places like Mahabaleshwar, Matheran, Khandala, Lonavala etc. once there was thick forest but as these have turn now as some of the famous hill stations. The forests are very much disturbed. This has affected the fern vegetation there. The number of genera have very much reduced.

Thus pteridophytes which formed the dominant position in Carboniferous period, presently do not form dominant vegetation anywhere in the world. Flowering plants and conifers

presently form the major position of the world's vegetation. As ferns are inhabitants of warm-wet and humid tropical forests mainly, many regions like that of Silent Valley in Western Ghats are not thoroughly surveyed from floristic point of view. Such surveys will reveal more and more number of ferns and the present work has been started from this point of view. It is intended to visit more and more deeper regions of the forests in Western Ghats and study the ferns from the same.